First Language versus Foreign Language

Fluency, Errors and Revision Processes in Foreign Language Academic Writing

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1. Introduction

> The time to begin writing an article is when you have finished it to your satisfaction. By that time you begin to clearly and logically perceive what it is you really want to say.
> (Mark Twain [1902] 1935: 380)

Writing is a relatively new form of communication, and the written representation of language is not an ability that is naturally inherent in human beings; rather, writing is "the single most consequential technology ever invented" (Coulmas 2003: 1). Today, although still 775 million people worldwide are illiterate (UNESCO 2012), writing is hardly a secondary form of modern communication. Because of the internet, it may even be that more communication now takes place in written than in spoken form (Crystal 2006: 5). Additionally, although speech preceded writing for many centuries, many aspects of our knowledge about language are influenced by the analysis of its written form. For example, words, phrases or sentences are often not perceptible in the phonological realisation. Breath pauses do not always co-occur with word boundaries, and often there are not even pauses between sentences. The division of language into words and phrases is obvious to the literate person, however, because they can see the blank spaces that separate groups of letters, or the punctuation – be it in visible or in the mental representation (Harris 2000: 207, Olson 1994: 19 ff.).

That is, writing and speaking have a close and complex relationship, but writing is not exclusively the representation of sounds – either in logographic writing systems that use signs for words, for example Chinese or ancient Sumerian, or in alphabetic writing systems, such as the Cyrillic or Latin writing systems (Grabowski 1996: 74, Pike 1947: 57 ff., Rijlaarsdam *et al.* 2005: 129).

A key difference between writing and speaking is the fact that writing must be explicitly taught and consciously learned by the individual (Rijlaarsdam *et al.* 2012: 189). It involves different areas of the brain and more of them, and is a more demanding process cognitively than speaking (Sternberg 2009: 410 ff.). The written word itself is only the final product of a complex series of processes and operations: first, long-term memory provides ideas for the text and (re)organizes them if necessary, then conceptual processes and planning lead to a pre-verbal message, followed by the scheduling of action plans for composing. The translating process then transforms the pre-verbal into a verbal message, an operation in which the mental lexicon, the syntactic structures and the morphological structures are involved. In a next step, the message is transcribed in graphic symbols. Finally, in monitoring, the written text is compared to the intended message and, if necessary, revised (Galbraith and Torrance 1999: 2). All of these processes call for

extensive self-regulation and attentional control, which in turn make high demands on working memory. These memory resources are limited, however, and thus the executing activities must also be kept to a level that allows the writer to cope with the task (Galbraith *et al.* 2005: 119, Levelt 1989: 143, 1999: 114, Olive 2004: 33).

Furthermore, the process of learning to write is not complete at the stage where one is able to produce text in an orthographically correct way. Quite apart from spelling and punctuation, writers must learn how to formulate texts in a way that is appropriate to the task situation and to the social and cultural status they inherit (Barron and Schneider 2009: 430, Tardy 2009: 13). Writers must also have their audience in mind, and must work to ensure that their readers will be able to understand the text. Since these readers may be remote in space and time, this must be accomplished without any immediate feedback which could be used to enhance the text directly in order to ensure that the information being conveyed is understood in the intended way (Harris 2000: 236, Shanahan 2008: 174, Torrance 2007).

Despite these added challenges, writing offers a number of distinct advantages over speech (Breetvelt, van den Bergh and Rijlaarsdam 1994: 105, Grabowski 2007: 169–170). Writers can thoroughly analyse their target groups before writing their texts. They can decide which information is of greatest importance and can provide background knowledge for a more diverse reader-group – possibilities that do not generally exist in speech, since the attention span of listeners is shorter than that of readers, who, if the message being conveyed is not of interest to them at the moment, can simply move on to the next text passage. Writers can plan the 'what' and the 'how' of what they convey and can search for the most appropriate words and the optimal text structure; they can also visually underline items of importance in the text, and they are not interrupted in the development of their thoughts by interference from their audience (Galbraith and Torrance 1999: 2). When the text is finished and written down, it can last for a longer time than speech: it can be stored and duplicated, and thus can reach a larger audience than a spoken utterance (MacArthur, Graham, and Fitzgerald 2008: 1). Additionally, when writers perceive that their message has not been understood, they can revise their texts and publish new and enhanced versions. A text can also be adapted to specific audiences (Grabe and Kaplan 1996: 207). Companies can generate operating instructions in different styles and structures for customers all around the world, making sure that their products will be successful in different cultures (Brady and José 2009: 46), or online classes can be given in cross-cultural contexts (Mercado, Parboteeah, and Zhao 2004: 183/184).

Another important benefit of writing is that the text itself, as it develops under the writer's hands, offers a platform on which they can 'communicate' with their own thoughts, enabling them to generate new knowledge from the knowledge already written down (Galbraith 1999: 142/143, Menary 2007: 622). Writing can thus function as a form of thinking, enhancing writers' knowledge and mental structures (Galbraith 2009: 18). It can help writers to find their own position – their 'personal voice' (Elbow 2007) – through kind of a discussion they enter with their own texts.

In the academic community, writing enjoys pride of place as the most important of all forms of communication (Russell 2002: 4, Swales 2004: 2). The written exchange of information, the publication of the results of academic and scientific work, and the communication of ideas across cultures have always been fundamental to the generation and development of knowledge in science and academia. The internet, e-mail and other electronic channels, as well as better and cheaper travel opportunities, have simplified this cross-cultural communication and international cooperation. As a result, today we are experiencing an explosive growth in publishing opportunities in the form of printed and electronic journals and websites, as well as an increase in the number of academic communities – both virtual and 'real' (Rijlaarsdam *et al.* 2012: 191) – and the communicative platforms that serve them, such as conferences.

To include as many participants as possible in this communication process, it has always been vital to find a common language for the exchange of information. For many centuries this language was Latin, and then for a time it was German (Kretzenbacher: 447). Nowadays, English has assumed the role of the prospective *lingua franca* of academia (Swales 2004: 43). It is the language in which most academic communities communicate in their e-mail lists and forums. Most international conferences are held in English, even when they do not take place in an English-speaking country. The same is true of academic journals with international distribution – regardless of the fact that neither the writers nor the readers may have English as a first language (Jenkins 2011: 932, Yakhontova 2002: 216). *Ulrich's Periodicals Directory 2010*, for example, shows that 67% of academic periodicals are published wholly or partly in English (Lillis and Curry 2010: 19). It is also the case that many universities in non-English-speaking countries offer a significant number of classes in English (Genç and Bada 2010: 143). At universities in Germany, for instance, a high proportion of faculties of economics teach more or less exclusively in English.

Thus, to become a successful academic or scientist, it is no longer enough to master

one's chosen topic or field: nowadays, one must also be able to speak and write in English at a high level (Armstrong 2011: 153, Crystal 2003: 93).

On the one hand, the broad acceptance of English as the international language of academia means that global communication can take place more easily and more successfully than ever before. At conferences, people from different cultural backgrounds can talk to each other, develop new ideas and start international projects, and foster knowledge exchange. Journals that publish in English can be consumed by a larger audience than journals that are published exclusively in the languages of the countries that produce them. This international availability of information facilitates research, and the different members of the global academic community have a greater chance of learning from each other (Swales 1990: 21).

Since young people in almost every country – at least in the Western world – now have the opportunity to learn English at school, English as the *lingua franca* offers the highest convergence (Crystal 2003: 4). Additionally, because so much media content is provided in English – including but not limited to websites, television and film, and popular music – nearly everyone with a certain level of education is able to understand and to produce spoken and written English texts (Dewey and Jenkins 2010: 333).

On the other hand, the rise of English as the *lingua franca* has also brought with it disadvantages for the academic community. Belcher (2007: 2), Flowerdew (2002, 2008: 84), and Swales (1990: 97, 2004: 264) have shown that an author's geopolitical location has an impact on his or her status in the community: academic findings that are published in a language other than English are perceived as being 'only' locally as opposed to globally relevant. In turn, locally and globally relevant knowledge is valued differently, the former being perceived as less important than the latter. A paper published in an international journal is thus assumed – rightly or wrongly – to be of "high quality". As a consequence, doctoral dissertations are also being written in English more frequently than ever before, regardless of whether the target audience is English-speaking or international in background.

For writers whose first language (L1) is not English, and who do not have an aptitude for writing in a foreign language or are not willing to heed "the imperative to publish in English" (Curry and Lillis 2004: 663), this means that their work may not be valued or recognised by the academic community. Their opportunities for promotion or for receiving research grants may be reduced, and as a consequence their careers may not develop as robustly as do those of academics who publish internationally. Additionally,

findings that are exclusively published in local journals may not receive attention from the larger academic community, and their absence from the on-going discourse might impede the advancement of research. Apart from this, researchers who publish exclusively in their L1 may not receive credit for their findings, whereas other researchers who reach the same conclusions at a later point but publish them in English may be able to reap the benefits (Flowerdew 2000: 127/128, Yakhontova 1997: 104).

Although the editorial boards of most English-language journals insist that they are interested in including authors from a range of cultural backgrounds, the number of participants from non-English-speaking countries included in their publication lists is relatively low (Lillis and Curry 2006). Armstrong (2011) conducted a survey among Swiss academics whose L1 is German and found that many papers that were proposed for publication were rejected because they contained L1 genre features as well as grammatical problems (156/157). Since most academic journals are peer-reviewed, and since the 'peers' canvassed by English-language journals in most cases come from an L1 English context, the English language as well as the "textual ideologies" (Lillis and Curry 2010: 156) that attach to it become signifiers of the level of academic quality that can be expected (see Hyland 2004: 63).

Another important factor underlying the importance of English in academia is the L1 English community's powerful influence not only over how scholarly work is published, but also over what kind of work makes it into print (Lillis and Curry 2010). The evaluation system within the Anglophone academic communities is very strong, and it determines the direction of its members' work to an appreciable extent. Since these communities also have an impact on the evaluation of academic work outside the English-speaking context, their judgments in turn further influence the direction of research in a supranational context:

> The presumed status of English as the medium of academic/scientific communication; the criticism levelled at journals described as 'marginal' which do not fit into the kind of network knowledge system valued by ISI [Institute for Scientific Information]; the carving up of which kinds of knowledge might be best disseminated in 'vernacular' languages. While we are not suggesting a simple cause and effect relationship between the position of one, admittedly powerful, institution such as the ISI, and what is happening in academic text production globally, it is striking that some of the distinctions made by [ISI founder Eugene] Garfield and ISI about which kinds of knowledge should be circulated where – and in which medium – do indeed seem to be playing out. (Lillis and Curry 2010: 19)

At the same time, studies in EFL (English as a foreign language) contexts show that in the international community, FL English speakers have the advantage of being able to use the English language more flexibly and more freely than native speakers because they are "not

influenced by standardising forces to the same extent" (Hülmbauer 2007: 9). EFL writers and speakers are better able to understand the difficulties that an international audience might experience in reading a text or hearing an oral presentation, and they are better equipped to adjust their language to their audience. FL English speakers are free to switch to another language ("code-switch") when they need to, and since they are accustomed to doing this themselves, it is easier for them to understand colleagues who do the same, even when they do not share this other language (Hülmbauer 2009: 323, Phillipson 2003: ch. 5). Coleman (2009: 125) even suggests that "[t]here is some satisfaction in recognising that English native speakers, arrogantly occupying for so long a privileged position as their language went global…will be obliged to master international English too." Although the privileged position of English is still noticeable in publication attempts, the demand to achieve a "native-like" level in speaking and writing is steadily diminishing in academia, and the advantages of being conversant in more than one language and culture are being acknowledged more and more (Jenkins 2011: 931/932).

Still, the reception and production of language by FL speakers are distinct from the reception and production of language by L1 speakers (Boëchat Fernandes and Siebeneicher Brito 2008: 201). This difference increases in the written form. For example, students at universities in non-English-speaking countries who visit the writing centres at their institutions often complain that their native-English-speaking lecturers misunderstand their texts completely, and because of this give them bad marks. In many cases, a reviewer who shares these students' L1 will be able to make out their intentions without any particular problem; they may be able to see that the texts are not written in perfect English, but they will not share the lecturer's impression that certain text passages make no sense (Han 2008: 49, personal communication).

A related phenomenon can be observed at universities that offer classes on academic writing for foreign students. Here, many student participants, including those who are proficient in the language of instruction and make few errors when speaking, commit manifest errors in writing that make it difficult to comprehend the texts they produce (Simard and Fortier 2008: 160). This can result in a negative evaluation of these texts by their instructors or other L1 readers, which in turn can lead to a loss of motivation and an increase in frustration among both students and teachers (Roberts and Cimasko 2008: 128/129, Silva *et al.* 2003: 110). Although in writing pedagogy it is often argued that orthography should not have an influence on the evaluation of texts, the reality in universities is that many papers are rejected because of low linguistic and/or orthographic

standards. As Johnson and Brackle (2012: 35) note in their description of the 1995 movie *Dangerous Minds*, which is set in an American high school:

> [M]ore fascinating and more realistic is not the depiction of the main character [a highly motivated and enthusiastic teacher] but rather her more experienced and considerably more embittered writing teacher colleague. In a memorable scene, this character sits alone grading student essays. The camera focuses on him as he grades papers, and the audience sees his furrowed brow and listens as he mumbles his impressions of the student writers. "Idiot" and "stupid" are his adjectives of choice as he shakes his head and circles mistakes. Many writing teachers may identify with this character who is "irritated" by student writing errors. Raters of student writing react strongly to writing errors and those reactions range from irritation and exasperation to amusement and sympathy.

It is not only the language *per se* that is of importance with respect to the evaluation of FL academic texts, but also the knowledge and the mastery of the English academic genre. This knowledge contains "an individual's repertoire of situationally appropriate responses to recurrent situations" (Berkenkotter and Huckin 1995: ix). The academic genre is distinct from vernacular language for functional reasons that respond to the expectations of the academic community. It is used in order to increase "the reader's chances of interpreting the writer's purpose [by taking] the trouble to anticipate what the reader might be expecting based on previous texts he or she has read of the same kind" (Hyland 2004: 5). This means that writers need to know the language and also the appropriateness of applying a specific genre if they want to be successful in a specific communicational situation (McEnery and Kifle 2002: 183). For an FL writer, this means performing in a further specialised subcategory of the foreign language, an 'FL' within the FL, so to speak (Heine 2010: ch. 3.5).

The genres used in different disciplines and in different socio-cultural contexts show significant overlaps in some respects. Non-experts might not even perceive the differences in tone and realisation between research articles published in the humanities, in economics or in the natural sciences. These differences do exist, however, and on a multitude of different levels: in the lexico-grammatical structure, in the choice of rhetoric, in the way concepts or knowledge are expressed, in the way this knowledge is structured, in the research methods employed, etc. Some disciplines allow the expression of more explicitly personal views – signalled for example by the use of the personal pronoun "I" – while other disciplines insist on virtually 'excluding' the presence of the author from the reader's perception of the knowledge being conveyed. Similarly, in some fields it is not common for a writer to take a critical stance with regard to the work of other authors, while in other fields – for example in the 'soft' disciplines of English studies – the critical

evaluation of referenced work is one prominent way in which writers make their own standpoint clear to their readers (Bhatia 2002: 31 ff., Hyland 2002: ch. 2.4–2.5).

For academic writers-in-training – that is, for the students who are the main focus of the analysis to be presented in this study – acquiring this genre knowledge is no easy task (Norton-Meier *et al.* 2009: 169). In many countries, students are expected to absorb the subtleties of academic writing 'by osmosis' in the process of reading and studying (Bereiter and Scardamalia 1984: 163, Hüttner 2008: 150). In technical terms, this means that learners must develop a schema in which past knowledge is stored and from which they can retrieve the knowledge of conventions in order to cope with new tasks. Teachers generally assume that students are able to develop an adequate model of the academic genre through exposure to a broad range of texts from a variety of backgrounds and genres. Although reading is a common and often effective way of acquiring knowledge and skills in writing, when it comes to acquiring skill in the academic genre, this method is problematic, since the academic genre is "extremely slippery" (Swales 1990: 33). The conventions used in the texts that students read can vary widely as a result of the different cultures, historical periods or communicative settings in which they were produced. As a result, the linguistic features of academic texts cannot be summarised in a simple list of 'dos' and 'don'ts'. Ideally, novice writers should generate their genre knowledge from texts that are more prototypical with respect to genre features than others (Bardovi-Harlig 2008: 220, Hüttner 2008: 152). Since the borders between academic genres are fuzzy, they tend to be defined by 'family resemblance', and their texts can be ranged along a spectrum from the most prototypical to those that can still be seen to belong to the genre, but do not employ many typical features (Swales 1990: 49). Students therefore have to evaluate the prototypicality of the features they encounter in published texts, and have to realise when features, components or conventions differ from the prototype. Deviations may concern the structure of the paper as a whole, as well as lexico-grammatical features (Wang 2012: 637–639).

A consequence of the breadth of the range of elements that define genre is that genre analysis can operate at different levels. It can work at the micro level, for example with regard to grammatical features and their usage, or at the macro level with regard to the overall structures of the text; or it can go beyond the individual text entirely and turn to the discourse in which it is situated, analysing the interrelationships of text, genre, professional practice and professional culture, all of which condition each other (Bhatia 2004: 17, 2010, Schneider 2010: 4). The textual as well as the discursive aspects of genres

can also be analysed intertextually or interdiscursively, looking at the realisations of the different factors in different disciplines or in different socio-cultural settings.

An additional factor which students must understand is the context in which they are working. They must recognise what the communicative purposes of academic writing are in order to work towards the same goals as other members of the academic community. For FL students (as well as professional writers), this can be critical, since academic goals differ from one academic culture to another. In China, for example, it is considered improper to express criticism in a class setting or to oppose the instructor's views (Huang 2008: 3). In Western culture, in contrast, it is quite common for an academic text to call attention to the idea that knowledge is not static, but is dynamic and arguable (Ehlich 1993: 22, 1995: 326, Eysenck 2009: 130). This attitude toward scientific enquiry is also mirrored in the academic register, which often makes use of phraseologies that underline a community's subjectivity. The linguistic figures employed, such as 'assume', 'propose', 'can be seen as' etc., are themselves rooted in the everyday language of the writer's geo-culture. This use of general language knowledge represents another main barrier to the mastering of FL academic writing (Thielmann 2009: 21).

In the absence of guidance, students often fail in their evaluation of what constitutes prototypical features and what are deviations of the academic (L1 and FL) genre. Instead they tend to concentrate on surface-level features in their analysis, which can lead to inconsistent or downright erroneous genre pictures (Breuer 2011). As a consequence, many students – and FL students in particular – see academic writing style as a "starchy, uncomfortable uniform that they must don to write course papers" rather than "a vast wardrobe that allows the writer to make choices about content and audience" (Kennedy and Smith 2010: 19).

In other words, the challenges and cognitive demands facing academic writers-in-training, and in particular those who attempt to write in a foreign language, are extraordinarily high, and they must develop methods and strategies to deal with these challenges (Manchón and de Haan 2008: 3). Among the strategies available are using the L1 in FL writing to help ease the process of text production (Ortega 2009: 42/43, Ortega and Carson 2010: 55, Wang and Wen 2002: 226, Woodall 2002: 23/24) or transferring L1 rhetoric into FL writing (Hirose 2003: 204, Kim 1996: 115, Kubota 1998: 88). Additionally, writers can reorganise their writing processes in order to cope with the extra demands on their cognitive capacities: they can slow down these processes or they can relocate their focus at

different points in the process, etc. (Alamargot *et al*. 2007: 15, Just and Carpenter 1992: 136).

A positive aspect of the complexity and difficulty of FL academic writing is the window it can potentially open onto the underlying processes in FL writing generally. To date, however,

> the main body of research on second language writing…has tended to compartmentalize, and thus fragment, current knowledge through separate investigations of either writing processes, written texts, teaching, or of specific types of social contexts or learner groups, rather than considering how these are integrated and interdependent. (Cumming 2010: 39)

In the project presented here, an endeavour is made to combine different analytical methods and to determine how the various aspects of different FL phenomena are related to one another.

To this end, a case study was designed in which L1 and FL academic texts written by ten L1 German students of FL English were examined, together with the text production processes that lay behind them. The analysis had three main dimensions. The first was quantitative and looked at the level of productivity of the participants: how much text were they able to produce in each task in the allotted time, how much of this time did they spend on the various writing subprocesses, and how fluently did they execute the writing processes. The second was qualitative and focused on the errors made in the English-language texts, with a special emphasis on the influence of the L1 German on these errors. The third was also qualitative and looked at the text production processes with respect to the revisions made by the participants during this process; for example, it examined whether they focused on different aspects in when revising texts written in their L1 as opposed to the FL, and whether they concentrated more on revisions of lower order concern or higher order concern (Stevenson, Schoonen and de Glopper 2006: 201/202). The results of these three analytical dimensions were then brought together in order to generate a more distinct picture of the way in which the writing processes and the underlying linguistic structures are interrelated.

Before the outcomes of the analysis are presented in Chapters 5 to 7, the theoretical background for the study is established in Chapters 2 and 3. In order to evaluate the errors and the revisions that the participants made in their L1 and FL writing, a bilingual language model was developed which is able to represent the processes that are (presumed to) take place in FL writing. Based on the *wholistic view*, which is applied in this study, the model had to depict the bilingual individual as a "fully competent speaker-hearer" (Grosjean 2008: 14). The bilingual speaker/writer is influenced by various processes that

are of microsociological nature (e.g. situational context) or of macrosociological nature (e.g. language contact; see Gardner, Tremblay and Masgoret 1997: 346). The model had to give room to the "psychological reality" (Hakuta 1986: 192) of the bilingual concepts. It needed to be able to explain how two and more languages can be used separately or together (depending on the context); to illuminate how cross-linguistic influences take place; and to reveal why the knowledge of multiple languages[1] does not significantly decelerate the production system for producing text (Costa, Alarion, and Sebastián-Gallés 2007: 531/532). Additionally, it had to be open to a potentially unlimited number of languages at different proficiency levels. These languages can grow and change, and they can interact (de Bot 1992: 1/2, de Bot, Lowie and Verspoor 2005: 14–25, Briggs and Peat 1989: 147–148, Cook 2008: 19/20, Cook *et al.* 2006: 140, van Geert 1994: 50).

The bilingual language model that was developed for coping with these demands is based on Jackendoff's monolingual *Parallel* or *Tripartite Architecture* (2002: ch. 5). This model consists of the phonological structure, the syntactic structure and the semantic/conceptual structure (Chapter 2.1). These structures are interconnected via interfaces that transport the results of the processes in one structure to the other structures. The core elements of these structures are rules which speakers use to produce messages that are context-appropriate, and that hearers use to decipher messages that they are confronted with. The language faculty has interfaces to extra-linguistic structures, for example to the audio or visual systems in hearing or reading, in order to enable individuals to communicate with the outside world.

This monolingual *Tripartite Architecture* was taken up and expanded into a *bilingual model* for this study (Chapter 2.2). In this model, it is proposed that an individual learns a foreign language by first using their L1 structures, and by adding acquired knowledge of FL elements into these structures (Krashen 1981: ch. 5, 1982: ch. II. A. 5). Once a learner has gained a certain level of FL knowledge, they are able to generate separate FL phonological and syntactic structures. The L1 and FL structures are interrelated via interfaces in the same way as are the phonological, syntactic and semantic structures in the monolingual model. That is, when the semantic structure generates a meaning to be conveyed, the L1 as well as the FL structures are activated – regardless of which language the speaker or writer intends to formulate the message in (Green 1998: 71/72, Sharwood Smith 2007: 10). The bi- and multilingual language system therefore consists of a dense

[1] The term 'language' includes linguistically distinct languages, but also dialects or other language varieties.

network of linguistic structures in which the speaker/writer's internal monitor is responsible for making sure that only the intended linguistic phonological and syntactic structures activate the vocal or manual systems for speaking and writing.

FL writers not only have to deal with the additional phonological and syntactic structures of the other language, but also with its *orthography* and punctuation systems, which interact with the phonological structures, the syntactic structures and the conceptual structure (Chapter 2.3). In many cases, orthographic and punctuation rules differ distinctly between the L1 and the FL (Coulmas 2003: 35); this is true for English and German. Whereas in German, spelling generally corresponds closely to modern (high standard) pronunciation, in English, spelling has stayed relatively stable over the last several centuries, even as pronunciation has changed significantly. For this reason, orthographic structures can add further to the cognitive challenges facing writers, especially FL writers.

The addition to this of the *academic genre* also has the effect of increasing the cognitive demands made on the writer, and again, these demands are higher for FL than for L1 writers because of the different realisations of the genre structures in different cultures (Chapter 2.4). Genre imposes further constraints on the writing processes and their monitoring.

The parallel activation of L1 and FL structures may, in turn, lead to errors that are the result of "opportunistic" processing, which go unnoticed because of the high cognitive demands. As different studies have shown (e.g. Figueredo 2006: 875 ff., Luelsdorff 1991: 203, Titone *et al.* 2011: 1422 ff.), errors in writing can often be explained by the influence of the L1 on FL processing. In this study, it is posited that these errors occur because the parallel processing in the L1 and FL linguistic structures leads to competition between the structures for execution; in some cases, the L1 structure 'wins' and its product is executed. These errors may involve complete code-switches, but they can also be only partial switches (for example *childheit* – a combination of the English word *childhood* with the German word *Kindheit*) in which the speaker switches languages in the process of word generation. These errors will be called *node-switches* (Chapter 2.5) and will form the basis for the error analysis in Chapter 6 and the revision analysis in Chapter 7.

Since writing makes more complex demands than speaking, it is suggested that in FL academic writing, the influence of the L1 on the FL is even stronger, but that the underlying writing processes also vary between the languages. Chapter 3 gives a short description of the state of the art in *writing research*. Different models have been developed in recent decades. They are understood as working hypotheses that continue to

be tested and elaborated in empirical research (Boëchat Fernandes and Siebeneicher Brito 2008: 200). Although no "sufficient level of formalisation" (Alamargot and Chanquoy 2001: 3) has yet been reached, the models successfully form a "groundwork for a more detailed study of thinking processes in writing" (Flower and Hayes 1981: 366; Hayes 2012: 370, Torrance and Jeffrey 1999: 1).

All writing models (e.g. Bereiter and Scardamalia 1987: ch. 1, van den Bergh and Rijlaarsdam 1999, Chenoweth and Hayes 2001, Flower and Hayes, 1984, Hayes 1996, Hayes and Flower 1980, Kellogg 1996) share in common the idea that writing consists of different processes: *generating ideas, planning, translation/formulation, programming the fingers/executing,* and *revising*; they also agree that these processes are controlled by the writer's internal monitor. In Chapter 3.1, the individual processes are described in more detail. The execution of the processes depends on the individual writer, but also on *language-external factors* (Pittard 1999: 171), which will be outlined in Chapter 3.2. Working memory, for example, is one of the crucial factors for a successful writing process, in that its capacity determines the writer's ability to handle the cognitive demands of the writing processes (Olive 2004: 33).

Consequently, working memory capacities have an impact on *parallel processing* in writing (Chapter 3.3). Writing processes do not unfold chronologically, but rather interact and influence one another. They become even more demanding in *FL writing*, because here further structures are added (Chapter 3.4). It is not only the FL linguistic structures that increase the level of demand, but also factors such as the purpose of the writing task, the need to choose topics that are appropriate to the task, awareness of the audience, and the different knowledge and cultural backgrounds of writers and readers (Graff 2008: 718/719, Leki and Carson 1997: 57/58). How well a writer is able to cope with these factors depends on their FL language proficiency as well as on their social context knowledge, their content knowledge, their genre knowledge, etc.

Since these factors are individually very different, writers develop *individual strategies* for coping with the demands (Norton-Meier *et al.* 2009: 184, Ortega 2009: 145, van Wijk and Sanders 1999: 59; Chapter 3.5). The use of the L1 may be one such strategy (e.g. Poulisee and Bongaerts 1994, Wolfersberger 2003: 1), but so too is the slowing down or disruption of the production process. Different studies (e.g. van Weijen 2008: ch. 3) have shown that writing processes are slower in the FL than in the L1 – just as they are in FL and L1 speaking – and that the processing also differs. In their L1, writers are better able to produce longer stretches or "bursts" of writing without interruptions in order to

pause or revise. In FL writing, writers usually pause more often and for longer periods of time because less parallel processing can take place. These elements are of importance because they can be an indicator of the quality that can be expected of the paper as a whole, and it is proposed that the longer the bursts, the better the writers are able to use writing as a form of thinking (Galbraith 2009: 16).

In order to analyse the productivity and the fluency of the writing processes as well as the L1 linguistic influence and the revising processes that were conducted during text production, ten L1 German students of English philology were each asked to write one simple and four academic essays (Chapter 4.1). The simple essay (SE) was to be written in the foreign language English, while two of the academic essays were to be written in the participants' L1 German and the other two in English. For the academic essays, two planning conditions were established: one of the L1 and one of the FL essays were to be written after a phase of planning by taking notes (L1N and FLN), while the other L1 and FL essays were to be written after planning by freewriting (L1F and FLF). The essays themselves were subject to no particular conditions – aside from a 45-minute time limit – and the participants were free to choose how they wanted to write them. The different planning strategies were chosen in order to test whether the different ways in which the linguistic faculty was activated by the planning process had an impact on the subsequent writing processes, as well as on the linguistic quality of the texts produced (Shin 2008: 106–109). The essays were written on a computer and the writing processes were logged with the help of a keylogging programme (*Translog*) that recorded in real time all of the actions executed by the participants using the keyboard or the mouse. The logs were used to analyse productivity and fluency (Chapter 4.2), but also to examine the revision processes.

Error categories were defined to assess the errors made in the FL essays (Chapter 4.3). These categories are based on the bilingual Tripartite Architecture and include different types of node-switches as well as typing mistakes and other, non-L1-induced errors. From a first analysis of the errors in the different categories, it became obvious that there were certain types of errors which occurred more frequently than others. For example, it became obvious that there was a tendency to misuse the definite and indefinite articles in the FL: the student writers used articles where they were inappropriate in English but would have been obligatory in German or vice-versa, or else they applied the indefinite article when the definite article should have been used. If there was an accumulation of errors of a certain type, these errors were further divided into

subcategories. The generated error categories form the basis for the analysis of the errors in the final texts and for the analysis of the revisions.

The outcomes of the analyses with respect to fluency and productivity are presented in Chapter 5. It was presumed that productivity would differ between the languages and between the texts that were produced after note-taking and after freewriting. The writers' productivity was evaluated in terms of the lengths of the final texts (number of words and characters), and in terms of the numbers of words/characters that were produced in total, including those eventually deleted (Chapter 5.1). The distinction between words and characters was necessary because the German language in general, and German academic language in particular, makes extensive use of compounding and nominalisations which result in orthographically and semantically complex words (Halliday 1994: 320, 1998: 201, Hyland 2004: 32). The results show that with respect to character production, the participants were far more productive in their L1, while in word production they were more productive in the FL. In both languages, the participants' writing productivity in the essay itself was enhanced by planning by freewriting. This effect was stronger in the L1 than in the FL.

Another aspect closely related to productivity is the fluency of the text production process. Its analysis casts light on the processes that underlie writing in general, and on those that underlie FL academic writing in particular. It gives an impression of how the various writing processes interact and of how different kinds of tasks make different demands on the writer's attention and cognitive resources (Berman 1994: 40, Chenoweth and Hayes 2001: 85, Schilperoord and Sanders 1999: 26). Analysing fluency also exposes the effect of the different planning strategies on the writing processes and reveals variations between L1 and FL writing. Because of this explanatory potential, the fluency of the participants was analysed in different respects, including the amount of time the participants needed to produce the texts (Chapter 5.3), and how long the stretches of sustained writing or "bursts" were during and after the two planning conditions and in the two languages (Chapter 5.4). Again it was proposed that there would be differences between L1 and FL writing, and that fluency would be enhanced by planning by freewriting because of the activating effect of 'uncontrolled' formulation. The results confirm these expectations: fluency does differ between L1 and FL writing, and freewriting indeed activates the linguistic structures differently in L1 and in FL.

The ways in which the writing bursts ended were also examined, i.e. whether sustained stretches of writing were interrupted by pauses or by the making of revisions

(Chapter 5.4). This analysis reveals information about the way the writers produced their texts and about the focus of their cognitive resources. As in the analysis of fluency and productivity, it was found that freewriting activated the participants' writing processes and made parallel processing easier in both languages.

The degree of success achieved by the writers in terms of the correctness of their final texts in terms of language and genre appropriateness is described in Chapter 6, where the error analysis is conducted. The errors were categorised with the help of the typology developed in Chapter 4. An assessment was made as to whether these errors were likely the result of a transfer of the structures of one language onto the other, in the sense that the monitoring process was not successful in subduing the L1 in FL writing and the FL in L1 writing. Since the focus of this study is the influence of the L1 on the FL, only a short overview of the errors in the L1 texts is presented (Chapter 6.1); the main part of the analysis concentrates on the analysis of the FL texts. Chapter 6.2 provides an overview of the numbers of errors, and Chapter 6.3 presents the numbers of errors per participant.

Of special interest here is the distribution of errors among the error subcategories in the plans and in the academic essays after planning by note-taking and planning by freewriting (Chapter 6.4). This is because they seem to give support to the model's underlying thesis that it is not words and sentence structures stored in the language faculties that are central to the language production process, but rather rules and their application, and that a significant proportion of word and structure generation is executed 'online' (Jackendoff 2006: ch. 6, 2009: 108, Pinker 1998: 221, Pinker and Jackendoff 2005: 215). The distribution of the types and subtypes of node-switches differed between the plans and the essays and after the different planning methods, which in turn indicates that the rules in the linguistic structures are activated differently by note-taking and freewriting. The lower number of node-switches in the SE additionally shows that because of the higher demand on cognitive resources made by academic writing, the participants were less successful in managing the suppression of their L1. The only successful management in terms of node-switching in the essays took place with regard to phonological node-switches (part L1/part FL word). That is, the monitor was most successful in detecting and/or suppressing the interventions of the phonological faculty.

Chapter 7 examines whether an awareness of these L1 influences was perceptible in the revision processes. In Chapter 7.1, the number of revisions in the different texts is presented, while Chapter 7.2 presents the types of revisions. The error typology of Chapter 6 was applied; here, however, it was necessary to make further differentiations, since in the

revision processes, none of the writers made a significant effort to correct node-switches, concentrating instead on content revisions and the correction of typing mistakes. It became clear that the participants acted differently in the L1 and the FL, as well as during and after note-taking and freewriting in the different processes. These differences are less significant at the error category level, but are more distinct at the level of the error/revision subcategories. An assessment was also made of which types of revisions required more than one attempt to correct (Chapter 7.3). The typology of revisions was conducted for all of the writing processes – that is, planning, essay writing, and final revision (Chapters 7.4–7.6). The writers' attention focused on different areas in these different writing processes. However, although in the act of freewriting, a slightly higher awareness of node-switching was detectable, during the writing processes there does not generally seem to have been an awareness of the influences of the L1 on the FL.

Another area of examination is the impact of revisions on the fluency of the writing process (Chapter 7.7). An analysis was done of the kinds of revision that demanded more cognitive capacity than others in terms of detecting elements that needed to be changed (immediately or after conscious consideration) and in terms of getting back into the writing process after making these changes. Generally, one can see that the revising processes did not inhibit the writing process as a whole, but that revision was cognitively more demanding in the FL than in the L1.

The findings of Chapters 5 to 7 are summarised in Chapter 8, where the weaknesses of the study are presented and suggestions for areas of further study are given. Overall, the study shows that FL writing proceeds differently from L1 writing, and that this difference is a function of the complexity of the task. In FL academic writing, the L1 has a better chance of 'winning' – perhaps not the entire 'language war', but at least several of its battles.

2. A bilingual version of Jackendoff's Parallel Architecture and its implications for 'node-switching'

> The reason there are no humanlike robots is not that the very idea of a mechanical mind is misguided. It is that the engineering problems that we humans solve as we see and walk and plan and make it through the day are far more challenging than landing on the moon or sequencing the human genome. Nature, once again, has found ingenious solutions that human engineers cannot yet duplicate. (Pinker 1997:4)

As Pinker noted, the cognitive processes humans execute are very complex. In order to analyse language production as one of those processes, research depends on the development of simplifying language models. Those models must represent the processes in language production – from generation of the content to be conveyed to phonological realisation of the generated message (Bock 2001, Jackendoff 2006: 2).

In the following, Jackendoff's *Tripartite* or *Parallel Architecture* (2002: ch. 5) will be presented and then extended to a bilingual model. Orthography and genre will also be presented in relation to this model.

2.1 Jackendoff's Tripartite Architecture

Jackendoff's (2002: 125) tripartite model of language is intended to break down the borders that exist between the different schools of linguistics, and between linguistic, cognitive and psychological research. In this sense, Jackendoff's work has become a "unifying starting point" (Ritter 2005: 121), taking the findings of the different academic fields and using them for an "interdisciplinary cross-fertilization" (Poeppel and Embick 2005: 103). The Parallel Architecture assumes a monolingual view of language, but it can be usefully extended to bi- and multi-lingual architectures, as did Francis with his tripartite architecture (2004) or Sharwood Smith (2007) and Sharwood Smith and Truscott (2006, 2008) with MOGUL.

Jackendoff turns away from the syntacto-centric view of mainstream generative grammar (e.g. Chomsky 1957, 1965, 1981) and combines its findings and those of empirical studies with the findings of Cognitive Linguistics (e.g. Fauconnier and Turner 2006, Geeraerts 2006, Lakoff 1993, Langacker 1987) or neurolinguistics (e.g. Cabeza and Nyberg 1997, Cappa and Parami 2006, Cheney and Seyfarth 2005, Dronkers 2001, Dronkers *et al.* 2004). The outcome is the *Parallel Architecture* or the *Tripartite Language Model*, which posits neither syntax nor semantics as *the* dominant structures of language, but rather takes a position "between these two extremes" (Jackendoff 2010: 4). Additionally, the model takes up the findings of phonological research of the 1970s that underline that the phonological structures cannot be derived from syntax (e.g. papers in

Bell and Hooper 1978, Ingram 1974: 50 ff., Shattuck-Hufnagel 1979: 338). As a consequence, semantics, syntax and phonology are seen as independent generative components in language. Fig 2.1 visualises the model.

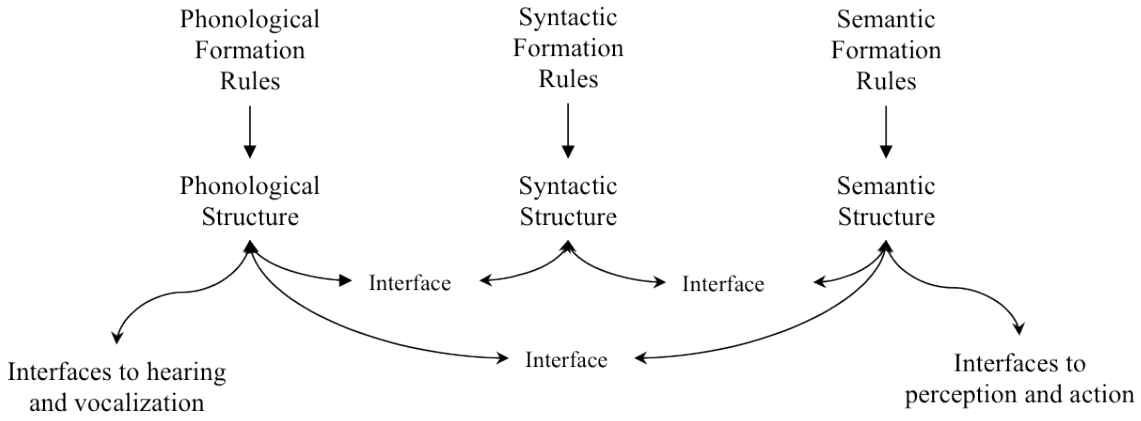

Fig. 2.1 The Parallel Architecture; after Jackendoff (2002/2010: 125/3)

In this model, the ***phonological structure*** is responsible for speech sounds and has four subcomponents: the *segmental structure*, which describes the string of phonemes; the *syllabic structure*; the *prosodic structure*, which deals with intonational phrases and the stress pattern; and the *morphophonological structure*, which groups the speech into words. The ***syntactic structure*** processes the sentence in phrases, which are made up of word forms (e.g. N, A, P) and syntactic features (e.g. 3rd person singular). The ***conceptual structure*** (or semantic structure) encodes meaning mentally (Moss, Tyler and Taylor 2007: 219); it is "the form (or one of the forms) in which human thought is couched" (Jackendoff 2010: 7). The *conceptual structure* is understood to be language-independent. It functions as an area which interrelates language with long-term memory, reception, etc.

In contrast to the syntacto-centric approach (e.g. Chomsky 1957, 1965), the Parallel Architecture does not propose that one of the structures dominates the processes of the others. Rather, each structure works on the same level: each consists of its own primitives, its own set of formation rules, its own internal hierarchies and its own rules of combination (Jackendoff 2002: 149, 2006: 5, Pinker and Jackendoff 2005: 204). All of the structures are interrelated via *interfaces*. These interfaces are always two-way: the interface between phonology and syntax sends information from the phonological to the syntactic structure and vice versa. When doing this, the interfaces transfer only that information which is relevant for the structure to be addressed. For example, in terms of syntax, it is irrelevant whether a statement such as "He is a clever man" is meant to be ironic or not, since this does not influence the syntax of the sentence. The semantic structure conveys the intended

notion of irony directly to the phonological structure, which must apply the formation rules for ironic prosody and thus realises the intended message. In reception, this process works the other way round. The phonological structure analyses whether the sentence has ironic prosody and gives this information directly to the semantic structure, enabling it to understand the expression correctly (Levelt 1989: 105). All of these processes work in parallel. When an utterance is heard, the hearer starts to analyse the expression with the first sound heard, trying to make out the intended meaning as soon as possible. This may be mirrored in the utterance itself: people often start to speak before they have finished planning the complete sentence or even the whole phrase (Brown and Craik 2000: 100, Marantz 2005, Myachykov, Tomlin and Posner 2005: 357).

In addition to language-internal interfaces, there are interfaces to non-language faculties (Ferreira 2005: 366, Jackendoff 2002: 130, 2007: 87). Phonological structure is related to hearing for the reception of phonological information, and to vocalization for the realisation of phonological concepts. Conceptual structure is related to perception and action, enabling us to speak and think about what we see and to perform actions that are appropriate to the utterance, e.g. shaking hands when greeting each other, or waving when saying good-bye, etc. Additionally, it has access to knowledge which is stored in the long-term memory, as well as to background information and rules regarding the appropriateness of the registers with which words are labelled. In the academic context, for example, the conceptual structure would be able to determine that the usage of a term such as *stuff* for "objects" or "items" would be inappropriate (Jackendoff 2002: 418, Levelt 1999: 92, Schneider 2010: 21).

2.1.1 The role of the lexicon in the Parallel Architecture

One of the crucial interfaces between phonological, syntactic, and conceptual structures is the *lexicon*, where each entry is a "small-scale interface rule" (Jackendoff 2010: 15):

> A word is thought of not as a passive unit to be pushed around in a derivation, but as a part of the interface components. It is a long-term memory linkage of a piece of phonology, a piece of syntax, and a piece of semantics, stipulating that these three pieces can be correlated as part of a well-formed sentence. (17)

The lexicon contains "feature values of functional categories, in addition to more prototypical lexical items" (Sharwood Smith and Truscott 2006: 209). That is, it does not only store words, but also morphemes, exceptional and idiosyncratic parts of the language, clichés and fixed expressions. *Meaningful constructions* such as sound+motion VPs (e.g. *The girl sang around the corner*) are part of the lexicon as well (Jackendoff 2002: 392,

2007: 69). Just like the language as a whole, each lexical item has a tripartite architecture. The sound+motion VP *sing*, for example, would be presented as follows (see also Jackendoff 2010: 18):

> Phonology: s ɪ ŋ
> Syntax: [$_{VP}$ V_1]
> Semantics: [GO ([$_{Thing}$ *x*], [$_{Path}$ *y*]$_2$); WHILE *[PRODUCE-SOUND*$_1$ *([Thing x])]*]

With this structure, the lexicon architecture can explain many lexical phenomena; regular VPs have the same structure as idiomatic VPs and sound+motion VPs: [$_{VP}$ V (NP) (PP)], and so this VP structure can be seen as a lexical item consisting of syntactic variables. Peter Culicover's *syntactic nuts* (1999: 45 ff., 2009: 31 ff.) can also be formalized as lexical entries:

- The more you drink, the worse you sing.
- How about a piece of pizza.
- One more whiskey and I'm dancing.
- hour after hour

When building words, the speaker makes use of *productive* and *semiproductive* rules. Productive rules are applied in the case of completely regular word building, e.g. the generation of the adverb form of an adjective by adding *-ly* to the word root. In cases where no regular word building is allowed, the productive rules are blocked, and the irregular forms are supplanted (e.g. good -> [goodly=blocked] ->well). Jackendoff (2002: 155) posits that the regular forms are not stored in the long-term memory, but are constructed online using the rules that are stored in the respective linguistic structure. The affix *-ly*, for example, is seen as working like a relative clause that is added to a noun: "it is just another case of free combinatoriality" (Jackendoff 2007: 62). Outputs of semiproductive rules are stored in long-term memory. Here, "lexical rules" that work in the lexicon apply. "Such a rule expresses a generalization in the relationship among pairs of lexical entries" (Jackendoff 2002: 159). In a process of *unification*, the items stored in long-term memory are taken and composed into larger units in the working memory. The generated unit contains all the common features of the units put together, but also preserves their distinct features.

Since the lexicon is a "multidimensional continuum of stored structures" (Jackendoff 2009: 108) with words in one corner and general rules in another, a clean dual mechanism of lexicon and grammar is not presumed (Francis 2008a: 188/189).

> [*T*]*he function of lexical items is to serve as interface rules, and the lexicon as a whole is to be regarded as part of the interface components.* In this view, the formal role of lexical

> items is not that they are "inserted" into syntactic derivations, but rather that they establish the correspondence of certain syntactic constituents with phonological and conceptual structures. (Jackendoff 2002: 131. Emphasis in the original.)

This lexicalized grammatical pattern supplants the traditional grammatical rules. A phrase structure rule is nothing else than "a lexical item with variables in it; free combination is achieved by attaching further structure to the variables…[P]hrase-structure l-rules…are sitting in the lexicon, available for other lexical items to inherit properties from them" (Jackendoff 2002: 186). The grammatical rules are learned in the same way as words, since both are lexical items and have the same formal character. The *UG*'s role in this concept is reduced to giving the language learner the tools to extract generalisations out of the material they perceive.

2.1.2 Simpler syntax

Another way in which Jackendoff and Culicover (Culicover 2005: 245, Culicover and Jackendoff 2005: 6, Jackendoff 2002: 80, 2010: 3–4) challenge the generative approach in which syntactic structure dictates the constituency of phrase and sentence meaning (Carnap 1934: 1–4, Frege 1892: 32/33) is in offering a distinct version of syntax: in their view, it is not the generative mechanism, but functions as "an intermediate stage in the mapping between meaning and sound" (Jackendoff 2010: 20). It fulfills the task of bringing the complex network of conceptual structure into the linear order of phonological structure (Schoenemann 1999: 309). In doing this, only those structures are delivered via the interface to the other structure that are relevant for production or perception in this structure. For example, conceptual material is indifferent to syntactic structure, whereas grammatical gender or case features are indifferent to conceptual structure.

> For Simpler Syntax, the complexity of syntactic structure involves the extent to which constituents contain subconstituents, and the extent to which there is invisible structure. Thus, the structure of A in (ia) is simpler than in (ib) or (ic), where β is an invisible element. SS will choose (ib) or (ic) only if there is empirical motivation for the more-complex structure.
>
> (i) a. $[_A$ B C D]
> b. $[_A$ B $[_\alpha$ C D]]
> c. $[_A$ B [α β C D]]
>
> (Culicover and Jackendoff 2006: 414)

There are almost no empty nodes in simpler syntax. Elliptical configurations, for example, are taken as lexical items. The interpretation is triggered by the conceptual structure of the context, not by an underlying syntactic structure. A sentence such as *I met him one day, but I can't remember when* is understandable to the listener, as they can generate the meaning

of *when* as '*the day when I met him*' from the first clause. Similarly, sound+motion constructions, cases of coercion (*The burger ordered a coke*), etc. have no syntactic reflex.

Although syntax is seen as 'simpler', it is still not evaluated as being simple, since its structures are quite complex (Culicover and Jackendoff 2005: xiv, 2006: 414). Still, in their approach, Culicover and Jackendoff succeed in closing the gap between the knowledge of language and the use of language as supported by findings in the study of aphasia (e.g. Baynes and Gazzaniga 2005, Aichert and Kiermeier 2005).

Thus the Parallel Architecture generates a model consisting of three independent components that are interrelated via specified interfaces. As will be shown below, it also offers a method of generating bi- und multi-lingual models and of explaining phenomena which occur in FL writing.

2.2 The integration of FL into the Parallel Architecture

The *wholistic view* of multilinguality sees the bilingual as a "fully competent speaker-hearer" (Grosjean 2008: 14). The aim of wholistic models is to describe how two and more languages can be used separately or in a mixed form (depending on the context), and how cross-linguistic influences take place (Hernández, Fernández, and Aznar-Besé 2007: 380). They also attempt to explain the fact that knowledge of multiple languages does not significantly decelerate the production system, and they make suggestions for how different levels of language proficiency can be monitored. Additionally, the wholistic model is open to a potentially unlimited number of languages, all of which interact. Language is thus defined as "a whole system of nested systems" (de Bot, Lowie and Verspoor 2005: 16). The first of these systems is language in general, which includes separate languages, dialects and language varieties such as slang or group-languages. In the wholistic model, each of these languages has subsystems of phonemic, lexical and grammar systems. A second system is the individual person's own language system. This system contains different languages, varieties, and registers as subsystems, each of which includes its own sub-subsystems of phonemic, lexical and grammar systems. Since language is seen as a dynamic system which varies and changes continuously, a bilingual model has to accommodate these changes as well (de Bot, Lowie and Verspoor 2005: 50, 2007: 14, Briggs and Peat 1989: 147–148, van Geert 1994: 50, Lightfoot 2001: 457, Matsuda 1997: 52).

In this study, an attempt is made to use the Parallel Architecture as the basis for such a wholistic model. The Parallel Architecture generates a language model consisting of three independent components that are interrelated via specified interfaces. Whereas syntax

and phonology are dependent on the language spoken, semantic structure is understood to be language-independent (see de Bot 1992: 7, de Bot, Lowie and Verspoor 2005: 42, Carroll 2002: 240, Jackendoff 2002: 123, 2010: 7, Levelt 1989: 106, 1999: 86, but see Oksaar 2003: ch. 3.3.3, Whorf 1956: e.g. 220 ff. for opposing views). However, the choice of language is made in the conceptual structure, and this choice is conveyed to the phonological and syntactic structures via the interfaces, so that these structures 'know' which language structure is to be responsible for performance and which interfaces are the preferred ones. This process of language choice is also in charge of the application of the appropriate genre or register in conversation (de Bot 1992: 8, Hyland 2004: 27). In this way, the conceptual structure is responsible for the correct choice of language in order to make sure that the intended message reaches the addressee in an understandable way or that the speaker acts appropriately to the situation they are in. This does not mean, however, that only the target language structures are activated; rather, the first language (L1) *and* the foreign language(s) (FL) all are activated via the interfaces – a view that is also shared, for example, by connectionist bilingual models (e.g. Dijkstra 2007, Dijkstra and van Heuven 2002, or Li 2006, see also Gaylor 2003).

Consider the following example. If a German football fan who is a German-English bilingual sits in the English part of the football arena when Germany plays England, he or she will know from the phonological context (talking, singing, shouting) and the visual context (shirts, flags) that it is dangerous to celebrate a German goal, and that if the English team scores, he must activate the English lexicon and shout *goal!* and not *Tor!*. Furthermore, they will know that in the latter situation it is wise to smile, jump up and down and join in doing the wave:

English Singing and Shouting → Phonological Structure → Conceptual Structure:
English speaking context
English shirts/flags → Conceptual Structure: English-speaking context
Conceptual structure → English lexicon
→ English Phonological Structure: g ə ʊ l
→ English Syntactic Structure: [$_{NP}$N]
→ Action: jump up and down

The syntactic and the phonological structures are distinct for each language the speaker knows using common and segregated neuronal networks (Chee, Siong Soon, Ling Lee 2003: 85, for the modular view, see also Brown and Hagoort 2000, Carroll 2002, Francis 2008b: 106). The FL structures are built up in the process of implicit or explicit learning, again by building up the lexicon and generating the appropriate rules to go with it (Butzkamm 2002: 25 ff., Carroll 2002: 228, 2009: 249, Sharwood Smith 2007: 2, Truscott

and Sharwood Smith 2004: 3/4). In the process by which a person acquires the syntax of any language, this works by establishing appropriate lexical items, their features and their feature values in the lexicon. When hearing phonological structures, the parser must "select from these chains (PS<>SS<>CS) to settle on the best possible representation in the current context" (Sharwood Smith and Truscott 2006: 208). If the parser encounters an anomaly, it does not 'crash', but puts in a placeholder while it looks for a best-fit solution based on additional information (for example, context or the rest of the sentence). If the FL structures do not contain information that makes a representation possible, the parser will make use of other language systems in order to fill in the blanks (French and Jacquet 2004: 89, Krashen 1981: ch. 5, 1982: ch. II. A. 5).

Sharwood Smith (2007: 9) analyses the extent to which metaknowledge about grammar is necessary for FL acquisition. He states that a person is usually not aware of the syntactic and the phonological structures in the language faculty, but aware only of the conceptual structure and the phonological input which they can analyse. Even in explicit learning, the FL learner is often unaware of all differences between the L1 and the FL (Edmondson 2009: 163). Van de Craats (2003: 92) notes that FL learners realise easily that for one semantic element, there are two phonological matrices in L1 and FL, but they often do not notice other lexical differences:

> Adult L2 learners are inclined to map or to attach a new phonological matrix from the L2 to a bundle of semantic and formal features from the L1...[T]hey start by assuming an L1 feature constellation and they gradually change the features of the bundle one by one...In this way, the L2 learners' output becomes more and more target-like; not only the surface form (=the phonological matrix) alters, but also the features.

When one learns the FL, the FL structures are incomplete, and therefore they are weak. Because of this, L1 tends to intrude and to exert control over language processing, resulting in errors which are L1 induced. With increasing proficiency, the speaker no longer has to make use of the L1, and in this way, the selected language stays the one that controls the language processing, holding back the intrusion of the generally stronger L1 (Green 1998: 71). For new words that they learn by reading, advanced FL learners can decide for themselves how to pronounce the words correctly using the FL phonological formation rules, without external help (e.g. a native speaker reading the word to them). Advanced FL learners are also able to generate an infinite number of sentences in the correct grammatical form due to the syntactic formation rules. For example, as beginners, German learners of FL English often use *will* or *would* in an *if*-clause because these modal verbs are characteristic of the German conditional clause. Over time, reception or explicit

teaching will enable them to establish an appropriate syntactic formation rule prohibiting *will* and *would* in the *if*-clause in English, and they will stop making this error.

Language acquisition and the development of FL structures in this way are seen as opportunistic and unwilled, in that they take place in real time and are context-dependent: "in development, as in evolution, change consists of successive make-do solutions that work, given abilities, goals, and history of the organisms at the time" (Thelen and Smith 1994: 144). As a result, something like variability in language behaviour, for example, can be explained by the flexibility and the adaptability of the system. At the beginning of the learning process, FL learners are quite variable ('free variation'), but gradually they stabilise the FL systems in the correct or in the incorrect (=interlanguage) form (de Bot, Lowie and Verspoor 2007: 8, van Dijk 2003: 129).

In addition to proficiency, linguistic distance can also play a role in building up FL systems: languages which have similar structures might share a bi-/multiregister system (de Bot 1992: 9, Chee, Siong Soon and Ling Lee 2003: 90, Paradis 1987: 16 ff., 2004: 137, 2007: 134), because no separate system is needed.

2.2.1 The bilingual lexicon

One crucial aspect of the process of generating the FL syntactic and phonological structure is the building up and extension of the lexicon. Since the lexicon works as an interface in the Parallel Architecture, it is co-responsible for building up all of the FL rules in the language system (Carroll 2002: 232, Francis 2004: 180, Sharwood Smith 2007: 9, Truscott and Sharwood Smith 2004: 3). For example, the FL phonological structure and its formation rules are generated from the acoustic input with which the language learner is confronted. Additionally, they will learn many of the syntactic rules via the lexicon. Hearing that *looking forward* is always followed by *to* and the gerund form, the learner adds the syntactic information [+ PP to (VP ($V_{gerund\ form}$))/(NP)] to the lexical entry "looking forward". As they learn more words and add more syntactic structures, the speaker comes to know which of the interfaces between the conceptual structure and the phonological and syntactic structures as well as which of the interfaces between the FL phonological structure and the FL syntactic structure should transport the chosen content to vocalisation.

When beginning to speak in a foreign language, FL processing requires a great deal of cognitive capacity, but with growing proficiency the processes become automatised (Green 1998: 69, Wood 2004: 28). Still, under certain conditions, the speaker might once again be forced to control the language process consciously, for example if the situation in

which the processing takes place puts a lot of stress on the speaker psychologically (e.g. speaking to an 'important' audience) or if content generation takes up too much of the working memory, leading to a working memory overload (Baddeley 2005: 84, 2009c: 48, Gathercole 2007: 760, Sternberg 2009: 510). Because of this working memory overload and the additional information that has to be processed, the speaker might subconsciously or consciously (if applying the wrong rules or confusing rules that they were taught) choose the wrong subcomponent. This in turn leads to a degeneration of the translating processes of the conceptual to the syntactic structure and to the phonological structure. That is, under certain conditions, even a German person who speaks English on an expert level might use the L1 syntactic structure *If I **would** know that, I would know what to do*, although the speaker is generally aware of the syntactic formation rule and supposes him- or herself to be in monolingual mode. These processes can be explained with a bilingual tripartite architecture.

In 2004, Francis was the first to develop a bilingual tripartite Parallel Architecture (Fig. 2.2), which – to a certain extent – is compatible with de Bot's production model (1992). In Francis' model, the phonological and the syntactic structures are located in separate linguistic domains, which are addressed via the interface lexicon or other interface components; the conceptual structure has access to all of the linguistic modules. Analogous to de Bot's (1992: 15) differentiated formulator, which inhibits the non-target languages in performance, in Francis' model, the inhibition mechanism functions as follows:

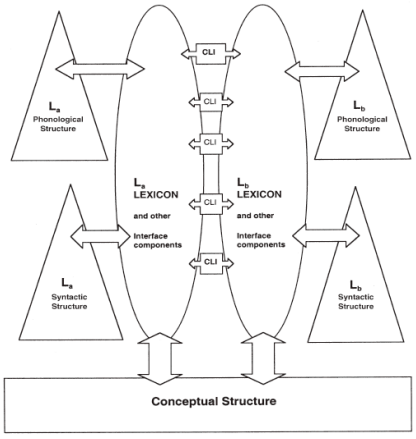

Fig. 2.2 Francis (2004: 181): The Bilingual Tripartite Parallel Architecture

> (1) preverbal message generation and macroplanning in CS; (2) microplanning in which lexical items are activated and the preverbal message begins to be converted into a speech plan in the CS-SS interface; (3) as lexical items are activated, following immediately upon the construction of a preverbal message, their corresponding syntax, morphology and phonology components are activated, establishing in this manner partial structures in these domains. (Francis 2004: 182/183)

However, Francis' activation of the lexicon before syntactic and phonological structures come into play is problematic in various respects. For example, if the lexical items are activated *before* syntax and phonology are addressed, no parallel activation of the L1 and FL structures should take place; rather, the activation of these structures should depend on the prior successful activation of lexical items. As will be discussed below, however, many

FL errors indicate that there is a direct influence of L1 on FL inside the structures – that, for example, the syntactic structure of L1 is applied to FL without any hesitation in the production process. If the L1 and the FL syntactic structures were related via the separate lexicons, as Francis suggests, these direct influences would be less likely to happen than they in fact are, for example inside words (for more errors of this kind, see Chapters 2.5, 4.3 and 6).

2.2.2 The Bilingual Tripartite Architecture

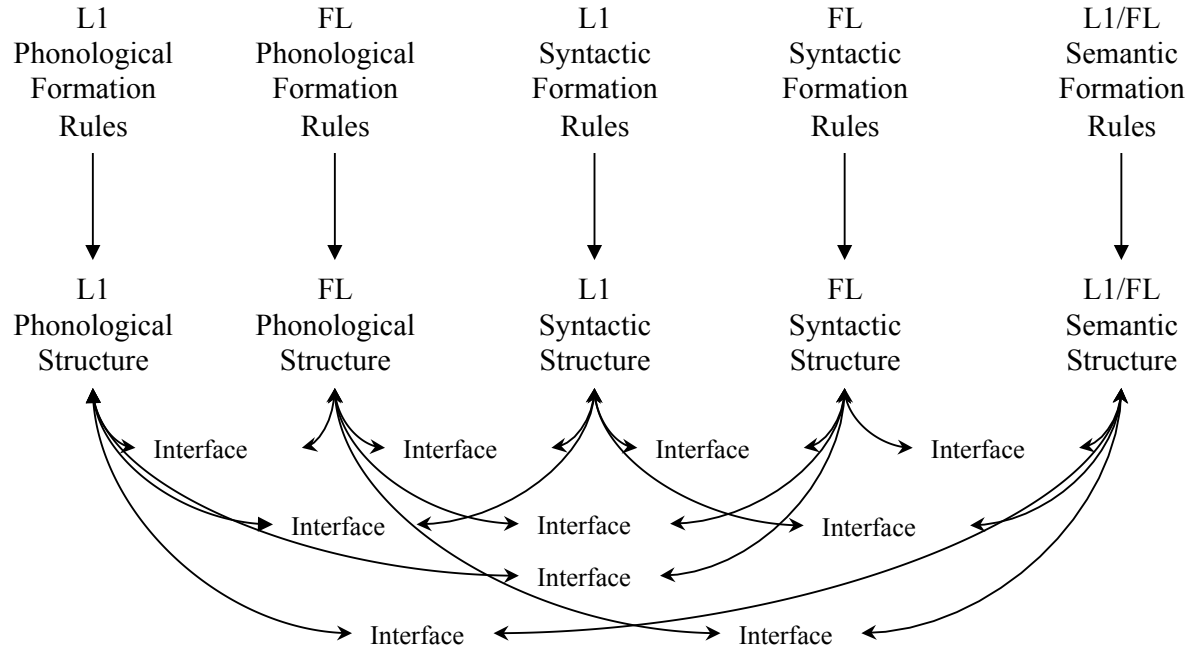

Fig. 2.3 The Bilingual Tripartite Architecture

In contrast to Francis' model, in the Bilingual Tripartite Architecture proposed in this paper, the lexicon is understood as a "single integrated system" (Schneider 2000: 321). Furthermore, it is not seen as being activated prior to the syntactic and the phonological structures. As can be seen in Figure 2.3, L1 and FL phonological structures are directly interrelated via interfaces, as are L1 and FL syntactic structures. The interfaces do not link only L1 and FL phonological structures and L1 and FL syntactic structures, but there are again direct interfaces between L1 phonological and FL syntactic structures, as well as between FL phonological and L1 syntactic structures. The semantic structure is interrelated with all structures. The number of interfaces makes the FL language system a very complex network in which the different structures can influence each other. It is compatible with the dynamic systems theory according to which all variables interact: the language system is constantly in flux because of the continuous interaction of the variables

(de Bot, Lowie and Verspoor 2005: 47, Cook 1995: 95, 2008: 20, van Geert 1994: 50, Lemhöfer *et al.* 2008: 26, Sharwood Smith and Truscott 2006: 207). In such a system, it is not only the L1 that influences the other language systems, rather the FL systems also have an impact on the L1 system – be it as a result of external forces (e.g. moving abroad and not using the L1 anymore) or as a result of the FL becoming dominant in specific fields. For example, academic experts who work exclusively in an FL often are unable to talk (or write) about this field in their L1 without using the FL because many of the technical terms are either missing from their L1 mental lexicons (Muysken 2000: 263), or are preferred in FL as they are more often read and used. In some cases, the conceptual structure is forced to use the FL interfaces to come up with a term to fill the gap in the phonological structure:

> Wie Sie an diesem Experiment erkennen können, kommt es hier zu einem *working memory overload.* (= 'As you can see in this experiment, a working memory overload takes place here.')

The interfaces and the lexicon of the intended language is of course the one that is preferred as the link between conceptual, phonological, and syntactic structure. However, speakers are unable to completely 'close' the interfaces between the conceptual structure and the systems of the non-intended languages, and all of the other languages can still be active to varying degrees. As Green states (1986: 215, 1998: 69, Abutalebi and Green 2007: 258), the language activity status can range from controlling the language output (= *selected* language) through having some effects on the production process (= *active* language) to simply existing with no influence at all on the language production process (= *dormant*). Because of this, if L1 and FL are active in a bilingual, he or she can shift from one language to the other, but will remain constantly on a scale that includes all of the languages he or she knows:

> The creation of meaning in on-line processing is commonly seen as a process of constructing appropriate representations for input, crucially involving continual competition...The outcome of the competition, in each case, is determined by the relative activation of the candidates…Less strongly activated structures will lose out. (Sharwood Smith and Truscott 2006: 207)

In the Bilingual Tripartite (or Parallel) Architecture, these different activation degrees can be explained by different degrees of activation of the interfaces (Sharwood Smith and Truscott 2006: 209, Truscott and Sharwood Smith 2004: 6). As the name already implies, in the Parallel Architecture the systems of all languages involved in the production processes are active at the same time (Jackendoff 2003: 671, 2007: 20). They are interrelated, and as the language system is a dynamic one, they influence each other constantly, no matter which language output is sent to the vocalisation system (de Bot

1992: 14, de Bot, Lowie and Verspoor 2007: 18, Green 1996: 213, 2008: 26). As stated above, during the production process of an FL utterance, the interface to the FL is the one preferred. Still, the other interfaces are active too, and as a result the L1 phonological and syntactic structures and the structures of all the languages the speaker knows produce the message at the same time; it is just that the output is not taken over to vocalisation (see Grosjean 2008: 62 for further discussion of the parallel activation of more than one language). Because of this parallel activation, involuntary influences of one language on the other, as well as intended (or unintended) switches to another language – *code-switching* – can take place. The more code-switching, borrowing, or using of words that are similar in L1 and FL occur in the FL speaking process (be it in conversation itself or in another context, e.g. in a song on the radio), the more active the L1 becomes (Grosjean 2008: ch. 4.1.2, Sternberg 2009: 132/133). The activated L1 element in turn activates other L1 elements (rules and lexical items) inside the network via the interfaces.

Thus, for example, if a German native speaker cannot find the appropriate English term for *cat*, they might insert the word *Katze* in order to maintain fluent text production (Snellings, Gelderen and de Glopper 2004: 175). This word is feminine in German, and because of the activation of this syntactic rule via the interface phonological structure → syntactic structure, the speaker might use the pronoun *she* to refer to the cat in a subsequent sentence. At the same time, further semantically or phonologically connected subcomponents of the German structures are activated, and the L1 status becomes more active and is selected more often. This phenomenon is also reported in studies on the usage of the dictionary in producing FL texts: the more often a writer uses the dictionary, the more often their L1 is activated, and the more flawed the result of the FL writing process will be (Ard 1982: 5, Elola, Rodriguez-Garcia and Winfrey 2008: 79).

2.3 Orthographic structure

Since this study analyses the influence of L1 on FL writing, another structure must be added to the Bilingual Tripartite Architecture: it will be referred to here as the *orthographic structure*. The model is thus turned into a 'quadripartite' architecture.

Generally, it is assumed that the orthographic structure is built up in a similar way as are the phonological structures and the syntactic structures. This structure stores orthographic rules and orthographic representations of words. These rules are in part explicitly taught and trained and in part generated by reading texts. This holds true for both the L1 and the FL orthographic structures (Nassaji 2007: 85/86). The generation of the structures, and also the way in which linguistic elements are stored in these structures,

depends on the depth of the orthographies. If the orthographic system is deep – that is, if the spelling is only loosely related to the pronunciation – more words must be stored in the long-term memory than is necessary with shallow orthographic systems in which the spelling is closely related to pronunciation and it is easier to generate the orthographic representation online (Bar-Kochva and Breznitz 2012, Coulmas 1989: 169; see also below).

The orthographic system is addressed by all three structures of the Tripartite Architecture via interfaces and vice versa (see also Dijkstra, Roelofs, and Fieuws 1995: 269). For example, if one wants to write the word *tales*, the semantic structure activates the phonological structure /t eɪ l/ as well as the syntactic structure which adds the rule for generating the plural by adding an /s/. This information is sent to the orthographic structure, together with the information from the semantic structure that the text to be produced will deal with stories, and not with dogs' tails. The correct transportation of the information of all three structures to the orthographic structure leads to the correct execution of *tales*. It is assumed here that the orthographic system is responsible not only for the spelling, but also for the appropriate punctuation. However, it may well be that the proposed orthographic structure is restricted to spelling and that together with a punctuation structure, it forms a parallel writing system. In the analysis of the errors that were found in the final texts, spelling and punctuation are evaluated separately (see Chapter 4.3).

Because of the different orthographic structures in the FL and the general demands of FL language processing, writing processes in FL make greater demands on the writer's cognitive capacities than do writing processes in L1 (van Weijen 2008: 161, see Chapter 3). Even if L1 and FL use the same writing systems – as in the case of English and German, which both use the Latin writing system – the writer cannot use the same orthographic structure for both languages. The Latin alphabet is based in the Latin language, for which the letters were developed in order to represent the phonemes that existed in that language. All of the letters contrast with one other. However, when a writing system is applied to another language, these contrasts are interpreted differently between the two languages and within the other language. Adaptations have to be made in order to describe the respective languages, and how these adaptations are made depends on the "different hands [that] exhibit the same sound by different combinations" (Johnson 1830: xxi). Because of this, FL writers cannot apply the same orthographic rules to both the L1 and the FL, even though they may use the same writing system in both (Coulmas

1989: 168, 2003). They must manage different phonological, syntactic and prosodic systems, plus the "distinct mappings of orthography to phonology" (Abutalebi and Green 2007: 243). In doing this, they must build up the FL orthographic structure in the same way as they build up its phonological and syntactical structures.

Although Latin often is seen as the prototypical phonemic writing system (e.g. DeFrancis 1989: 186), in no adapted orthography does the implied one-to-one correspondence between phonemes and graphemes take place. Rather, writing canonises a language in reducing its phonetic varieties: it is an abstraction rather than a representation of the spoken language (Pike 1947: x), since "none of the European alphabetic orthographies is the fruit of deliberate linguistic calculation. They are all natural children of tinkering and groping in the dark, which, nonetheless, have reached a quasi-functional balance" (Coulmas 2003: 94).

There are three kinds of alphabetic orthographies (Haarmann 2004: 83, Rogers 2004: 9–16, Scheerer 1986: 263/264). *Shallow orthographies* reflect the phonemic distinctions of the language very close to the phonetic surface structure, while *intermediate orthographies* largely operate close to the phonetic surface, but also contain morphophonemic information. *Deep orthographies* rely on the deep phonetic level. A large amount of morphemic and lexical information is conveyed via the orthography. German orthography belongs to the intermediate orthographies (Mann and Wimmer 2002: 658), while English orthography belongs to the deep orthographies (Sampson 1985: 43). Whereas German orthography is subjected to reform more or less regularly in order to adjust the official spelling to speaking and to customised spelling – the last reform was performed in 2006 – English orthography has stayed much the same for the past four hundred years, while the pronunciation has changed considerably (Venezky 1970: 12/13). Grapheme-phoneme correspondences in English are very complicated. English spelling often cannot be derived from the way a word is pronounced, but has to be learned or generated from other knowledge resources, such as knowledge about the word's etymology or paradigmatic similarities (Rastle and Davis 2008: 944). Because of this, in the model proposed here, writers in English must store more orthographic representations in long-term memory than do those in German, where more spelling can be generated online.

Still, in German as in English there exists a multivalency of phonemes and alphabetic symbols (Coulmas 1989: 168, Jacobs 2007: 46/47). For example, in German, the phoneme /e/ can be spelled *e* as in g*e*ben, *eh* as in n*eh*men, *ee* as in Kl*ee*, or *é* as in

Café. In words such as *Exposee/Exposé*, both spellings are possible. In English, /oʊ/ can be spelled *o* as in g*o*, *oe* as in t*oe*, *ow* as in thr*ow* or *ough* as in th*ough*. In these examples, in neither language is the writer able to extract the spelling from the phonemes, and the orthography conveys more information than mere pronunciation. This can be the result of different factors: the orthographies of different words might be based on different roots; different orthographic structures might have been selected in order to avoid misunderstandings; or it may be – and this is most often the case – that the relationship between speech and writing has changed. Whereas when languages first began to be represented by letters, the question was how to spell a word, nowadays, the question is often how to pronounce the word. This *etymological spelling* is an important factor in many orthographies. In it, "purely phonemic representations of words are corrupted for the sake of graphically preserving their etymologies" (Coulmas 1989: 170, see also Jacobs 2007: 50/51, Venezky 1970: 28). For example, words like *hotel* or *habit*, which were borrowed from the French language (which in turn derived them from Latin), are pronounced with an *h* in English, although the phonetic realisation of the *h* had already disappeared in French at the time the words were borrowed into English. Here the written form influenced the English phonetics. In other cases, for example in words like *hour*, the missing phonetic realisation of *h* in French was taken over to English. One can therefore conclude that spelling works as "a stabilizer, something like a catalyst, which introduces shape where in phonic reality [there] is flux" (Coulmas 2003: 97).

Closely related to etymological spelling is the spelling of loan words. English orthography as well as German orthography tend to preserve the grapheme-phoneme correspondence that was applied in the origin language. Words like *philosophy*/*Philosophie* or *alphabet*/*Alphabet* preserve the *ph* from their Greek origin, although in both languages [f] is usually spelled *f*. Similarly, the preservation of *ch* in loan words that are pronounced with a [k] is frequent: *Christian*/*christlich*, *chronology*/*Chronologie*. The orthography is preserved; the pronunciation in both languages, however, is no longer Greek, but English or German, respectively. Because of this, in many cases English and German speakers/writers are no longer aware of these words' Greek origins, although they are still visible in the spelling (Eisenberg 2011: 16, Maylath 2000: 33).

Because of the different phoneme-grapheme relationships in the different languages, and because of the distinct rules that have developed in each language over the centuries, writers must build up an orthographic structure for each FL that they acquire. In

the parallel FL architecture proposed here, it is assumed that the writer's L1 and FL structures are interrelated, and that the orthographic L1 and FL structures are both active when the writer is building up the orthographic representations for execution (Lemhöfer *et al.* 2008: 26). That is, both orthographic structures – albeit to varying degrees (Green 1998: 67) – send their outcomes of the translation of conceptual, syntactic and phonetic structures into an orthographic representation to the motor systems and 'compete' for the execution of their results. Just as in FL speaking, in FL writing the L1 influences have to be blocked, and monitoring is needed in order to make sure that the text to be typed or written by hand is realised in the target language.

Because of this further linguistic structure in FL writing, in which certain letter combinations are more common than they are in the L1, the degree of automatisation in execution for many FL writers is lower than that of L1 writers. As a result, parallel processing in FL writing is more demanding than it is in L1 writing, and lower-level processing of spelling can become demanding too (van der Hoeven 1999: 76, Kreiner 1996: 49).

2.4 Genre

As noted above (Chapter 2.2), the different registers of language also have to be stored in the linguistic structures. In the case of FL academic writing, this means that the writer not only has to find the correct interface between the conceptual structure and the FL phonological, syntactic, and orthographic structures, but also has to make sure that only those outcomes of the activations that are genre-appropriate are transported to typing or handwriting.

In the academic literature, *genre* is variously understood as "situated linguistic behaviour in institutionalised academic or professional settings" (Bhatia 2002: 22); as "a rhetorical means for mediating private intentions and social exigence" (Miller 1984: 163); or as "classes of communicative events which typically possess features of stability, name recognition and so on" (Swales 1990: 9).

In order to write in the appropriate genre, writers have to be aware of the cultural context in which they are writing or of the cultural context in which they wish to present their findings (Burgess 2002: 198, Schneider and Barron 2008: 4/5). The knowledge of cultural context includes physical place (e.g. the classroom) and other non-linguistic factors and events that influence the writer (e.g. the nature of the task, time pressure, etc.). The writer must understand what is called for in the specific situation and must work accordingly. To do this, the good writer makes use of situated cognition and draws on past

experience, evaluating what worked out well and what failed on other occasions, while using the elements that define the genre (Brown, Collins and Duguid 1989: 32, Schneider 2010: 22).

The *how* of genre analysis differs distinctly between these schools: Miller (1984: 159, 1994: 151) or Berkenkotter and Huckin (1995: ix) understand it as the typification of rhetorical action, while Martin, Christie, and Rothery (1987: 57) or Martin (1992: 505, 1993: 121) see it as the regularities of "staged, goal oriented social processes", and Swales (1990: 41) and Bhatia (1993: 13) see it as the consistency of communicative purposes. Across all schools of thought, there is general agreement on various aspects of the elements that define a genre. For example, genres are seen to have social origins. They are used by discourse communities, which are

> sociorhetorical networks that form in order to work towards sets of common goals. One of the characteristics that established members of these discourse communities possess is familiarity with the particular genres that are used in the communicative furtherance of those sets of goals. In consequence, genres are the properties of discourse communities; that is to say, genres belong to discourse communities, not to individuals, other kinds of grouping or to wider speech communities. (Swales 1990: 9)

Because of this, the mastery of certain genres is associated with different degrees of status than the mastery of other genres (e.g. the academic genre compared to the genre of tabloid newspaper articles). All orientations see genres as reflections of disciplinary cultures which were developed over time by the social group. Genres define how communicative events are executed and which communicative purposes – according to the members of the community – are intended and realised by communicative events (Reichelt 2003: 99). These types of events "consist of texts themselves (spoken, written, or a combination) plus encoding and decoding procedures as moderated by genre-related aspects of text-role and text environment" (Swales 1990: 10). Although each of the disciplinary genres has textual and discursive factors (lexico-grammatical settings and structural form), as well as contextual and disciplinary factors that define them, these linguistic characteristics are neither controlled in an absolute manner by the genre, nor does the writer have total freedom to change them (Bhatia 2004: 29, 2010, Hyland 2004: 35, Schneider 2010: 3, Swales 2004: 42).

2.4.1 The academic genre

Since in academia "intellectual activity is primarily verbal activity, it is couched in a language" (Galtung 1981: 841). This activity has to be formulated and communicated to the academic community in order to widen knowledge, and in order for the writer to join

the academic discussion and the academic community. The basis for the academic genre is provided by vernacular language, which is extended for academic purposes. Still, a constant exchange between vernacular and academic language takes place, enabling writers and readers to profit from the developments in both areas, thus ensuring that the academic texts can be received by an audience beyond the immediate community, or that novices may access the community (Macbeth 2010: 36, Maingueneau 2002: 324/325). Although many researchers (e.g. Devitt 1997: 54, 2004: 63/64, Hyland 2002: ch. 2.6, Tardy 2009: 13) perceive a barrier between academia and society with respect to language, noting that vernacular and academic practices are sharply separated and that academic language is exclusively used in an institutionalised setting, the relationship between vernacular and academic language is of importance, especially if novel information is to be presented (Ehlich 1995: 326). In these and indeed in all cases, it makes sense to refer to the object of knowledge using language that does not distract the reader's attention away from that object and toward the language itself that is being used. Still, the academic genre is distinct from the vernacular language for functional reasons that respond to the expectations of the academic community. As a result, writing in the academic community is beyond the reach of the average native speaker (Johns 2003: 196, Swales 1990: 11).

For students, this means that in order to write successful papers, they have to know the text conventions. This knowledge "refers to a shared sense of the conventions of grammar, vocabulary, content, organization, and so on, which allows us to write and read texts with ease and confidence" (Hyland 2004: 63). Knapp and Watkins (1994: 8) call this *genre-based grammar*:

> A genre-based grammar focuses on the manner through which different language processes or genres in writing are codified in distinct and recognisable ways. It first considers how a text is structured and organised at the level of the whole text in relation to its purpose, audience and message. It then considers how all parts of the text, such as paragraphs and sentences, are structured, organised and coded so as to make the text effective as written communication. (Knapp and Watkins 1994: 8)

As the academic genre is dynamic, the analysis of academic texts and the extraction of rules from them presents problems, because features can be replaced by new, varying features and structures (Bakhtin 1986: 80, Hyland 2004: 35). For example, in Germany today we are witnessing a change from the old 'Teutonic' manner of academic writing (Galtung 1981; see Chapter 2.4.2) to a more 'Saxonic' manner. For the acquisition of expertise, it is also problematic to concentrate only on formal features when learning to write academically, since this can produce a text which is more a parody of the genre than a good example of it (Freedman 1993: 226, Hyland 2004: 69–71). In other words, if

writers do not go farther with their analysis than the collection of commonly-appearing textual features, the texts they produce can become instances of "formulaic parroting" (Swales 1990: 16).

2.4.2 Cross-cultural differences in academic writing

In the case of FL academic writing, the analysis must be taken even further, since "given acts and objects appear vastly different in different cultures, depending on the values attached to them" (Oliver 1965: xi, see also Čmejrková 2007: 74 ff.). The FL writer needs to understand how particular grammatical features are used to express meanings reflecting textual, ideational or interpersonal attitudes. They need to be able to recognise and apply patterns of theme, cohesion, modality, and word type (nouns and verbs) that support the reader in finding the functional stages of the text. In addition to the textual features, the FL writer must also acquire knowledge about social and cultural practices in the FL setting. They must be able to identify the social forces that underlie the form of a genre, its purposes and its changes (Lafuente-Millán *et al.* 2010: 19, Reichelt 2003: 99). For this reason, the cognitive demands made on students by the tests presented in this study are greatly increased by requiring them to write academic papers in a foreign language.

Research into cross-cultural differences in the academic genres – and the conscious awareness that such differences exist – is a rather recent development. Kaplan's "Cultural Thought Patterns in Inter-Cultural Education" (1966) provided the basis for the contrastive analysis of academic writing in different cultures and languages. It was based on the findings of Dufrenne (1963: 35) and Oliver (1965: xi), who both argued that the cultural environment has a significant impact on the perception and application of rhetoric. Galtung (1981) took up these findings and proposed that there are different *intellectual styles* which can be distinguished from each other in different respects. In his analysis, Galtung concentrated on three occidental intellectual styles (the *Saxonic*, the *Teutonic*, the *Gallic*) and one oriental intellectual style (the *Nipponic*). The terms were chosen because Galtung did not see the styles as being exclusively located in their respective countries (Britain, Germany, France and Japan), but as having spread over different regions, for different historical reasons. For example, the Teutonic style was dominant in Northern Europe and in Eastern Europe for many years due to the fact that Germany long held dominance in scientific research and produced many of the most influential thinkers of the last century (Mauranen 1993: 40, Yakhontova 2002: 230). However, all academic styles interact with each other, and because of this interaction and the more recent "subjugation to a general

world intellectual style" (Galtung 1981: 819), the distinction between the styles is becoming less marked.

For Galtung, the languages which stood behind the different intellectual styles as their 'godfathers' were well suited to these styles, which reflect the social role of academia in the communities. One characteristic of high-standard German which Galtung associated with "upper-class German" (842) is its complexity and its rigor both in wording and in syntactic structure. Its syntax supports the realisation of the Teutonic academic structure, which is non-linear and non-directional. In contrast to this, English academic texts do not tend to be highly complicated in their syntactic structure, but are more linear and richer in vocabulary and nuances than those written in the German high-standard language. This Saxonic linearity, it is suggested, in turn corresponds to a broader social orientation characteristic of English-speaking contexts. In other words, it is not exclusively a textual feature, but it can be seen in other situations, such as the spontaneous queue-forming that is typical in England but less common in other, non-English-speaking countries in Western Europe (Clyne 1981: 61). When a text departs from this linearity, the English reader experiences an "incoherence in thought" (Wong 1988: 10) which might lead to a "communication breakdown" (Ramsay 2000: 242). Galtung (1981) therefore concluded that intellectual style is an indicator of the role played by academia in a given society. Whereas the Teutonic style demands a level of linguistic competence that can be reached by only a minority of people, the Saxonic style is more democratic and more tolerant, traits which mirror the attitudes of participants in the academic community (Clyne, Norrby and Warren 2009: p. 94 ff.).

Clyne (1981, 1987, 1994: ch. 5) and Thielmann (2009: ch. 2) tested these theses by comparing German and English academic texts. Clyne, for example, compared essays written by British and Australian students with others written by German students. One of his crucial findings was that the British and Australian students showed far more aptitude for writing according to given essay-writing rules than were German and other Western European students. For the English-speaking students, linearity and relevance were the most important requirements to be fulfilled in essay writing. These requirements are also presented in essay-writing manuals as being the essential ones (Macbeth 2010: 44), whereas in German-speaking countries, according to Clyne (1987: 238), they are not given the same value in the teaching curriculum.

Another characteristic of Teutonic texts is that they often require readers to do the work of identifying the central ideas themselves. Few verbal signs are given to guide the

reader toward the goal of the text, i.e. the argument or the point it is trying to make. Frequently, *Exkurse* are taken: digressions of one or more paragraphs, or even whole chapters, in which the writer discusses topics that are only marginally related (if at all) to the central topic of the text (Siepmann 2006: 143). Because of this, Clyne (1981: 63) compared German academic writing to "cooked spaghetti" – referring to the difficulty of consuming it in a comfortable or dignified manner. These characteristics of the academic genre make reading Teutonic texts cognitively demanding. They reinforce the image of the German academic community as elitist, since the structure and language of academic texts tend to 'keep out' those readers that do not belong. This style also lends itself to abuse as a 'smoke screen', which writers can use to conceal a lack of knowledge and make themselves appear wiser and more knowledgeable than they actually are (Bünting, Bitterlich and Pospiech 2000: 113).

It is possible to summarise the features that characterise the German (Teutonic) academic genre as follows (Clyne 1987: 213, Galtung 1981, Siepmann 2006: 141/142):

- Academic texts are written in a non-linear way. Often, the reader has to reread paragraphs or longer passages in order to understand how (and whether) they are related to the central topic of the paper.
- There are frequent digressions. The authors introduce and discuss in detail topics that are only marginally related to the text topic. In order to 'realign' the reader, the writer must repeat the relevant topic-related content.
- More than one topic is introduced and discussed per paragraph; for example, arguments and counterarguments are presented together.
- Transitions from one paragraph to the next are often not made clear with the help of linguistic signposts, and because of the complicated syntactic structure and the multiplicity of topics presented in a paragraph, readers (and sometimes writers) tend to lose track of the connection to the central idea.
- 'Hedging' strategies are employed extensively, in order to ward off criticism of statements or theories that may lack a foundation in empirical evidence.
- The passive voice is used extensively, since the person of the author is considered to be 'irrelevant' to the object of knowledge.
- The tendency to nominalise, and in so doing to pack a large amount of information into a single word, is very high – a feature shared in common by the Teutonic and the Saxonic academic genres. Since the German language is highly amenable to the

creation of compounds, the nominalised words can be very complex in meaning as well as very long.

- The syntax is complicated and nested. The central idea is often not presented at the beginning of the sentence, but rather at the end. Often the main idea is presented in a subordinate clause or a sub-subordinate clause.

The following excerpt is an example of the Teutonic style in modern academic literature:

> Syncretism develops at those places where differentiation shall be paid attention to (be gained or be kept up), but is not paid attention to (kept up). For example, in those cases when phenomena of two different processing levels, e.g. the level of knowledge and the level of verbal knowledge processing, are put into context with each other and – at least on one level, in our case at the level of formulation – cannot be configured in the way that would be expected by standard. (Ortner 2003: 193; 'translated' by the author)

The two sentences are taken from a book on academic writing. The translation is word-for-word – more or less – in order to make visible the linguistic patterns academic readers encounter in German texts. The syntax is complex and the phrases are nested. Looking closely at the excerpt, it becomes clear that the second sentence is not in fact a complete sentence, but rather a subordinate clause of the first sentence that has been separated from it – in disregard of grammatical rules – by a full stop. All of this makes the sentence difficult to understand for a person who is used to English academic writing and whose L1 is not German. On the other hand, for a German reader who is used to German academic literature, the paragraph is quite easy to understand because they possess a repertoire of methods for untangling the syntax and for extracting the information (Brown, Collins and Duguid 1989: 39).

In contrast to the Teutonic academic community, the Saxonic community does not regard the academic text as a medium for presenting knowledge in an unguided manner, but as a means the writer can use to make an argument and convince the reader of their opinion (Thielmann 2009: 87/88). That is, it is not only the superficial aspects of academic writing that differ in the Saxonic texts – aspects such as sentence construction or wording – but the purpose of academic writing *per se*. The entire view of the 'what' and the 'how' of academic texts is markedly different. In the words of Swales and Feak, the intention of academic writing in the Saxonic manner is not "telling" but "selling" (1994: 214). The writer is not just a provider of knowledge, working as a "stimulus for thought or even intellectual pleasure" (Yakhontova 2002: 230); rather, he seeks to 'empathise' with the reader, developing the argumentation step by step and taking care that the reader will grasp the intended meaning and, ideally, come to share the opinions and views introduced.

To accomplish all this, the following aspects of genre and style need to be maintained in English academic texts (Clyne 1987: 212, Ramsay 2000: 242, Thielman 2009):

- The texts should be linear and coherent.
- Everything that is said should be relevant to the topic. No digressions should take place, and because of this, there is no need for repetition.
- No more than one thought or idea should be introduced and elaborated per paragraph.
- The transitions from one paragraph to the next should be clear and understandable.
- The writer should use a high number of advance organisers in order to help orient the reader and make him feel at ease.
- The style should be direct and not too elaborate. At the same time, the vocabulary should be rich in order to make the text stylistically interesting.

To summarise: academic genres in German and English differ markedly. However, as noted above, in recent years German academic writing has begun to align itself more and more with the English tradition. One of the central factors in this development is the fact that in order to publish in international journals, writers must conform to the textual ideologies applied by the reviewers (Pittard 1999: 165). Although such journals may state that they are willing to publish texts from outside the L1 English community, data shows that many texts are refused not on the basis of content or purely linguistic inappropriateness (spelling or wording), but because reviewers are intolerant of different cultural discourse and pragmatic patterns (Armstrong 2011: 155, Clyne 1994: 166). Since the majority of these peer reviewers come from the Saxonic academic tradition, English becomes *the* medium of academic publishing on the international level (although it is still far from being a *lingua franca*) and English genre conventions are supported and find their way into other academic cultures (Lillis and Curry 2010: 1).

As a consequence, when students are trained in the academic genre in Germany today, it is most often the Saxonic manner to which they are introduced. Such training remains the exception, however: most German students receive no explicit instruction on how to write academic texts, but must generate the academic register for themselves by reading published work (Breuer, Schindler, Vernoor in preparation). This gives rise to a problem: since their reading includes Teutonic as well as Saxonic academic texts, students are often unable to generate a stable picture of the academic genre. One could say that they

are in a state of 'intragenre' – which in turn has a negative impact on their academic writing in both the L1 and the FL (see also Kobayashi and Rinnert: 17/18).

All of this makes FL academic writing very demanding for their cognitive capacities (Heine 2010, Torrance and Galbraith 2008: 72), which can lead to a weakening of mechanisms by which the L1 is blocked. The result is an increased frequency of what will here be called *node-switches* – a phenomenon which will be defined and described in the next chapter.

2.5 Node-switches

Node-switches are speech (or writing) errors that are not complete code-switches of the type "*Yesterday, I met the* Bürgermeister von Bonn [*the mayor of Bonn*] *and he told me that my German was really* wunderbar [*wonderful*]"; i.e. they are not simply instances of the speaker using a complete word out of the other language. When switching *nodes*, the speaker switches between one FL and one L1 structure, or inside the L1 and FL structures. That is, when node-switching takes place, an 'incorrect' interface is chosen and as a result the wrong phonological or syntactic structure becomes dominant in a particular respect. The term *node-switch* has been coined here for three reasons: first, it is phonologically close to the term "code-switching". Because node-switching is a 'sub-form' of code-switching, this acoustic proximity and the priming of information that is related to 'code-switching' is intended. Second, the term "node" emphasises the network structure which underlies the language capacity. Since in node-switches the wrong interface becomes dominant, it can be seen as a 'bad connection' inside the network. Third, the inverted term "switching node" defines a point at which two different objects are connected, and this, in a very special way, is also what takes place in node-switching.

This can be demonstrated using a few examples. In a sentence written by a German-English bilingual speaker such as *I laughed* ***because the joke funny was***, the language chosen in the conceptual structure is English, and the activated and executed phonological structure is realised in the target language. In English syntax, however, the word order in a declarative sentence always places the verb in the second position: subject – verb – object. This word order is also relevant for subordinate clauses that depend on a main clause: *This is the man* ***who visits me often***. German, on the other hand, is a language in which the verb takes the last position in a subordinate clause if that clause begins with certain conjunctions (*da* [=since], *während* [=while], *weil* [=because], *damit* [=so that], *ob* [=whether], etc.) or in relative clauses: *Dies ist der Mann,* ***der mich oft besucht*** *[This is the*

man ***who me often visits.*** *(=who visits me often)].* In the example of a German-English bilingual utterance given above, the conjunction *because* activated the syntactic rules of the German counterpart *weil.*

> English syntactic structure: PP[because (SVA)]: *because the joke was funny*
> German syntactic structure: PP[weil (SAV)]: *weil der Witz lustig war*
> -> English phonology + German syntax: *I laughed, because the joke funny was*.

These types of errors are an indicator of the parallel activation of linguistic items and linguistic rules in L1 and FL (see also Grosjean 2008: 13). If FL speakers are looking for an item they need in the conversation, or if FL hearers try to interpret the input, they first check the items with a high activation level (Croft 2006: 345). If they do not find an appropriate item, they are forced to check the less activated levels, "even if that means mixing language systems" (Sharwood Smith 2007: 10). In the example above, which was taken from an essay written by a German student of English philology, the error could be due either to working memory overload (Baddeley 2007: 190, 2009c: 46) or to the influence of the academic setting, which demands high-standard language. The latter would result from the various and complex decisions that must be made in linguistic processing (Grosjean 1982: 132 ff.): the conceptual system not only has to activate the semantically correct phonological elements, but it must also choose the situationally adequate element. In purely conversational German, the conjunction *weil* can be followed directly by the verb, as is the case in English syntactic structure: *Ich lachte, weil der Witz war lustig* (= I laughed, because the joke was funny). However, in 'high-standard' German, and especially in the written form, this word order is seen as a sign of low-standard. Because the German syntactic formation rules 'know' this connotation of the word order, and because the conceptual structure gives the direction that the style of the paper is to be in high-standard because it is academic, the correct English syntactic structure of the sentence is blocked and the German syntactic structure is chosen instead. Here, the usage of the (incorrect) German syntactic structure is the result of an internal, unconscious strategy of making the language style-appropriate (Hyland 2004: 216).

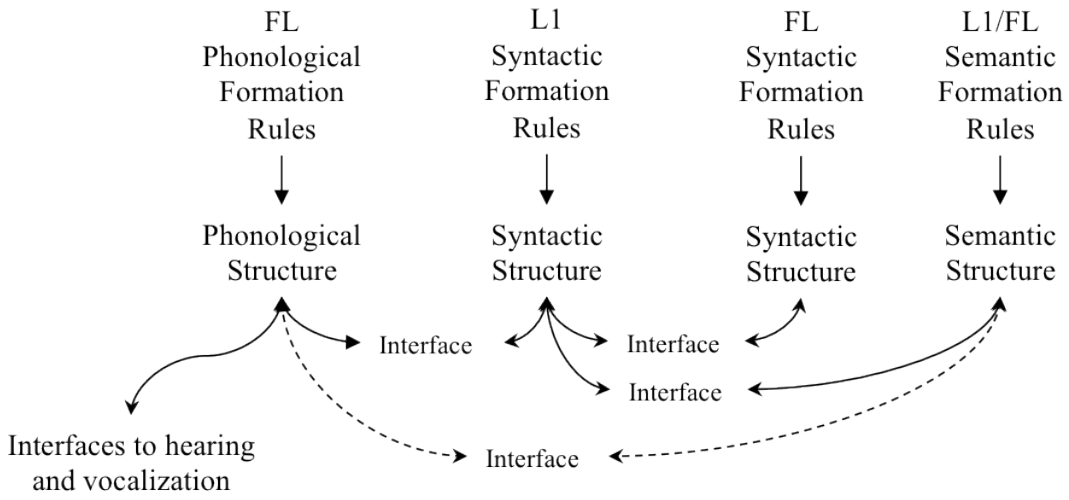

Fig. 2.4 Syntactic node-switch

Figure 2.4 illustrates how node-switching takes place. The illustration is greatly simplified and only includes the interface activations that are crucial for the production of the syntactic node-switch. First, the conceptual structure determines that the text to be produced must be written in English and that it is academic in nature. For these reasons, it denotes the FL Phonological Structure and FL Syntactic Structure as the dominant ones and conveys the information that the words and the syntactic structure to be chosen should be high-standard. In the example above, the need for a causal clause to introduce evidence prompts the Semantic Structure to activate the lexicon entry /because/. The activated FL syntactic formation rules of this entry stipulate that *because* requires a NP with the standard word order; that is, the verb must take the second position in the phrase. At the same time, the (active) L1 syntactic formation rules choose the high-standard syntactic rule, which indicates that the verb-second position is prohibited. This information interferes with the FL Syntactic Structure. In the example, the L1 syntactic structure overrules the correct verb-second position. It transfers its word order to the FL Phonological Structure, which generates the phonological formation of the words to be produced in the linear order that the L1 structure demands. The sentence to be written is thus generated in a syntactically incorrect – that is a German – way.

In a simple sentence such as *He laughed because the joke funny was*, the consequence of a syntactic node-switch is semantically negligible. For English monolinguals, understanding the sentence becomes more difficult, but they will still likely succeed in perceiving the intended message. If the syntactic structure is more complex, however, and if the underlying conceptual structure contains more complex information,

the monolingual's ability to understand the sentence can be seriously compromised. As an example, see the following sentence:

(1) Different concepts of language that were to ensue accounted differently for the character of the non-verbal items that words were to stand for and the relation they subscribed to exist between the two relata.

The example is taken from a German student's paper and was judged to be nonsensical by an American professor. For German-English bilinguals, on the other hand, the syntactic structure may sound clumsy – depending on their own language proficiency – but the intended meaning of the sentence is nevertheless graspable. This is as follows:

(2) Different concepts of language ensued. Each of them accounted for the character of the non-verbal items that the words stand for, as well as for the relation that they subscribed to exist between the two relata.

Or to put it even more simply:

(3) Different concepts of how language works developed. Each of them included different ideas about how language mirrors the 'real world'.

To be sure, in sentence (1) it is not only the syntax that makes understanding difficult. The choice of words is also rather awkward; yet it is the node-switching in the syntactic structure that makes the sentence unintelligible to the English monolingual. Among other things, the sentence is rather long and nested, which is how many German academics think it should be in academic writing. That is, this node-switch is supported by this specific demand on the academic syntax (Clyne 1987: 213; see Chapter 2.4.2).

Another, more concrete syntactic node-switch is the syntactic structure of the VP *to account for*. In English, the subordinate PP should not be separated too widely from the verb, and if a second subordinate phrase of the verb follows, the preposition should be taken up again. In German, the native and dominant language of the writer in this example, it is normal to separate a verb from its subordinate PP. The division of the verb from the second dependent prepositional phrase (*the relation they subscribed to exist between the two relata*) in sentence (1), with no additional *for* marking it as a PP belonging to *account*, makes understanding the intended meaning difficult for a monolingual English reader. Such a reader will instead understand the phrase as belonging to the relative clause *[of the non-verbal items] that words were to stand for*. However, the semantic information which is then generated by this interaction of syntactic and phonological structures with the conceptual structure will make the reader misunderstand the intended meaning. Together with the complex syntax of the sentence as a whole, the intended meaning becomes obscured.

In a German-English bilingual, the phonological structure of the sentence activates the English as well as the German syntactic structure in the Parallel Architecture (although the activation of the German syntactic structure is at first weaker than that of the English syntactic structure; Green 2008: 34). Since the English syntactic structure does not provide the "correct" form for transferring the phonological to the conceptual structure, the activation of the German syntactic structure becomes stronger, and in that way becomes responsible for the correct reception of the sentence. The missing preposition *for* would not be an omission in German syntax, and therefore the German reader understands the meaning correctly.

Since FL and L1 phonological and syntactic structures are linked to the conceptual structure via the interfaces, different types of node-switches can occur. The speaker may use the correct FL syntactic structure for the message generated in the conceptual structure, but may use the L1 phonological formation rules in generating the phonological structure. This can happen, for example, if the speaker has to read a line aloud and does not know how to pronounce one of the words, or if they learned an FL word from a book and generated their own pronunciation using their L1 phonological formation rules. An example for this could be the word *war*, the orthographic form of which exists both in German and in English. In German, *war* is pronounced /v a: r/ and means "was". The English *war* is pronounced /w ɔː r/ and has a completely different semantic (and syntactic) structure. If a German FL speaker of English pronounces *war* as /v a: r/, the phonological node-switch has implications for the semantic structure that the hearer generates from the message they receive. If they do not know German and cannot use node-switching in order to regenerate the intended meaning, the phonological structure has no interface to any semantic or syntactic element. The hearer will not be able to build up a semantic structure that conveys meaning. For a German, on the other hand, it is also difficult to understand /v a: r/ in the intended way. For them the L1 phonological structure is directly interfaced with the semantic and syntactic structure of the German word *war* ($V_{sg./past\ tense}$/[BE]) and in consequence, different meanings are activated that either do not fit into the context, or have the potential to divert understanding in a completely different direction. Still, the interfaces between L1 and FL might help the bilingual to grasp the intended meaning in the end because they might activate – explicitly or implicitly – the orthographic representation of /v a: r/ → *war* which also activates the English phonological element /w ɔː r/ (see also Dijkstra, Roelofs and Fieuws 1995: 264, van Heuven and Dijkstra 2010: 224).

Node-switches are also possible between the L1 and FL orthographic structures (e.g. writing *philosoph**ie***, using the German suffix, instead of *philosoph**y***), or between the L1/FL phonological or semantic structures and the L1/FL orthographic structures. If, for example, a German FL English writer writes *extent* instead of *extend*, one can presume that they applied the German final devoicing to English voiced word endings in the phonological structure, and because of this committed a spelling error.

Because the interfaces work two-way (Jackendoff 2002: 198 ff., 2007: 49), node-switches can occur in producing language as well as in perceiving language. As seen in the example above, the FL phonological and syntactic structures as well as the L1 phonological and syntactic structures are active when a person takes part in a conversation (Abutalebi and Green 2007: 243). When hearing an FL word that has the same pronunciation as an L1 word with a different semantic structure, this semantic structure may be the one activated, if, for example, the hearer does not have the intended FL word in his or her lexicon. This can also happen if the FL phonological structure sounds like a one-to-one phonological translation from an L1 word. For example, the sentence *I love high gables* was understood by a German who was not proficient in English as 'I love high forks', because the rarely-used *gable* was unknown to him and, in trying to understand the message, he looked for a similar German word in his mental lexicon. The German word *Gabel* /g :a b ə l/ (=fork), which would be pronounced *gable* /g eɪ b ə l / using the English phonological formation structures, is activated, and with it, its syntactic and semantic structures (see Grosjean 1982: 300–306).

Chapter 4.3 will give a broader as well as more precise overview of the kinds of node-switches that can (and do) occur in written texts.

Like code-switching, node-switching can take different forms if the speaker is aware of the differences between L1 and FL rules: it can be situationally motivated and intended, it can be contextual, and it can be a performance form (Muysken 2000: 222). Situationally-motivated phonological node-switching, for example, is used extensively in cinema in order to indicate that one of the characters is a foreigner. In films about the Second World War, German characters – and in particular fascists – are often made to pronounce their English dialogue using German phonological formation rules. This node-switching signals to the audience that this character is evil and that one should not trust him, even if he pretends to be on the good side.

Syntactic node-switching can likewise be used intentionally to convey meaning. For example, many viewers of *Star Wars* believe that Yoda is using German syntactic structure in passages such as the following:

> Ready, are you? What know you of ready? For eight hundred years have I trained Jedi. My own counsel will I keep on who is to be trained. A Jedi must have the deepest commitment, the most serious mind. This one a long time have I watched. (Kasdan and Brackett 1980: www.imsdb.com/scripts/Star-Wars-The-Empire-Strikes-Back.html [2012-06-12])

Although the performed syntactic structure is not strictly German, it does have traces of it: the missing auxiliary *do* in the question *What know you of ready?* and the verb end position in the sentence *This one a long time have I watched* evoke a German impression. Here, German has a positive connotation: it gives Yoda a wise and thoughtful aura – like Kant or Hegel – and so alludes to the once dominant position of German as the language of international academic discourse.

Most of the time, however, node-switches are not intentional. They are simply a symptom of performance errors caused by the increasing influence of L1 due to various factors – cognitive overload and the inability to reduce L1 activation, or the need to overcome a lack of language knowledge by making use of the linguistic resources in other structures (Sternberg 2009: 399). Such errors can lead to misunderstanding, but they can also help keep the conversation moving forward, because the speaker does not have to interrupt their language production to look for the correct FL form (Snellings, van Gelderen and de Glopper 2004: 175). In this way, node-switches can be both "a blessing and a curse".

2.6 Conclusion

Many errors that occur in FL speaking or writing are the result of competition among the different language systems inside the speaker's/writer's brain, struggles in which a language other than the target language gains the upper hand – most often, the L1. The speaker/writer does not completely switch into the L1, but only parts of their sentences/phases/words show the L1 influence; or the writer applies genre elements of one language to the other language. These phenomena can be explained by a bilingual version of Jackendoff's *Tripartite Architecture*, since many errors can be identified as switches between phonological, syntactic and orthographic structures and their rules, and between the L1 and FL registers and the semantic structure. These errors can be the result of low FL competence, of imbalances in bilingual speaking and writing, or of impairment of language, in which the linguistic structure makes use of the L1 in order to generate a

phonological output for conveying the intended meaning (Bloom and Gleitmann 2001: 886, Francis 2004: 185).

In this way, the Bilingual Tripartite Architecture can work as a compatible alternative to other bilingual language models (e.g. Dijkstra and van Heuven 2002, Francis 2004), since it makes use of findings in neuroscience (e.g. Bock 2001, Bond 2005, Cheney and Seyfarth 2005, Friederici 2006, Götze 1997, Grodzinsky 2006, Hagoort 2006, Indefrey 2007, Kim *et* al. 1997, Mayes 2005, Müller 2003a, 2003b, Poeppel and Hickock 2004) as well as different linguistic schools (e.g. de Bot, Lowie and Verspoer 2007, Brugman and Lakoff 1993, Lakoff and Johnson 1980, Langacker 1987, 1991, Levelt 1989, 1999). In Chapters 6 and 7, it will be used in order to show how node-switches occurred in the final texts written by test subjects, and what kinds of node-switches occurred, and whether the participants had any awareness of these node-switches during the language production process – that is, whether they noticed them and tried to correct them.

3. Cognitive Aspects of Writing

> Our literature, our science, our philosophy, our law, our religion, are, in an important way, literate artefacts. We see ourselves, our ideas and our world in terms of these artefacts…The topic of literacy is all about the special, indeed peculiar properties of these artefacts…and about the kinds of competence, the forms of thought and the modes of perception that are involved in coping with, indeed exploiting, this world on paper. (Olson 1994: xii–xiv)

Writing has communicative functions and in many respects shares the same cognitive capacities that speaking uses for its production processes. Still, writing is "not just speech written down" (Galbraith, van Waes and Torrance 2007: 3, see also Grabowski 2003: 355/356, McCutchen 2008: 118, Pugh *et al.* 2008: 436, Torrance 2007). It is not an innate, "natural" form of communication but a relatively new, culturally dependent development (Olson 1994: 43, Sampson 2001: 895); as Hidi and Bascolo put it, "literacy events are more than individual acts of meaning making and language use" (Hidi and Bascolo 2008: 153; see also Prior 2008: 54 ff.). Because of this, the acquisition of literacy is not complete when one is able to read or write. Rather, the successful writer takes into account the individual and social contexts of the literate practices in which the writing task is performed, and uses them as a pattern of practices in which the language makes the meaning (Flower 1994: ch. 2, Schultz 2008: 366, Tardy 2009: 11).

In other words, writing is a rather complex process that requires extensive self-regulation and attentional control (Hidi and Bascolo 2008: 154, Ransdell and Levy 1996: 93). The demands that writing places on working memory capacities are thus more complex than they are in verbal communication: the writer must deal with the graphic representation of his or her communicative intentions, and internal language must be converted from phonemes to graphemes. The writer has to know how to construct sentences, and at the same time should have in mind the need to maintain cohesion and coherence (Kellogg 1996: 61, 1999: 43, Sanders 1997: 120, Sanders and Maat 2006: 591, Torrance and Galbraith 2008: 71). Additionally, the author should pay attention to the fact that the audience is remote. Immediate feedback is not possible, and for this reason it is necessary to plan the *what* and the *how* more carefully than when speaking, where gestures can help to guide the addressee's understanding and where it is often immediately apparent whether the intended message is being grasped by the audience. In writing, the author creates an "autonomous cognitive object" (Galbraith, van Waes and Torrance 2007: 2) which is stored and accessed independently from the writer. In doing so, a process of negotiation is triggered in which individual readers and the writer juggle conflicting demands and chart a path among alternative goals, constraints, and possibilities. Success in

this process is hard to achieve, since the writer and his readers are situated in different contexts and times and have different backgrounds with respect to knowledge of content, to cognitive resources and to cultural as well as social aspects (Alamargot and Chanquoy 2001: 1, Flower 1994: 103, Grabowski 2003: 85, Ransdell and Levy 1996: 100, Shanahan 2008: 176, Torrance 2007).

On the other hand, the difference in the time available for writing as opposed to speaking, i.e. the fact that a writer can usually spend more time on the processes of generating and formulating ideas than can a speaker, can mean that written texts are more clearly organised and more goal-oriented than are verbal expressions (Hayes 1988: 580/581). Unlike verbal action, the writer can – and often does – pre-plan the text. Since the task situation changes continually throughout the writing process, more information becomes available to the writer as they write. They can revise the text during the writing process, and in so doing, continually improve the text quality. Additionally, writing itself can generate new ideas and mental structures (van den Bergh and Rijlaarsdam 1996: 231, Breetvelt, van den Bergh and Rijlaarsdam 1994: 113, Galbraith 1999: 142/143, 2009: 18, Grabowski 2003: 364).

Although models of writing differ distinctly (see e.g. Bereiter and Scardamalia 1987, van den Bergh and Rijlaarsdam 1999, Chenoweth and Hayes 2001, Hayes and Flower 1980, Hayes 1996, 2012, Kellogg 1996), the following five components are agreed by the majority of researchers to be inherent writing processes. In order to fulfil a writing task, the writer must (1) *generate ideas*, and (2) *create a plan*. The plan combines a more closely specified goal of the writing task and a list of the means to be used in order to reach that goal. A decision is also made about the order in which those means should be applied (Dansac and Alamargot 1999: 95, Hayes and Nash 1996: 30, Olive 2004: 35, Troia 2008: 329). The writer plans the way in which they want to convey the information; that is, they impose a linear order on the network of ideas; in the next step, this linear order can be translated into the language to be written down. This act of (3) *translation* involves word-retrieval and the development of syntactic structures, as well as phonological and grammatical encoding and reference to orthographic rules (Torrance and Galbraith 2008: 71).

Hayes and Flower (1980: 15) chose the term *translation* because the ideas are not necessarily represented verbally in the writer's mind, but could have a visual or acoustic form (e.g. if the task is to describe a picture or a melody). In the following, the term will be replaced by *formulation* in order to minimise ambiguity, since in the context of FL writing,

translation can be understood as the conversion of text from one language into another, which is not the meaning of the term as used in the literature on writing.

After formulation, the writer must (4) *programme and execute the finger moves* for typing or handwriting. They also (5) *revise* the text produced – either mentally before writing, or after writing, when reading and editing the text produced so far (Flower and Hayes 1981: 374). For all of these tasks, specific skills are needed which the writer has acquired and practiced during previous writing tasks.

Apart from language-internal aspects, there are also *language-external aspects* which the writer depends on in order to cope successfully with the writing task. These include the social context (Lantolf 2011: 24, Pittard 1999: 164), the genre (Chapter 2.4), and the knowledge the writer has about the topic he or she is going to write about – either stored in long-term memory or derived from source texts (Dansac and Alamargot 1999: 80/81, Eysenck 2009: 113, Kellogg 1987: 257, 1996: 57, 1999: 43).

All of the composition processes are controlled by a *monitor*. The monitor controls the orchestration of the writing processes, that is, "the temporal organization of cognitive activities" (Alamargot and Chanquoy 2001: 125; see also Braaksma *et al.* 2004: 2, Graham and Harris 1996: 349, McCutchen 2000: 20/21). It decides when the writer moves from one of the processing steps to the next, e.g. when the number of ideas generated is sufficient, when the plan is clear enough, when formulation can begin and when it must be interrupted by revision. How these decisions are made depends on the goals and the writing habits of the individual writer. For example, there are so-called *Mozartian* writers who prefer to plan the whole text in detail before writing the first word (Boehm 1993), but there are also *Beethovians* who start to write as quickly as possible while remaining aware of the need to edit and rewrite extensively (Bräuer 2009: 56, Torrance, Thomas and Robinson 1999: 190, van Waes 1992: 174).

3.1 Writing components

In the following, the five components of writing – idea generation, planning, formulation, execution and revision – will be discussed in greater detail.

3.1.1 Idea generation

A crucial factor in the writing process is the generating of ideas. If this process is not successful, the rest of the writing process cannot be invoked. In most writing models (e.g. Flower and Hayes 1984, Hayes 2008), idea generation is the starting point on which the plan is built. Most studies posit that ideas are generated by activating knowledge that is

stored in long-term memory (e.g. Torrance, Thomas and Robinson 1996: 192). Idea generation is seen as being more or less language-independent, in that it operates without the active use of linguistic capacities.

However, recent research has found that idea generation often interacts with formulation; idea generation can in fact be enhanced by the writing process itself. Van den Bergh and Rijlaarsdam (2007), for example, therefore assume that content generation is in part driven by spreading activation. This activation causes the nodes and interrelations to change during text production – that is, the text activates nodes that have not been activated before:

> Generally speaking, spreading activation accounts for the fact that one concept may facilitate recalling of another, associated concept. Which other concept(s) is(are) activated depends on the structure of the network. The main point to be made here is that the attentional state (working memory) changes due to text production. (van den Bergh and Rijlaarsdam 2007: 127)

In a test (van den Bergh and Rijlaarsdam 1999), the authors analysed think-aloud protocols created by writers during the text production process. From the results, they concluded that there are at least five different generation types. In *Assignment-Driven-Generation*, the writer generates ideas upon having read the assignment. *Rereading-Text-Driven-Generation* activates the generation of new ideas after the writer has read the text produced thus far. In *Translation*[i.e. formulation]-*Driven-Generation*, nodes that are activated in the formulation process activate other nodes (e.g. images, strings, etc.). In *Generation-Driven-Generation*, an idea produced in the generation process activates the next idea; and *Pause-Related-Generation* occurs after pauses have taken place (100/101).[2]

The different generation types play different roles at different points in the production process. Since the authors propose that idea generation is a context-sensitive cognitive process, the probability of occurrence of the types of generation at specific points in the production process is variable, as is the effectiveness of the types at different moments. For example, Generation-Driven-Generation is seen as being generally effective throughout the whole writing process. It might be an indicator of thoughtfulness. Assignment-Driven-Generation is particularly relevant at the start of the writing process,

[2] In 2007, the authors revised this labelling as they realised that the terms are hard to interpret. Additionally, in other experiments they found that often, the trigger for the generation is not located in the writing process directly preceding the generation. Because of this, they excluded *Pause-Driven-Generation*, since they believe that pausing does not trigger activation of nodes. In its place, van den Bergh and Rijlaarsdam include *Structuring-Driven-Generation*, which is activated by the structuring processes either of previously generated ideas, or of parts of already-written texts (129).

while Rereading-Text-Driven-Generation is most effective at its end. Translation-Driven-Generation should be monitored carefully and is most important during the process of writing the text body (van den Bergh and Rijlaarsdam 1999: 114, 2007: 127).

David Galbraith (1999) introduces another perspective on the generation process during writing in his *Dual Process Theory*. Galbraith proposes that text and content are not generated and planned only during the planning stage; for him, the writer can use text production itself to generate more knowledge. Spontaneous writing generates ideas which are shaped afterwards in terms of their rhetoric in order to bring them into an adequate form (Elbow 1973: 10/11). Other scholars agree: "Writing sentences can lead to more than just a change in the writing plan. It can also provide the occasion for writers to change their understanding of the topic" (Kaufer, Hayes and Flower 1986: 124). This view contradicts problem-solving writing models (e.g. Bereiter and Scardamalia 1987: 342 ff.), which state that one either thinks, then writes, or one simply transfers one's knowledge in a written form.

In his dual-process model, Galbraith assumes that writers develop content in two different ways: the explicit problem-solving strategy (=knowledge transforming; Bereiter and Scardamalia 1987: 10 ff.; see 3.1.2), and the knowledge-constituting process. In the problem-solving strategy, the writer evaluates and modifies their ideas in order to satisfy their rhetorical goal. The writer does not gain any new understanding of the topic in this process (Evans 1989: 89). In the knowledge-constituting process, thoughts are spontaneously articulated and the writer gains understanding of the topic thereby. The underlying idea is that the writer stores and processes the knowledge that they encode in writing differently from the knowledge to which they apply problem-solving strategies. The sentences writers produce are stored in episodic memory. They are local cycles which are situated in global cycles. The sentences that are produced at a later point bring up material that was previously suppressed. Because of this, conflicting ideas can arise, forcing the writer to reflect more thoroughly on the topic and perhaps bringing them to adjust their views (Sharples 1996: 144/145). Since the ideas are formed in writing, they stand in relation to each other. In contrast to texts that are produced after a pre-planning phase in which the writer consciously searches for ideas, texts by the spontaneous writer are not expected to exhibit problems with coherence, but should have an "organic unity" (Galbraith 1999: 151) and thus be of better quality. This suggests that the use of problem-solving strategies would be better shifted to revision and to the interface between successive drafts, while the knowledge-constituting process should be allowed to create an

interaction between problem-solving and thought (Galbraith 1999: 153, Galbraith, van Waes and Torrance 2007: 5, Klein, Bomann and Prince 2007: 202/203).

3.1.2 Planning

Idea generation and planning are usually interwoven and influence each other. If writers cannot generate enough ideas, their plans will be correspondingly simple; if, however, the ideas are numerous and various, the planning of the text will become more demanding. The term 'planning' in writing theory is not used in the strict sense of 'making a detailed plan' *before* starting to write, but is understood to mean making use of the internal representation of the knowledge to be used and choosing the organisation of the text to be written (Flower and Hayes 1980: 43). The planning process has several sub-processes. The key elements are reflective processes, which include problem-solving strategies, decision making and inferring. *Problem solving* outlines the steps the writer has to take to reach their goal. In essay writing, these steps include creating a plan for the text, making an argument, adding words together to make sentences, etc. If the writer does not have an adequate task schema, problem solving and *decision-making* are together responsible for the adequate fulfilment of the task. In decision-making, the writer evaluates alternatives and decides which ones to take. In *inferencing*, the writer derives new information from old information (Hayes 1996: 21/22, Jackendoff 2002: 199).

When dealing with a writing task, the writer identifies the idea categories which are most appropriate for the task. They decide which ideas are superordinate and which subordinate. The writer also chooses the appropriate way in which to convey the content: the order in which the topics and subtopics should be presented, the importance of the individual (sub)topics, and the emphasis the writer wishes to place on them accordingly. Both rhetorical aspects and the nature of the intended readers have an impact on this process (Greene 2008: 947). Often, these aspects guide the goal-setting process in which the writer decides – for him- or herself – what he or she will convey and how to do so (Bereiter and Scardamalia 1987: 303, Flower and Hayes 1980: 41, Hayes 1996: 5). These processes can take place subconsciously, but they can also be the result of a conscious searching and thinking process (Hayes 1996: 21). The planning processes are not finished after the pre-writing planning phase, as is proposed by stage models of writing (e.g. Rohmann 1965), but take place during the entire *recursive-cognitive writing process*: writing is "not a one-way process of planning followed by translation but a two-way interaction between reflection and text production processes taking place both within and across drafts" (Galbraith, van Waes and Torrance 2007: 5).

Different writing tasks require different planning strategies. In several empirical studies, Bereiter and Scardamalia (1987: ch. 1) showed that the planning strategies can range from the 'natural' end of the writing-ability continuum, which they call the *knowledge-telling strategy*, to the 'difficult' end, the *knowledge-transforming strategy*. The strategy of knowledge-telling is a very efficient one. In cases when the writer is able to specify the topic and the genre without difficulty, they will be able to generate a task-appropriate text without having to use more than the information stored in long-term memory. Knowledge-telling basically corresponds to the production of verbal language. The writer identifies the topic and the type of discourse with the help of their content knowledge and their discourse knowledge (Graff 2008: 722). Both are prime associated concepts, which retrieve content from memory via the spreading activation in the long-time memory network (Anderson 2009: 188, but see: van den Bergh and Rijlaarsdam 1999: 100). In a subsequent step, the writer tests whether the information called forward is appropriate for the intended text. If the test of appropriateness is passed, the writer writes the content down (in notes or in text). In the following cycle of generating new content, the writer will attempt to make the new content fit the text already produced.

Because of the efficiency of this strategy, it has proven to be a successful basis for writing – not only in school writing tasks, but also in texts produced at university as well as in professional life, provided that the writer's knowledge of the topic and his language abilities are adequate (Bereiter and Scardamalia 1987: 344 ff.). Novice writers or writers with learning disabilities also make extensive use of this strategy, although they tend to experience less success with it than do expert writers (Troia 2008: 325).

For expert-level writers, however, composition is a goal-directed, complex activity which is quite distinct from talking (Bereiter and Scardamalia 1987: 350, Galbraith 2009: 9, Sanders and van Wijk 1996: 256). In the knowledge-transforming strategy, knowledge-telling strategies are included, but the writing process is not confined to capturing and expressing stored knowledge. Instead, writing becomes a problem-solving process. The writer develops "an explicit representation of the rhetorical problem as a hierarchy of goals and sub-goals, and requires the active transformation of content in order to satisfy [these] goals" (Galbraith and Torrance 1999: 3). This in turn leads to rethinking and restating until the thoughts are fully developed. After the writing process, the content and discourse knowledge is no longer the same, but is transformed – a very laborious and strenuous procedure, as Ian McEwan described in 2001:

> I would sit without a pen in my hand, framing a sentence in my mind, often losing the beginning as I reached the end, and only when the thing was secure and complete would I set it down. I would stare at it suspiciously. Did it really say what I meant? Did it contain an error or an ambiguity that I could not see? Was it making a fool of me? (McEwan 2001: 37)

In knowledge-transforming, writers analyse the task, identifying which problems are set and deciding on their own goals for fulfilling it. Two problem spaces are involved in this: the *content problem space* and the *rhetorical problem space* (Bereiter and Scardamalia 1987: 303). The former is needed in order to work out the problems of belief and knowledge: "What do I mean?" (*ibid*). The latter is responsible for deciding on how to achieve the goals: "What do I say?" (*ibid*). The outcome of one problem space can serve as input for the other, and vice versa. For example, if the task to be fulfilled is to explain climate change in a book for primary school children, the rhetorical problem space might decide that in order to understand the whole process, the term *climate* first needs to be defined. What climate is, however, is stored among the content knowledge in long-term memory. The rhetorical problem space must therefore send a message to the content problem space to generate knowledge about the term *climate*. In the next step, the content problem space can decide that the knowledge it generated is too technical and can subsequently ask the rhetorical problem space to formulate a definition that is appropriate for children. In doing so, the rhetorical problem space might find that other aspects which have already been formulated are not phrased in a way that children understand them, and will revise the text already written. This, again, can lead to requests for more content knowledge, which in turn can change the writer's beliefs and their knowledge (Alamargot *et al*. 2007: 15, Butcher and Kintsch 2001: 295, Galbraith and Torrance 1999: 6, van Wijk 1999: 35). In the model that is proposed here, this process would be executed in the conceptual structure which functions as the interface between language and context.

Different experiments have shown that writers do indeed use different planning strategies, such as knowledge-telling and knowledge-transforming. Zbrodoff (1983), for example, tested how long people stopped and planned before starting to write after they were given an assignment. Zbrodoff found that adult writers had longer start-up times, which might indicate that they spent more time on planning and therefore on problem-solving than did children in grade five. In order to find out what writers did with their time before starting to write, Bereiter and Scardamalia (1987: 14 ff.) conducted a study in which the participants were explicitly asked to plan their writing in advance and to make notes in order to do so. The outcome of the test was that the notes of younger writers resembled a pre-edited version of the final text. In contrast to this, the notes made by adults were often

unordered and required a conscious creative act on the part of the writer in order to transform them into a coherent text. Similar findings resulted from think-aloud protocols, in which the spoken words of the younger writers corresponded more or less one-to-one to the written text (Scardamalia, Bereiter and Steinbach 1984: 178).

Based on these findings regarding the different writing strategies of novice and expert writers, van Wijk (1999: 41) defines five levels of text production. Writers at level 0 give their opinion in just one sentence. Lacking more ideas, they often include other topics in order to fill out or 'pad' the text (e.g. *I like to read. I also like to swim.*). Writers at level 1 give reasons for their claims. Although the reasons relate to the topic, they are not interrelated (e.g. *I like to read. I know a lot of good books. My grandma used to read to me when I was small. You can read in the tram.*). Level 2 writing is characterised by a one-sided elaboration of the topic. This level is equivalent to Bereiter and Scardamalia's knowledge-telling. The writer gives the list of reasons, makes them cohere and elaborates on them (e.g. *I like to read. I know a lot of good books that have interesting topics. Reading these books helps me to enlarge my knowledge which is good for my work and for my private life. It was already my grandmother who planted this feeling inside me when I was still a small girl…*). At the next level (level 3), writers are able to present two perspectives and come up with a conclusion. Global, local and topic coherence can be detected, and yet macro-processing is still rather minimal. At the highest level (level 4), the introduction, content and structure of the argumentation are generated strategically, and the writer is able to make stylistic choices. It is on the last two levels that writers achieve knowledge-transformation (van Wijk 1999: 42/43).

The borders between planning and formulation are rather fluid. Often, planning is partially formulated but not executed. Instead, inner speech takes place, which "to a large extent [is] thinking in pure word meanings. It is a dynamic, shifting, unstable thing, fluttering between word and thought" (Vygotsky 1962: 149). In inner speech and in pre-text planning – which Witte (1987: 398) called "the 'last cheap gas' before writers commit themselves to extended written text" – writers can plan and "tentatively translate [i.e. formulate] ideas before beginning a first draft" (Kellogg 1996: 60). There are also ways of externalising plans with only partial formulation, such as notes, diagrams, networks or lists, which make the planning process easier as they leave out the other subprocesses. Kellogg (1996: 59) therefore calls planning and formulating subprocesses of formulation. Galbraith, van Waes and Torrance (2007: 5), however, warn that the explicit thinking

process in writing theory may be overemphasised, and the more basic, implicit processes, such as formulation, have not so far been the focus of enough research.

3.1.3 Formulation

After idea generation and planning, the generated ideas are put "into visible language" (Flower and Hayes 1981: 373) in the process of formulation. Even if the thoughts are represented in words, the mental representation differs from the written text and does not yet meet its demands. For example, syntax is less elaborate in thinking. In addition, it is assumed that ideas are stored in keywords that are "[so] saturated with sense that…[they become] a concentrate of sense" (Vygotsky 1962: 247). Cohesion is not marked explicitly in thought: the ideas represent a mental network which is much more elaborate than simple keywords, and requires effort to formulate into a linear piece of language. Semantic, syntactic, phonological, and orthographic subprocesses are activated in order to express the ideas in sentences (see Chapter 2). Lexical units must be selected, syntax must be chosen, and phonology and orthography must be fitted into this frame. The writer then has to take into account generic and formal demands (syntax and wording) as well as motor tasks such as typing or handwriting.

Writers who formulate in an appropriate and efficient way tend to produce text in small divisions. On average, such writers produce a sentence in three parts "for each sentence of the final text" (Hayes 1996: 23). In Kaufer, Hayes, and Flower's series of studies of advanced adult writers (1986), the variances between the writers were individually quite large. One could see, however, that they tended to compose sentences from left to right, and in many cases did not produce whole sentences, but only sentence parts. Frequently, writers reread the sentence parts that they had written so far and then added a further segment. In the experiments of Kaufer, Hayes and Flower, the sentence parts ended at clause boundaries in about a third of the instances. The writers evaluated the sentence parts produced and sometimes rejected them for semantic or syntactic reasons. When the writers accepted a sentence part, they often appeared to be searching for a new sentence part that had an appropriate meaning. This indicates that writers generally begin writing syntactically complete sentence parts before the content of the whole sentence is fully determined. The results of the tests also show that prior knowledge of the meaning of a sentence as well as the prior knowledge of the grammatical structure of the sentence makes sentence production easier. These two factors – grammar and semantics – work independently from each other (Hayes 1996: 23). In the Tripartite Architecture, this means

that changes in semantics activate the interfaces to syntax and phonology, but it may be that this change in activation is not applied to the text written thus far.

The formulation process has not been analysed in writing theory very thoroughly. It is proposed that it operates by activating the language faculty of the writer. Yet this activation still has to make use of cognitive resources other than speaking: the writer has to build up a picture of the orthographic representation of the language he wishes to convey through written text. This means that formulation in writing makes use of greater cognitive capacities than does formulation in speaking (Olive 2004: 37). In FL writing, the demands are still greater, since here the writers have to block out the non-target language words and sentences which are activated in the formulation process (Abutalebi and Green 2007: 243).

3.1.4 Execution

In the physical processes of writing – the *execution* – the mental formulation is translated into motor activities. Execution is subdivided into *programming* and *executing*. These subprocesses take the output of formulation and programme it for the appropriate motor systems – be it handwriting, typing or dictating. When dictating, the speech system is activated; typing requires the programming of arm, hand, and finger movements; and in handwriting, the letter form must be selected and the grip execution must be programmed, as well as the muscle movements and feedback mechanisms. The latter become important when, for example, the written text is not visible because the writer has not pressed the pen hard enough on the paper; in this case the visuo-spatial sketchpad gives the feedback that the words are not legible, and the writer must repeat the execution processes (Kellogg 1996: 61, van Wijk 1999: 32).

Some of the execution processes can be automatised and do not require much conscious attention, but when a writer has to attend to them consciously, e.g. when he or she is a child first learning to write or an FL writer, these tasks can interfere with planning and other writing process (Alves, Castro, de Sousa and Strömqvist 2007: 56, Fayol 1999: 19, Hagoort and Levelt 2009: 372, Schacter 2001: 394, Squire 2001: 522, Wengelin 2007: 68). As noted above, however, research has not yet put significant emphasis on this aspect.

3.1.5 Revision

After execution, in the reviewing process, the writer reads, edits and evaluates the text he or she has produced with respect to "linguistic, semantic and pragmatic peculiarities of the writing goal" (Alamargot and Chanquoy 2001: 5). Reading and editing are aspects of *monitoring*. In reading, the writer recognises the words, comprehends sentences,

establishes coherence among sentences, and builds global discourse structures. Reading in this way is "a necessary, but not sufficient, condition for writing well" (Kellogg 1996: 61). In addition, the writer has to compare their intentions with the output of the processes when they are editing. A mismatch delivers a feedback – either to the process in question or to earlier processes, which then requires new planning and new formulation (Hayes *et al.* 1987: 179). Numerous forms of editing can take place. At one end of the scale, localised error revision (e.g. spelling and punctuation) can occur, while at the other, it may be necessary to address global problems (e.g. text structure). There are also forms in between these two extremes (Kellogg 1996: 61/62).

When reviewing consciously, the text may also be used as "a springboard to further translating [i.e. formulating] or with an eye to systematically evaluating and/or revising the text" (Flower and Hayes 1981: 374). Because of this, planned reviewing often leads to new planning, formulating, and – again – reviewing. The process of evaluating and deciding on alternatives is as active in revision as it is in planning, since in revision, the writer decides on the evaluation criteria that are to apply to the text and judges whether and in which respects it fulfills these criteria. As noted above, revision can also lead to new idea generation, in that the reading of the text triggers new nodes in the semantic network (van den Bergh and Rijlaarsdam 1999: 102, 2007: 131, Galbraith 1999: 152).

Reviewing is not restricted to the written text, but can take place before and after execution and does not always involve reading. For example, the plan or the formulation can be revised *before* execution. One can edit ideas, text organisation, text goals, inner speech etc. If the writer realises that the intended readers may not be able to understand some of the passages in the text due to lack of background knowledge, he or she may decide to add new information or leave whole passages out. In this way, reviewing can interrupt any writing process and cause the writer to 'jump' through the different sub-processes of writing (Flower and Hayes 1981: 374).

The influence of the point in the writing process at which writers commit themselves to editing can also depend on the task to be fulfilled. In empirical studies, Chenoweth and Hayes (2001: 94) found that in FL writing, editing during the process of composition was less fruitful than editing after composition was complete. This may be attributable to the higher demands made on cognitive resources by writing in the FL *per se* (Chapter 3.4), which makes it a more efficient strategy to try to undertake a minimum of processes in parallel (Hayes 2008: 29).

However, the attitude that the more the writer revises the text the better it will be (e.g. Britton 1996: 322), must be recognised as a generalisation requiring qualification and further analysis. In empirical tests, Becker (2006), for example, has shown that novice writers tend to spend most of their time on planning and writing. Revision for them is "punitive" (25). Good writers revise more, but their revision is concerned with the meaning of the text. Revision becomes an "almost hallowed place" (Bereiter and Scardamalia 1987: 22). Novice writers, less skilled or insecure writers, and – in many cases – FL writers may also spend a lot of time on revision, but they tend to concentrate exclusively on revising spelling or wording; that is, they often confine it "to a cosmetic level of little more than proofreading" (*ibid*: 22). They neglect structure or cohesion, whether it be because they still lack the necessary diagnostic skills (Bereiter and Scardamalia 1983: 21, Breetvelt, van den Bergh and Rijlaarsdam 1994: 105, Flower and Hayes 1981: 367, Hayes 1996: 17), or because the demands on working memory reduce their capacity to concentrate on problem finding (Becker 2006: 30, McCutchen 2011: 62, Phillips and Baddeley 1989: 68).

Additionally, in some cases, text revision does not lead to an improvement in the text, indicating that the writer's cognitive abilities are not adequate to the writing task and that they are struggling to find strategies to compensate for these deficiencies (Rijlaarsdam, Couzijn and van den Bergh 2004: 190). Because of this, it is necessary to limit the attribution of a major positive effect from revision on practised writers. For them, revision can function as another opportunity for discovering new ideas and structures, using the text written thus far as a discussant that triggers the semantic network.

3.2 External factors and working memory

External factors are factors that are not strictly speaking integral to the linguistic writing process itself (Flower and Hayes 1981: 369). The *task environment* includes all the things that are related to the writing task but are not actual elements of it: they include task materials (e.g. the assignment, the source text, dictionaries or style guides) and the text that the writer has produced thus far, and that they can read and reread while writing to guide their progress. Social factors, such as the intended audience, are also part of the external process level, as is the medium chosen for text production, e.g. a computer or a pen. The working memory is also seen as an external factor (Chenoweth and Hayes 2001: 84, Galbraith 2009: 14, Hayes 1996: 4, Kellogg 1996: 64/65, 2012).

The *writing assignment* can be understood as the rhetorical problem which the writer is asked to solve. It comprises the general text topic (often a task given by another person), the communicative goal (the audience), and motivational factors evoked by the writing

situation (Galbraith 2009: 10, Grabe 2001: 42, Park and Han 2008: 130). In the case of academic writing by students, the topic is often given by their professors or lecturers, and can range from a handout for an oral presentation, through an essay for a test or a term paper, to the topic of a Bachelor's or Master's thesis. For students, the audience aspect can be problematic: on the one hand, academic texts are usually meant to be aimed at a general audience of academically or scientifically interested readers; on the other hand, the actual reader is usually the lecturer, who is perceived by the students as 'superior' in respect to his or her knowledge of the topic (Burgess 2002: 211). This situation influences the motivating cues ("I want to do my exam with this professor and must impress her with my good work!") and in turn may influence the way in which the assignment is understood and how the rhetorical problem to be solved is defined – in this case: error-free writing, well-structured content, high academic style, excellent quotations, etc. (Flower and Hayes 1980: 44).

The *text produced thus far* also belongs to the task environment and puts many constraints on the writer and on the text still to be produced. The title that the writer chooses restricts the content, the topic sentence of a paragraph has an impact on the sentences that follow, and so on. Flower and Hayes (1980: 46, 1981: 371) suggest that the way in which the written text influences the subsequent steps in writing depends on the writer and especially on their level of writing skill. The poor writer often does not read their text in order to structure it appropriately and make it logical, and as a result, the final text may lack coherence; or they remain bound to the individual sentence and fail to make global decisions, for example on what to say next and how to reach the overall goal of the text (Flower and Hayes 1980: 48, van Wijk 1999: 42).

Also crucial for reaching higher levels of writing competency is the ability to attend to a large amount of information during the writing process (Bjorklund, Schneider and Hernández Blasi 2003: 1059). Expert-level argumentation demands control over topic as well as over global design, local concept and rhetorical considerations. Only if the writer attends to these four information units can coherence at the topic, local and global level be achieved, together with appropriate style (Sanders, Spooren and Noordman 1992: 25 ff., Sanders and van Wijk 1996a: 256, 1996b: 93). Thus, in van Wijk's (1999) view, "the development of writing skills consists to a large extent in acquiring suitable control strategies to make maximum use of limited processing resources" (45). The governance of these control strategies depends to a large extent on the capacities of *working memory*.

Baddeley and Hitch's (1974) description of the working memory heavily influenced cognitive sciences and the development of language models. In metaphorical terms, the working memory can be defined as "a multimedia production house" as opposed to a "warehouse in which information is passively stored" (Sternberg, 2009: 194). It comprises the *central executive*, the *sketchpad*, the *phonological loop*, and a number of other subsidiary slave systems. The *central executive* is an attentional control system that has only a limited capacity. It is responsible for active thinking, coordinating attentional activities and governing responses. Its task is to decide "what resources to allocate to memory and related tasks, and how to allocate them" (Sternberg 2009: 193). In so doing, it has a great impact on comprehension and higher-order reasoning. That is, the central executive is one of the main factors for human intelligence as it governs the processes of memory; thus it is one of the main factors for successful speaking and writing (Baddeley 1986: 225, 2001: 516, Bjorklund, Schneider and Hernández Blasi 2003: 1059, Ward 2006: 180).

The working memory has had a central role in research on writing since the 1990s (e.g. in Chenoweth and Hayes 2001: 84, Hayes 1996: 4, Kellogg 1996: 64/65, 2012, Kellogg, Olive and Piolat 2007: 107/108). All writing processes (except those that are completely automatised) make use of the working memory: in finding and articulating ideas and meaning, the working memory makes use of information stored in the long-term memory (Torrance and Galbraith 2008: 75). Ideas from long-term memory must be recalled, evaluated etc. In planning, the writer again has to retrieve information from their long-term memory (rhetorical as well as content knowledge) in order to fulfil the task using this material (Richardson-Klavehn and Bjork 2002: 1096). Working memory inhabits task schemes, which are usually activated by environmental stimuli, but can be activated through reflection as well. Working memory also activates the writer's knowledge about their audience. This knowledge influences the content and the rhetorical structure of the text to be produced (Dale 1999: 52, Mann and Thompson 1988: 246, Mann and Taboada 2005a, 2005b, Taboada and Mann 2006: 569). The writer has to manage tasks when solving problems and to decide on strategies for doing this. These processes are controlled and executed by the visuo-spatial *sketchpad* and the central executive, and these compete with each other for the limited resources (Galbraith *et al.* 2005: 117, Ward 2006: 180).

Formulating requires the *phonological loop* and the central executive. The writer must find appropriate words and fitting expressions. In certain situations (e.g. in the final

draft), this process can be rather strenuous, since the formulation may be judged to be central to the response the reader will have to the text. That is, the demands of formulation on the central executive may vary from writer to writer and from task to task (Lea and Levy 1999: 72). For example, tests by Brown *et al*. (1988: 53) show that if the demands on formulation are high, monitoring suffers. In their test, the participants were asked to write as quickly as possible. This caused an increase in the number of syntactic and cohesive errors, whereas the semantic content stayed more or less stable.

Reading, evaluating and revising require capacities both from the phonological loop and from the central executive. Since the editing task is seen to be more demanding than reading a text simply to get more information (Piolat *et al*. 2004: 23), most of the demands on the cognitive capacities are directed at the central executive. As was shown above, these demands can vary: the writer can revise locally – concentrating mainly on spelling or punctuation – or globally – evaluating and revising the structure as a whole. For Kellogg (1996: 61/62), this could indicate that in editing, a hierarchy of relevance is active, one that judges semantic content to be more important and therefore more relevant for the monitoring process and the central executive than are syntax and wording.

Looking at all these factors, it is clear that the demands on the *working memory* are significant and vary with the writer's skill in different areas (Berninger and Winn 2008: 102, Kellogg 1999: 47, Torrance and Galbraith 2008: 72). The limitations on working memory in a given writer influence the path of the writing processes as well as their success (Bjorklund, Schneider and Hernández Blasi 2003: 1060, Fayol 1999: 18/19, Olive 2004: 33). Because of this, many years of training and practice are needed in any genre of writing in order to attain expert-level proficiency (Kaufman and Gentile 2002). Only when these trained processes become automatised can the working memory relocate its capacities (Baddeley 2009a: 82/83, Connelly *et al*.: 281). If, for example, the writer feels comfortable with a specific topic, knows the genre well and can write in their L1, the demands on their working memory are minimal. They will be able to carry out many processes in the writing task more or less automatically. They can concentrate on structural and linguistic aspects in order to generate a comprehensible, coherent text (Sanders and Maat 2006: 592/593). In such scenarios, the skilled writer often plans the next sentence while typing or hand-writing the previous one. The same writer, however, may struggle with the text to be produced if the situation is different: if they do not have enough knowledge about the topic, if they do not feel comfortable with the genre (e.g. the high-level academic who has to present a complex idea so that it is understandable to a grade-

school audience) or if they have to write in an FL where they lack the relevant vocabulary. In these cases, the experienced writer might be – and often is – preoccupied more with formal text features than with the purposes, goals and reader responses to their writing, as they would be in their own topic area, genre and L1. The production of text becomes very strenuous due to a cognitive overload which, in turn, has a negative impact on text quality (Fayol 1999: 20, Flower 1994: 138, Levy and Ransdell 1995: 776/777, McCutchen 2008: 122, Torrance and Jeffrey 1999: 1).

Hayes (1996: 9) postulates that another crucial aspect for the distribution of the working memory's capacities over the various writing processes is *motivation*. Motivation can have different sources: it can lie in immediate goals (e.g. finishing the task as quickly as possible) or in long-term goals (e.g. enhancing certain writing competencies). Thus, if the goal is to finish the task as quickly as possible, the working memory will spend less capacity on reflection and make more use of task schemes stored in the long-term memory (Troia 2008: 325).

3.3 Parallel processing in writing

The writing processes are not uni-directional but often work in parallel, and thus compete for the resources of the working memory (Galbraith *et al*. 2005: 117, Kellogg 1996: 59, 2012, Lea and Levy 1999: 72, Levy and Ransdell 1995: 768, Torrance 2007). For example, the revision process often starts very early in the overall writing process. Most writers do not write down all the ideas they have after receiving an assignment, but revise and edit their ideas while writing – be it on a scrap paper or in their minds. These writers monitor the coherence of the text and the adequacy of the sentence structure and morphology during the writing process. In the formulation process, new ideas can emerge, which might then lead to a revision of the whole plan and, in turn, to a complete revision of the text written thus far (Hayes and Nash 1996: 33). In other words, the writing processes are interrelated and it is crucial for successful writing that the sets be well balanced. Only if this is the case can information be received and passed from one writing process to another in a fluent and uninterrupted way. A consequence of the varying demands made on cognitive resources is that the executive processes are often interrupted: writers write down words, pause, go on writing, pause again, and so on. Flower and Hayes (1981) suggest that this stop-start behaviour is part of a strategy of separating the thinking processes, which "writers orchestrate or organize during the act of composing" (366). It operates as a repeated plan-formulate-revise cycle.

Torrance and Galbraith (2008), however, propose that hesitation, rewriting and backtracking are in part associated with the need to repair problems that occur because of the complexity of the information processes and the constraints they put on the writer's limited cognitive resources. These researchers make use of McCutchen's (1994: 1) analogy and compare writers to "a switchboard operator [who is] continually, and at times frantically, trying to coordinate and direct the inputs to outputs from several component processes" (Torrance and Galbraith 2008: 73).

How the orchestration of the cognitive processes is managed depends on the individual writer and at the same time on the context in which they must perform the task (Pajares and Valiante 2008: 162, Schultz 2008: 362, Torrance, Thomas and Robinson 1999: 190). This raises the perennial question of whether and to what extent successful writing can be taught. MacArthur (1996: 344 ff.) and others assume that "process writing [is] primarily based on indirect rather than direct methods of instruction" (Graham and Harris 1997: 252). Elbow (2000: 166) proposes that students should not be pressed into a single approach to writing and planning an essay, since it is important to be flexible in the pre-writing stage. He suggests that it can even be counterproductive to have a clear picture of the final version of the text in one's mind before one begins to write, because then the potential of writing transform knowledge is reduced (Alamargot, Favat and Galbraith 2000, Menary 2007: 622, Newell 2008: 236). To put it in E.M. Forster's (1949 [1927]: 101) words: "How can I know what I think until I see what I say?". Other pedagogies – especially those in textbooks on academic writing – recommend generating a predefined picture of the entire essay before beginning to write, because otherwise the structure and the logic of the argument cannot be guaranteed; moreover, in exam situations – where texts are almost always written by hand – thorough revision is not possible (e.g. Aczel 2007: ch. 2, Reid 2000: ch. 3, for an overview of the discussion, see Prain 2009).

Applebee (1986: 106), Knapp and Watkins (2005: 83 ff.), and others argue that direct strategy instruction and guided practice are crucial for the acquisition of efficient writing processes. A study by Scannella (1982: 91), for example, found that students improved in expository writing after having been taught writing process methods. The students' attitude towards writing became much more positive in comparison to the attitude of the control group. When writing strategies are internalised, self-regulation strategies are employed, and writers can activate strategies for dealing with negative emotions that arise during the composition process. As a consequence of this positive thinking, the quality of the texts

improves. However, this improvement is not apparent in creative writing (Honeycutt 2002: ch. 5.1.2; for an overview of the discussion, see Hyland 2003: 178 ff.).

Van den Bergh and Rijlaarsdam (1999) found that certain cognitive processes are more likely to succeed than others depending on the stage of writing reached at a given moment:

> The occurrence of cognitive activities in the writing process is determined by two factors: 1) the writer's procedural knowledge of the ways in which he or she typically sequences cognitive activities and 2) the task environment (102).

In their dynamic model of cognitive activities, all such activities that take place during the writing process – including the basic ones such as typing – are guided by the monitor. It has access to both the text produced thus far and the procedural knowledge. The knowledge about the general writing processes and task-specific modifications tells the monitor which aspects it must concentrate on. This procedural knowledge can be acquired through experience or gained through explicit teaching (Baddeley 2009a: 82/83). It stores data about which cognitive activities are to dominate which stages of the writing process (van den Bergh *et al.* 2009: 400, Rijlaarsdam and van den Bergh 1996: 108). According to van den Bergh and Rijlaarsdam (1999: 102), it is not the frequency of a specific cognitive activity that is relevant for the success of the writing process, but the probability of its occurrence. This rate of probability changes during the writing process, as the monitor decides which activity is the most suitable at a specific moment. In this way, the situation at a given moment diminishes the number of choices to be made for the next step and gives the activity a different role depending on current demands. For example, when the writer reads the task at the beginning of the writing process, the reading activates the generation of ideas. In a later step, after parts of the text have already been produced, the re-reading of the task can either reactivate the generator in order to produce more ideas, or it can activate the revision activity. That is, it can be used to assess whether the text written thus far fits the demands of the assignment.

Rijlaarsdam and van den Bergh (2008) tested the model and investigated the writing processes of students who were about fifteen years old. These students were asked to write argumentative essays within a peer-audience-oriented contextual frame. The authors found that the cognitive activities involved in writing are indeed not spread randomly over the writing process, but that each activity tends to dominate at different points in it. Furthermore, the distribution of the processes influences the text quality (van den Bergh *et al.* 2009: 421, van der Hoeven 1999: 75, Rijlaarsdam and van den Bergh 2008: 51, van Weijen 2008: 163). Good writers analyse both the rhetorical problem that is posed by the

assignment and the purpose and audience of the text at the beginning of the writing process. As a result, they are able to generate a wider range of ideas. Reading the resource material before writing helps them to integrate facts and background knowledge into the text. If, however, the writer re-reads the assignment often in the later stages of the writing process, this indicates that they are still insecure about the actual task and the goals they want to achieve. As a consequence, the quality of the text tends to be lower (Levy and Marek 1999: 40, Rijlaarsdam and van den Bergh 2008: 43, van Weijen 2008: 163).

Some combinations of cognitive activities also have a higher probability of occurring at certain points in the writing process than others. When tasked with an argumentative essay, for example, writers tend to read the resource material in order to generate ideas, whereas during the formulation process, the resource material is consulted in order to find support for the thesis. In the revision process, the resource is needed to make sure that the facts quoted in the text are correct. That is, although the quality of papers and the orchestration of writing processes differ from person to person (and from task to task), it can be said that "the correlation between the occurrence of cognitive activities and text quality…is dependent on the moment in the writing process" (Rijlaarsdam and van den Bergh 2008: 44). In other words, it is not exclusively the level of writing skill in itself that has an impact on quality, but also the writer's knowledge of when to apply which skill. Rijlaarsdam and colleagues assume that the cognitive system learns which activity should follow another particular activity at a given moment based on (subconscious) routine, plus the influence of other activities that are triggered by the evaluation of the text produced thus far. The text changes over time, and with it so do the activated cognitive nodes, and writers employ different cognitive activities in response to the change in the internal representation of the text (van den Bergh and Rijlaarsdam 1999: 113/114, Breetvelt, van den Bergh and Rijlaarsdam 1994: 103, Dale 1999: 56/57).

All of these findings are based on studies in L1 writing. In FL writing, however, the strategies that are used may differ because of the additional cognitive demands placed on the writer – for example because of the need to repress the L1 (which is often more active), and because of the different orthographic structures involved (see Chapters 2.2 and 2.3).

3.4 The processes in FL writing

Leki and Carson (1997) summarise the differences between L1 and FL writing as being located in ten areas: epistemological issues; the functions of writing; the writing topics; knowledge storage; writing from reading; audience awareness; textual issues; plagiarism; memorisation; imitation; quotation; and the writer's right to his own language. If the FL

writer wishes to write successfully, they must cope with all of these areas. As a result, the probability of cognitive overload is increased. Impediments to certain aspects of the writing process must be compensated for by shifting cognitive resources away from some aspects in order to allocate them to others, or else by slowing the process down (Alamargot *et al*. 2007: 23, Dansac and Alamargot 1999: 95). Whether or not the writers are able to compensate for the problems depends on a whole range of factors: their knowledge of the language; their knowledge of how to use it; their individual traits as learners; their abilities and preferences; the social context; their attitudes and motivation; their writing practice; the instructional context; processing factors; cultural variability; content knowledge; and knowledge about discourse, genre and register (Grabe 2001: 53, Grosjean 2008: ch. 3.1, Spolsky 1989: ch. 3). That is, the acquisition of FL writing in part depends on factors that the writer cannot influence directly (e.g. formal instruction, abilities and preferences, attitudes and motivation), and in part on others which they can actively work to enhance (Ashby, Valentin and Turken 2002: 273).

Berman (1994: 38) tested FL students' writing with respect to the transferability of their L1 writing skills to their FL writing. He found that writers are generally able to transfer their skills, but that this ability depends on their proficiency in the grammar, structure and vocabulary of the target language (see also Sagarra 2008: 145/146). Expertise in L1 writing thus is not a sufficient condition for becoming a good FL writer (Galbraith 2009: 11, Grabe 2001: 44/45, Hirose and Sasaki 1994: 216, Wolff 2000: 109, but see Schoonen *et al.* 2003: 194). Often, FL writers are not as flexible in the usage of their writing skills and methods as they are in their L1, but are consistent in their strategies. 'Sticking' to an L1 writing strategy can be used as a method of overcoming cognitive overload; at the same time, however, it might have a negative impact on the quality of the FL text (Kimball and Holyoak 2005: 118/119, van Weijen *et al.* 2008: 219, 2009: 246, but see Beare and Bourdages 2007: 157/158).

Other studies document the fact that many FL writers tend to use the resources of both their L1 and the FL while composing (Cumming 1990: 31, 2001: 5, Uzawa and Cumming 1989). Sasaki (2000) conducted an experiment with L1 Japanese writers at novice and expert levels who were asked to write argumentative texts in FL English. The novice writers often stopped to translate the generated ideas from their L1 Japanese into FL English, whereas the expert writers stopped to refine the English expressions (278). Similarly, the participants in van Weijen's (2008) experiment with L1 and FL writers needed more "composing episodes" (164) when writing in the FL. Van Weijen proposes

that this is a symptom of a decrease in the attention span in FL writing, and that writers tend to use L1 as an attempt to overcome cognitive overload. Only if this is unsuccessful does the quality of the FL text suffer. That is, if turning to the L1 as a resource, the FL writer has to find a way in which the L1 "is used but not…misused" (Wolff 2000: 110).

The non-language internal factors in FL writing also have an impact on FL writing processes. As Leki (1992: 90) notes, "cultures evolve writing styles appropriate to their own histories and the needs of their societies". These styles are rhetorically distinct, no matter what other factors of processing are taken into account – be it the age of the writers, their language proficiency, the task complexity or the audience. Due to cultural and educational differences in the L1 and in the FL setting, the writer has to cope with different problems: they must decide which knowledge the FL audience is likely to have about the topic (e.g. if a person from Cologne writes about a carnival parade there, can they assume that a British audience will know about the tradition of throwing sweets and flowers?). The writer also needs to know about different cultural conventions, i.e. the "standards and norms specifying what is expected and considered appropriate in a particular type of written discourse" (Schneider 2012: 1027). When a German writer wants to apply for a job at a company in England, they should know how a letter of application is commonly structured in that culture, as well as which formal aspects should be taken into account (e.g. greeting, references, etc.), and which register is appropriate (e.g. level of formality). Contrastive rhetoric also highlights the influence of the L1 and its cultural settings on FL organisational structures. Organisational structures are above the sentence level, meaning that they are not restricted to different syntactic structures, but apply to the overall structure, the topics to be included, etc. For this reason, FL writers often perceive tension between culturally-appropriate writing and the personal voice, whereas L1 writers usually do not notice such tension (Devine, Railey and Boshoff 1993: 208, Galbraith 2009: 11).

Idea generation is more problematic in the FL if one sees it as being dependent on the activation of a semantic network. Although this network is seen as language-independent by different linguistic schools, the interfaces to phonology and syntax plus the interfaces between the phonological structures and back to the semantic network are language-dependent (see e.g. Culicover and Jackendoff 2006: 413, Hagoort and Levelt 2009: 372, Jackendoff 2002: 293, 2010: 9, 2012: 175/176, Ward 2006: 214, Zimmermann 2000: 85). That is, if the L1 is the most dominant language in the writer, the L1 network is denser and the activation of one word in the phonological structure during the thinking process will activate more nodes in the L1 network than will its FL counterpart.

Additionally, word-finding problems can suppress the activation of the semantic network via the phonological structures. The concentration on the interface phonology-semantics impedes the recall of other, associated concepts in the semantic network. Thus the "generation-driven-generation" which van den Bergh and Rijlaarsdam (1999: 114) propose to be an index of thoughtfulness is more difficult for an FL writer to carry out than for an L1 writer. The same is true for the overall organisation of a paper: the more working memory capacity the writer has to devote to finding words and syntax, the less capacity is available for structuring and organising (Berman 1994: 40, Cumming 2001: 5, van Wijk 1999: 45).

In the case of weak FL writers, the revision process is often problematic as well. Revision does not improve the text but makes it even worse, and writers tend to preserve the written text even if it is useless (see Breetvelt, van den Bergh and Rijlaarsdam 1994: 105). Strong FL writers, on the other hand, are often occupied with searching for appropriate words and phrases, with finding language forms that are appropriate for the expression of their ideas and for the intended genre. If FL writers are skilled, they plan effectively and extensively before and during composing, and they revise and edit more than do their less-skilled counterparts (Cumming 2001: 5, Sasaki 2000: 275, Zimmerman 2000). That is, the number of revisions and the goal of the revisions point to the text quality that can be expected.

In short: FL writers have to deal with higher demands on their cognitive capacities in all writing processes, and in order to deal with these demands, they must find strategies that differ from those applied in L1 writing. This need is even greater if the writer must write in a genre that is differently defined in the L1 and the FL – as is often the case in academic writing (Chapter 2.4.2).

3.5 Writing fluency

All the demands on the cognitive capacities have an impact on writing performance. To become an expert writer, one needs to possess a well-developed metarhetorical, metastrategic and metalinguisitic awareness, plus effective writing skills collaboration, knowledge of genre, text and context, and linguistic tools (Hammond and Macken-Horarik 1999: 529). If the writer is in command of these aspects, many writing processes can occur automatically, and writing fluency will increase. *Writing fluency* can be defined as the "rate of production of text" (Chenoweth and Hayes 2001: 81); thus writers that produce a greater number of words/signs in a specific amount of time are considered to be more fluent than those who produce a smaller number (see also Wolfe-Quintero, Inagaki and

Kim 1998: 4). Fluency may result from knowledge and the prior organisation of knowledge that strengthens internal connections, making recall easier, chunking and the sequences in which languages are learnt (Anderson 1995: 212, Chenoweth and Hayes 2001: 81, Dansac and Alamargot 1999: 84, Ellis 1996: 92 ff., Rohmann 2005: 107, Towell, Hawkins and Bazergui 1996: 85). For example, Berman (1994: 38) found that the transfer of L1 writing skills to FL writing depends on grammatical proficiency in the target language. Fluency is also an indicator of how effectively writing strategies are being applied. Hence the degree of fluency can be understood as an indicator of the level of quality to be expected from the text (Kellogg 1996: 67), and of the likelihood that writing is being used as a knowledge-constituting process (Galbraith 2009: 14). Fluency also shows the extent to which graphomotorical execution is automatised and does not require any awareness, or at least not a relevant amount (Ward 2006: 285).

For the analysis of fluency and the extent to which it influences or is dependent on the writing processes, the analysis of *bursts*, their frequency and their duration are an important tool. *Bursts* can be defined as "stretches of writing continuously produced to a given threshold of pauses" (Alves 2012); that is, they are the periods in which the writer is typing (or hand-writing) fluently, with no pauses and/or revision – such as deleting, moving the mouse to add words at another place in the text, correcting, etc. (Alves *et al*. 2007: 58). If the writer has more experience in writing and is language proficient, working memory resources are freed up and bursts consequently become longer.

In bursts, execution and other (internal) writing processes often take place in parallel. Generally, it is supposed that execution is more or less automatised and does not interfere with the cognitive writing processes. The writing process goes on fluently, with no unintended interruptions. If, on the other hand, the writer is not skilled in typing or hand-writing, the cognitive costs are higher (Grabowski 2003: 363/364) and he or she must struggle even more with the problem of being "a thinker on a full-time cognitive overload" (Flower and Hayes 1980: 33).

Olive and Kellogg (2002: 598/599) suggest that one method of dealing with this high demand is a serial mode of composition, in which writing bursts are delimited by pauses (*p-bursts*). This mode can be sketched as follows: first, both the writing plan and the text produced so far help the writer to produce semantic content (Hayes 1996: 23/24). The writer stores this content in working memory. In order to express it, they must create a surface form, which is stored in the *articulatory buffer* (Levelt 1989: 12). The writer then articulates the sentence parts (vocally or subvocally) until all of the content is expressed or

until the articulatory buffer has no capacity left. The articulated sentence parts are then evaluated. When this evaluation is positive, the sentence part is written down; when it is negative, the process starts over again. After having expressed all current content, the writer can search for new content, which is done during the pauses.

Various studies show that in the writing process, more pausing than executing processes tend to take place (e.g. Alves *et al.* 2007: 57). Inspired by studies of oral speech production (e.g. Levin, Silverman and Ford 1967, Tannenbaum, Williams and Wood 1967), researchers have been interested in the temporal course of writing pauses, analysing the purely linguistic as well as the semantic context (Alamargot *et al.* 2007: 14, Chanquoy, Foulin and Fayol 1990: 519, Dansac and Alamargot 1999: 85, Olive and Kellogg 2002: 596, Schilperoord and Sanders 1999: 14). The conclusions reached suggest that there are four different interpretations for these pauses: (1) pauses vary in duration depending on the complexity of the processes in which they take place; (2) the position of the pauses in the structure of the text throw light on the nature of the writing processes and their interactions; (3) during pauses, the writer is mentally dealing with the text to be produced next; (4) pauses take place if the processes demand a high amount of cognitive capacity and if the writer is not able to do this processing in parallel with graphomotorical execution.

Although these assumptions about the role of pauses in the writing processes might be true for short and simple texts that are, in terms of their processing, close to the production of speech (=knowledge-telling strategy; Bereiter and Scardamalia 1983: 27), they are not borne out in relation to longer and more complex texts. In the latter, more sophisticated composition strategies are involved. Writers tend to plan such texts more thoroughly and to (re)read them during production in order to revise and resume the production process. Because of this, the temporal course of text production in longer and more complex tasks differs strongly in terms of the writing process from the temporal course of text production in the case of simple written texts or verbal communication (Grabowski 2003: 360).

Chesnet and Alamargot (2005: 482/483) additionally propose that the slower pace of writing as compared to speaking enables the writer to execute even complex processes more easily in parallel (including graphomotorical tasks), whereas speakers – due to the greater speed and the need to spontaneously interpret the reactions of hearers and restructure/replan content as well as wording accordingly – need the pauses in order to (re)act. That is, in writing, high-level processing does not exclusively take place during the

pauses, but also during transcription (Brown *et al*. 1988: 45, Chanquoy, Foulin and Fayol 1990: 519, Olive and Kellogg 2002: 598). Processes such as content generation, planning, and revision constantly require attentional control. Pauses occur when the cumulative demands of the activities involved in the writing process are higher than the total amount of the available cognitive resources. At such points, the processes slow down or are postponed. How great the demands are depends on the degree of automatisation, the knowledge involved in the processes and the lexical access. In this way, FL writing – and even more so FL academic writing – includes more and longer pauses (Just and Carpenter 1992: 136). Additionally, the duration of the bursts is shorter – even more so for writers with limited linguistic experience, as is often the case with FL writers.

In order to find out more about parallel processing and other parallel events, Alamargot *et al*. (2007) conducted an experiment with adult writers in which they timed the pauses the writers made using a keylog programme combined with eye tracking. They found that the processes that take place in parallel with graphomotorical activities differ in terms of their relationship to the pauses. The researchers distinguished four different types of parallel events. First, there are *independent parallel events*, in which the processes occur but do not impede each other, and no pausing takes place. *Pre-pause parallel events* take place while the writers continue to type but are already looking elsewhere (e.g. at other places in the text they are composing than the ones they are writing at the moment). *Post-pause parallel events* are executions which take place directly after a pause, but while the writer is still looking at another place in the text. *Complex parallel events* feature alternating writing and pausing phases (Alamargot *et al*. 2007: 18–19). The results of this experiment indicate that during independent and pre-pause parallel events, writers are often dealing with conceptual matters, such as planning the content and the steps to be taken in order to execute the task. During post-pause parallel events, the writers are frequently concentrating on how to formulate the already-prepared content. The typing speed is reduced, which confirms the capacity theory's claim that there is competition for cognitive capacity between low- and high-level processing (McCutchen 2000: 18). That is, an interrelation could be detected between the frequency and the duration of the pauses and the writer's abilities with respect to lexical fluency, graphomotorical fluency, writing production span, and domain expertise.

Alamargot *et al.* (2007: 27/28) conclude that pauses are not always the result of a conscious decision to stop and plan or revise, but that they are often an indicator of cognitive overload. The boundaries of a pause should not be seen as strict indicators of the

start and end of an incident of cognitive overload, but often the processes begin before the pause starts and may continue after formulation has been taken up again. Still, Alamargot *et al*. assume that pauses are not exclusively determined by the cognitive resources. Linguistic units, especially word boundaries, also play a role in the occurrence of pauses. Sometimes lexical and graphomotorical constraints can "postpone some processes until unbreakable units…[have] been completed" (Alamargot *et* al. 2007: 28). Thus bursts are usually constrained by grammatical units; i.e. they often end at the ends of sentences or phrases, but they often consist of sentence parts rather than complete sentences (Hayes 2009: 67, Kaufer, Hayes and Flower 1986: 138, Nottbusch, Weingarten and Sahel 2007: 50). Matsuhashi (1981: 128) concludes that this reveals the demands on working memory to be especially high after clause boundaries.

Another activity that brings bursts to an end is revising (*r-bursts*, Chenoweth and Hayes 2003: 103). In cases where a writer has problems with metalinguistic awareness or writing skills collaboration, or where they lack knowledge about certain of these aspects, they are forced to stop the execution process and revise; they have to evaluate more consciously the text written thus far and the text yet to be written during the writing process. This leads to a decrease in fluency as well.

As was noted above, it is suggested that skilled writers revise more, and that their revisions are chiefly concerned with the meaning of the text. According to Hayes (1996), revision represents a task schema. It is a "package of knowledge [that] might be thought of as a set of productions – that is, condition-action rules – that mutually activate each other" (Hayes 1996: 16). The goal of this task schema is to improve the text. For it the writer defines attentional subgoals; that is, they decide what kinds of errors to concentrate on (content, style, or spelling), and they compare the text produced thus far with internal templates and criteria for quality. Less skilled writers concentrate more on orthography, punctuation and word semantics. In this way, spelling problems have an influence on the writing processes, as the constant need to make corrections reduces fluency (van der Hoeven 1999: 75, McCutchen 2008: 119).

For FL writing, Chenoweth and Hayes (2001: 89–93) found that the p-bursts of good FL writers are shorter than the p-bursts of L1 writers; the p-bursts of less proficient FL writers are even shorter. The percentage of r-bursts among the latter group is also higher than that of L1 writers. One conclusion is that the different distribution of burst types and burst lengths has an impact on the text quality and on the quality of the generated ideas (Galbraith 2009: 19, Hayes and Chenoweth 2007: 290).

The results of the analysis of fluency and burst production of the participants will be discussed further in Chapter 5.

3.6 Strategies for problem solving

The description of the writing processes and the cognitive demands these processes make has shown that it is not uncommon for writers to run up against processing constraints. Writers can use different methods to overcome them (Torrance and Jeffrey 1999: 6): one such method is practice and training. Whereas at the beginning of writing acquisition, children encounter problems with subcomponent skills such as the low-level skill of transcribing and spelling, in the experienced writer, these skills are automatised and do not interfere with the higher-level processing mechanisms, such as content structuring or idea generation (Connelly *et al*. 2012: 281 Kellogg 2008: 13).

Training in typing likewise relieves the working memory and sets capacities free for other processes. Alves *et al.* (2007: 64) tested whether typing skill and the higher or lower number of pauses made during the writing process have any qualitative effect on the written text. They found that typing slowly or quickly does not have any qualitative effect: the formal and the creative use of language and the structure of the texts produced by fast typists were of equal quality to those of slower typists. However, it should be noted that slow typists tend to write shorter texts than do fast typists. Their bursts are also shorter, which would indicate that they use the alternating strategy proposed by Olive and Kellogg (2002: 594): that is, the reduction in speed and in the content to be stored in working memory helps less-skilled typists to cope with the cognitive constraints of the executing processes. So, too, does the support offered by digital media, e.g. spell-checking or word-prediction software (Best 2003: 1081, Brown and Craik 2000: 99, MacArthur 2008: 253). Another method of reducing the processing constraints could be the development of specific skills that help to manage memory resources efficiently (Torrance 2007, Van Wijk 1999: 45).

Ransdell and Levy (1999: 110) suggest that the fact that good readers can allocate their resources flexibly, deliberately dedicating them to meeting one demand rather than another, could be exploited for writing as well (see also: Levy and Marek 1999: 40). These skills are often domain-specific memory-management strategies which enable people to use their capacities more efficiently. For example, knowledge of the structure of a specific genre can enable the writer to plan his or her own text with less effort, and thus more effort and attention can be put into the wording that may help them to reach their goal with greater success. Writers can also use pre-planning, note-taking, rough-drafting and other

strategic steps to reduce the number of processes that must be executed in parallel. In this way, planning and formulation become separate acts and writers are able to organise their ideas prior to writing. This has the positive effect of freeing them to focus their attention on formulation during the writing process (Galbraith 1999: 151, Torrance and Galbraith 2008: 76).

Describing how the latter method can work for students faced with writing academic papers in their L1 and their FL is a further aim of the study presented here.

4. Methods

As was outlined in Chapters 2 and 3, the cognitive demands made on FL writers in general, and on FL writers of academic papers in particular, are large: this is because the linguistic structures of the L1 and the FL are active in the FL writer at the same time and to different degrees (Abutalebi and Green 2007: 243, Sharwood Smith and Truscott 2008: 63), and because the writer has to suppress – subconsciously or consciously – the 'wrong' language when it interferes with FL language production (Francis 2011: 78). Moreover, in FL writing, wording, syntax, and orthography pose extra difficulties. In academic writing, the writers must set goals for their writing, they must analyse the context (e.g. the target group) and the task to be fulfilled, and they must activate and – in the ideal case – transform their knowledge (Bereiter and Scardamalia 1987: 12). Additionally, they have to write in a genre that is in many ways quite different from vernacular language. In FL academic writing, furthermore, the genres as understood in the home culture and language (L1) and in the target culture and language (FL) often differ (Chapter 2.4.2). All of these factors make additional cognitive demands that in turn have an impact on the writing process and on the texts produced.

This study analyses the ways in which these demands become visible in the production process and in the final text. The combination of product- and process analysis is rather uncommon, because usually either the one or the other aspect is in focus, but it promises deeper insights into the underlying processes and their influences on the texts produced (Spelman Miller and Sullivan 2006: 9). To do so, a 'within-writer' study design was chosen in order to try to "establish the unique aspects of second language knowledge that are not present in the monolingual" (Ortega and Carson 2010: 53). Particular focus will be placed on the effects of parallel activation of the L1 and the FL, and on the extent to which the influence of the L1 on the FL writing processes and the linguistic quality of the texts is perceptible.

In the test, ten German students of English philology were asked to write one initial 'simple' or non-academic essay in English each, plus four academic essays, two in the L1 German and two in the FL English (Chapters 4.1.1 and 4.1.2). Since German students are regularly asked to perform such tasks in their university courses, they were used to producing these kinds of texts. The 'exceptional' element was that the participants were asked to use different planning strategies: note-taking in one essay and freewriting in the other essay in each language (Chapter 4.1.3). This concept was chosen in order to analyse whether the different planning strategies have different effects in the L1 and the FL

(Alamargot, Farvart and Galbraith 2000, Piolat 1999: 123, Spelman Miller 2006: 14). In theory, the strategy of note-taking should reduce the linguistic demands made on the writer by formulating, since they should not have to put significant effort into formulating ideas while writing. This means that idea generation and planning should become easier, and this effect should be noticeable in both the L1 and the FL. The strategy of freewriting could, again in theory, have similarly positive effects: the activation of FL interfaces via freewriting might lead to a higher activation of FL linguistic structures and thus to a greater automatisation of the formulating process in the writing of the essay.

In order to examine this, the writing process was keylogged (Chapter 4.2.1), and it as well as the final texts were analysed with respect to the writer's productivity (text produced and production processes, Chapters 4.2.2 and 5), the linguistic traces of the L1 in the final texts (Chapters 4.4.1 and 6), and differences in the production processes with respect to revisions that were made during and after the formulation process (Chapters 4.4.2 and 7).

4.1 Test

The study was conducted at Cologne University between December 2010 and April 2011. The following sections describe the participants, the tasks, and the test conditions.

4.1.1 Participants

Ten students of English philology participated in the study. Their native language was German. Seven of the participants were female, three were male. This ratio corresponds to the female/male ratio of students of English philology generally at Cologne University. The average age of the writers was 24.3 years; the average number of semesters they had been enrolled was 7.6. Eight of the participants were enrolled in the teacher-training programme, while two were in the BA/MA programme. Seven students had previously spent between five months and 2 years 9 months in an English-speaking country (Great Britain and/or the U.S.). The minor subjects being studied by each participant were diverse. Six of the candidates had minors in another field of philology, two had minors in the natural sciences, and two were minoring in sports. Each of these study programmes makes different demands of the students with regard to writing activities. In sports, for example, students are not required to write many academic papers, whereas philosophy requires at least six longer papers (between ten and twenty-five pages) over the course of the university programme.

The participants were asked to fill out a questionnaire about their educational history and their writing experience (Appendix C). In order to emphasise the anonymous character of the study and its published results, the participants were asked to write under a pseudonym, which they chose for themselves and which are used in the following to refer to the respective participant. The questions were structured to be answerable by checking yes or no, by giving a rating from 1 to 5, or by writing an open answer. For example, the participants were asked about the writing activities in which they engaged most frequently. Although their minor subjects differed distinctly, the 'top 3' writing activities named by the students were quite consistent: nine put down e-mail writing (here, the questionnaire did not distinguish between e-mails to friends/relatives or to lecturers), eight put down academic writing, and seven put down SMS writing (i.e. texting) as the kind of writing task in which they engaged most frequently.

All of the participants claimed to have a positive attitude towards writing. Eight out of ten candidates also judged their writing competency to be at an advanced level. Only one participant evaluated themselves as being at a low level, and one was undecided. This positive attitude towards writing probably does not reflect the general attitude of German students towards writing. On the contrary, many students complain that they do not feel comfortable with writing, and that they do not know what style of writing and what level of topic mastery is expected of them at university (Parker-Corney, Kilpin, and Taylor 2011: 13, Paulson and Armstrong 2011: 500). Still, the participants formed a viable group for the test because when testing students with a negative attitude towards writing, the psychological effect of uncertainty and self-criticism is a factor that is accounted for the analysis of the written texts and the writing processes (Prat-Sala and Redford 2012: 9). Since the intention was to keep the influence of such psychological factors to a minimum, choosing a test group with a majority negative attitude towards writing – even though it would reflect more accurately the general student population – would have been counter-productive. Additionally, people who enjoy writing tend to be more willing to try out new methods. Since the tests used different planning methods – and in the case of freewriting, a method that is rarely used in academia at Cologne University – a certain curiosity for trying out new things in writing was essential. Without this, it would not have been possible to understand whether less successful writing efforts under the different conditions were the result of the methods or the students' negative attitudes towards.

In order to ensure that the level of language proficiency among the participants was adequate to the writing tasks, each participant was required to complete the *Nelson*

Language Test 300B for the intermediate level, which corresponds to the language placement tests given at German universities in order to evaluate students at the beginning of their study programmes (McNamara 2009: 616). The results achieved by all participants were over 80%, which testifies that their language proficiency was at a high level.

Each of the participants had attended at least one course in English-language essay writing during the course of their university studies. At German universities in general, and at Cologne University in particular, the essay structure taught in these classes is a strict five-paragraph structure of introduction, thesis, anti-thesis, synthesis and conclusion. However, in English- or in German-language essays in exam situations, this structure is often not the one best suited to the assignment (Kennedy and Smith 2010: 16, Kubota 2010: 197, Macbeth 2010: 35). This means that if students wish to be successful on exams, they must usually find appropriate alternative structures on their own. Only the test subject known as Krebs had studied in the United States for a significant period of time and had taken classes on different academic genres during high school. Since at German universities it is not obligatory to take classes on L1 academic writing, and since the number of classes offered in this area is correspondingly low, none of the participants had attended a class on academic writing in their L1 German. As a consequence, the strategy employed for learning to write academically was 'learning by doing' or 'learning by reading'. Students read academic texts and extract appropriate content, structural elements and registers on their own (see Breuer, Schindler, and Venohr accepted, Hüttner 2008: 150).

The group was split into two parts with respect to the language in which the academic texts they read were predominantly written: 50% of the participants had read mostly German-language academic texts, the other 50% had read mostly English-language academic texts. One participant (Owlet) had also read texts in Finnish. Since the Finnish manner of academic writing is widely judged to be close to German academic writing (Mauranen 1993: 248, Thielmann 2009: 30), it was assumed here that no models of academic writing other than the Teutonic and Saxonic (Galtung 1981) were affecting this participant's writing processes. Rates of reading for entertainment in the two languages were also evenly distributed. Nearly all of the participants who read more German academic texts preferred German texts for entertainment and *vice versa*. Only Artilleryman and Owlet switched their preferred languages in these different areas.

A short overview of the answers to the questions in the questionnaire is presented in Appendix B. The filled-in questionnaires are stored in the electronic appendix in the folder "4_Questionnaires".

In return for their participation, the students were given detailed evaluations of their papers and tips for optimising their academic writing, as well as a small amount of monetary compensation. They were told that the goal of the tests was to find out how different planning methods worked in different languages. It was not explicitly mentioned that the influence of L1 on FL writing was to be analysed in detail, in order to avoid any conscious focusing on this aspect during the writing process.

4.1.2 Tasks

For the empirical test, the participants wrote five different papers in four or five sessions. Three of the papers were to be written in the participants' FL English, two papers were written in their L1 German. Each participant wrote under laboratory conditions; that is, they did not write the essays while sitting in a classroom with twenty other students or more, as is typical at university, but alone with the analyst in a smaller room. A 'real-life' writing study was not possible because the technical conditions that were relevant for the analyses were not given in the relevant university context (for a discussion of the laboratory condition see van der Geest 1996). They wrote the papers on a laptop, which is also rather uncommon for essay writing at university, where – at least in exam situations – writing is usually done by hand. It is proposed here that this condition would not have a distinct influence on the underlying writing processes (see Chapter 4.1.3).

The first paper to be written was a simple essay (SE). The students had twenty minutes to complete it. They were asked to describe themselves as writers, taking on the point of view of their writing instruments. This initial, non-academic writing task was chosen for different reasons. First, it gave the students the chance to familiarise themselves with the surface of the keylogging programme (Chapter 4.2.1) and with the keyboard of the laptop that was used in the study. Second, it made it possible to analyse the fluency of their execution when working on a task that did not make significant demands on the cognitive writing processes. Thus a base line could be established against which to measure the additional demands made by academic writing and their influence on FL performance (Burgess 2002, Devine, Railey, and Boshoff 1993: 207). Additionally, the style used in this task provided an impression of the extent to which the participants were able to use the vernacular in English, and of the extent of their general tendency to make use of their L1 in FL writing. A final reason for assigning the SE task was that it had

proven very effective in other writing classes in making writers feel comfortable and reducing the feelings of stress associated with writing 'under observation'.

The other papers to be written were academic essays, for which the participants were given 45 minutes per task. Two of the papers were to be written in English, two in German. The task environment was the same for all four essays. The participants were asked to imagine that they were writing an exam. This exam was to be seen as a kind of 'rehearsal' for a BA-exam which the students would have to pass in three months' time: The participants received a short source text and were asked to write about the topic presented in this text. They were also given a list of points that they should keep in mind when writing the essay. These points included the time limit, some general instructions on essay writing (introduction, main body, conclusion), the instruction that they should use the source text they were given, etc.

The participants wrote the essays in the same order. The first essay to be written was an English-language academic essay planned with the help of note-taking (FLN), and the second its L1 counterpart (L1N). The third essay was written in L1 German using the planning method freewriting (L1F), while the last essay was its English counterpart (FLF). This order for the freewriting essays was chosen because it introduced an uncommon planning method which differed from the one they usually use in the academic setting (see 4.1.3). Since their production rate after freewriting was expected to rise more significantly in the L1 than in the FL because of the higher cognitive demands in the latter task, it should be made clear that this relative rise reflects impediments in FL writing and FL idea generation, rather than simply greater familiarity with the planning method the second time around.

It should be noted that although the essays will be called note-taking essays and freewriting essays, respectively, freewriting and note-taking are restricted to the formulation of the plans. Participants were free to formulate the academic essays themselves in their (individually) accustomed ways.

All essay topics were chosen from areas of general interest to the students in order to make sure (a) that the background knowledge needed would be more or less the same for all participants; (b) that they would be able to generate ideas about the topics; and (c) that they would be capable of taking positions relative to the opinions stated in the source texts (electronic appendix 6_SorceTexts). The topics were: the interdependencies of logic and language, the use of English by German academics, the censorship of video games and films with a violent content, and the progress of the Bologna process (Appendix D).

4.1.3 Planning strategies

Crucial for the activation of knowledge-constituting processes and the structuring of texts are – among other things – the planning strategies used by the writer, their goals, and the form of the output (Galbraith 1999: 149/150, Reece and Cumming 1996: 363, Shin 2008: 110). In the tests presented here, an attempt was made to maintain uniformity across all of the conditions for the essay-writing task (i.e. task environment and requirements). Only the language participants were to write in and the planning condition to be used for the tasks varied. The first English and first German essays were planned with the help of the note-taking method, while the second English and German essays were planned with the help of freewriting. The different planning strategies were chosen in order to determine whether the writers' productivity was enhanced by the use of freewriting in the FL to the same extent that it was in the L1; that is, to see whether the participants could write as fluently in the FL as in the L1, despite the additional cognitive demands involved. If the less language-dependent planning method of note-taking worked significantly better in the FL, this would indicate that the inhibition of L1 in this way takes less effort, because here the cognitive processes make less use of a concrete language (Alamargot, Favart, and Galbraith 2000: 2). At the same time, it was possible that the formulation process in essay writing worked more effectively after freewriting activated the interfaces between the semantic and the FL linguistic structures, and thus fewer node-switches occurred.

Note-taking is the planning method that is usually taught at school and at university, if planning is taught at all (Graham 2007: 83). After reading the assignment and, ideally, the source text, the writers note down the ideas that they generated in this process as keywords. The method of planning by note-taking thus does not lend itself to generating ideas and structures through the process of writing itself (Dansac and Alamargot 1999: 95). The notes were to be taken on the laptop. For most of the participants, this instruction was unusual, since more were used to taking notes by hand. The explicit instruction to use the keyboard might, therefore, have had a negative impact on the effort of writing down the ideas if the participant lacked confidence in typing (but see Hartley 2007: 302 ff. who found that writing on computers did not have a noticeable influence on the writing process). However, since the writing down of ideas was to be logged (Chapter 4.2.1) in order to see whether the planning process enhances fluency more in the L1 or in the FL, this condition was crucial. Furthermore, the danger that the results might be distorted by the participants' inhibitions when typing on a keyboard was judged to be minimal, since in the present day of e-mail, Facebook and Twitter, most students are

familiar with typing. This was confirmed by observations of students writing the SE, where it was clear that they did not have appreciable problems in finding the right keys. What must be acknowledged as slightly distorting, however, is the fact that not all of the participants wrote using the touch-typing method; rather, some watched their fingers or used the hunt-and-peck method. This could have introduced variation among them with respect to the correction of spelling mistakes and the general evaluation of both the text written thus far and the text being produced at the moment.

For the note-taking planning method, no explicit time frame was given. The participants were free to decide how much time they wished to spend on the pre-writing planning process.

The second German and the second English essay were planned by using the focused freewriting method, which is based on Elbow's freewriting method (1973: 3):

> The idea is simply to write for ten minutes...Don't stop for anything. Go quickly without rushing. Never stop to look back, to cross something out, to wonder how to spell something, to wonder what word or thought to use, or to think about what you are doing. If you can't think of a word or a spelling, just use a squiggle or else write "I can't think what to say, I can't think what to say" as many times as you want; or repeat the last word you wrote over and over again; or anything else. The only requirement is that you never stop.

Focused freewriting adopts this idea, but adds the significant variation that the topic is set by the assignment (Li 2007: 42).

In the study conducted here, the students first read the assignment and the source texts presented to them. They then spent at least five minutes writing down the ideas that came to them in a fluent text. The longer time window of ten minutes which was recommended by Elbow (1973: 3) was not adopted because the participants had only forty-five minutes' time for the entire task (including source text reading). Additionally, it was found in a pilot study that most of the participants ran out of ideas after about five minutes. Still, if the participants wanted to continue freewriting for more than five minutes, they were permitted to do so.

Although Elbow explicitly states that in freewriting, one should not think about what one is doing and should not evaluate what one has written, the participants were allowed to correct spelling mistakes that they noticed when they occurred in the word just being typed or just completed. The decision to 'undermine' the freewriting rules in this way was made because in the pilot study, the participants stated that after having noticed an error and being 'forbidden' to repair it, they often kept on thinking about this error, which had a negative effect on their idea generation and on the writing process in general.

4.1.4 Questionnaires and interviews

After completing each task, the participants filled in a questionnaire about their perceptions of their writing processes (Appendix E). The questionnaires were in the language of the respective essay and were to be completed in that language. The questions addressed the planning process and the planning method, the writing of the essay itself, and the process of revising. The participants were asked to what extent they had used their notes or their freewritten texts in the formulation of the essay, and whether they had had the subjective feeling of writing fluently. They were also asked to recall whether L1 words had come up when writing in FL, whether they had encountered word-finding problems, and what they had done in order to overcome these difficulties. Additionally, the participants were asked whether they had revised the text during writing or after having completed the whole text. If they had revised after the writing of the essay, they were asked how many times they revised the texts and what aspects they concentrated on in particular (spelling, grammar, structure, content, or others).

The participants were also asked questions about their writing processes in person communication. However, the comments made often were unreliable in that they indicated that the participants sincerely wanted to give an answer, and thus were thinking about what they *probably* did, for example, during the pauses (for the discussion of the reliability of interviews, see also Spelman Miller 2005: 298). Remarks like the following were common: "Oh. This pause comes just before the last paragraph. So I guess I must have been planning here. Yes. That's what I was doing." Because of this, the comments will not be taken into account extensively in the final analysis produced by the study. Some of them were enlightening, however, and they are included in the analysis in Chapters 5 to 7.

4.1.5 Evaluation of the final texts

In both languages, the plans and the essays were read by two independent readers. The English texts were evaluated by (bilingual) L1 English speakers (Canadian and South African), the German texts by L1 German speakers. At the time of the tests, all of the readers taught at Cologne University: the English readers were lecturers in English-language essay writing classes, the German readers taught German literary studies. One of the German readers was also a teacher of academic writing. The readers did not know who the participants were and they were not given any information about their university background (e.g. their level of study or whether they had spent time abroad). When evaluating the papers, the readers were asked to mark all errors they found, both in terms

of language and content. They were also asked to evaluate whether the statements were clear and whether they were appropriate to the genre (Rijlaarsdam *et al*. 2012: 203).

The L1 English evaluators marked the errors in both the essays and in the plans. They were asked to be 'hyper-critical' in their error marking and to refrain from 'helping' the participants by trying to interpret what they might have been intending to express in particularly 'un-English' passages – that is, passages where the semantics of the wording or the sentence structure were such that an L1 English speaker with no knowledge of German would have been incapable of understanding the message. Still, in the discussion of the errors, it became clear that in some cases the readers did do some interpreting – if only subconsciously – so that some semantic node-switches might have gone unnoticed.

4.2 Analysis

The data that were generated in the tests were used to analyse the fluency of the production processes, the types of errors that were found in the final texts and their rootedness in the L1, and the kinds of revisions that were done in the writing processes. Although think-aloud protocols are currently popular for analysing writing processes (e.g. Braaksma *et al*. 2004, Göpferich 2007, van Weijen 2008: 23), in this study, no think-aloud protocols were made, since it has been shown that the demands of speaking while writing impede the writing processes and lead to less fluent writing (Emig 1971: 92, Janssen, van Waes, and van den Bergh 1996: 248/249, Spelman Miller 2005: 299, see also: Stevenson, Schoonen and de Glopper 2006: 209). Instead, the keylogging method was used.

4.2.1 Keylogging

To make it possible to analyse fluency and revision, the participants' text production was recorded using the keylog programme *Translog 2006*. This programme was initially developed for translation process research, but it is also very efficient for research into task-related writing (e.g. in Jacobsen 2006, Lindgren and Sullivan 2003, Sullivan and Lindgren 2006). *Translog* records all of the movements a writer executes on the keyboard: it logs the use of the mouse and records where the keyboard and mouse events take place on the screen. The duration of the individual processes is recorded as well.

Translog has two interfaces. The user interface simulates a typical word processing programme (Fig. 4.1). In the upper half, the assignment is presented, and in the lower half the participants can write their text using simple editing devices such as bold or italic letters, deleting, moving the mouse, etc. Neither a spell checker nor a grammar or style

checker is provided. The writers cannot change the font, nor can they use any graphic devices, symbols, footnotes or other more refined word processing tools.

Fig. 4.1 *Translog* user interface

The supervisor interface consists of three parts (Fig. 4.2). In the upper left block, the analyst can read the assignment that the writer was given. Immediately below, the programme can simulate the writing process: it can recreate in real time the way in which the text was generated, including where and when the writer made pauses and where and when they revised, reformulated or went from one place on the screen to another. The analyst can also press a button to see the edited text. The right side of the screen provides a visualisation of the linear version of the writing process. In the example above, the participant (Thor – a participant in the pilot study) started with a 'pause' of 2 minutes, 4 seconds, and 498 milliseconds during which he read the assignment. After this, he moved the mouse and a new pause of a second's duration began. He pressed the return key to indicate that he had finished reading the assignment and then spent 11 minutes, 14 seconds and 481 milliseconds reading the source text. After this he pressed return again and started the planning process – in this case, freewriting. The stars indicate pauses of a second each. When he wrote 'dont', he deleted the *d*, as indicated by the framed back-arrow following the letter. The simple arrows in the line below show that Thor then pressed other keys, and so on.

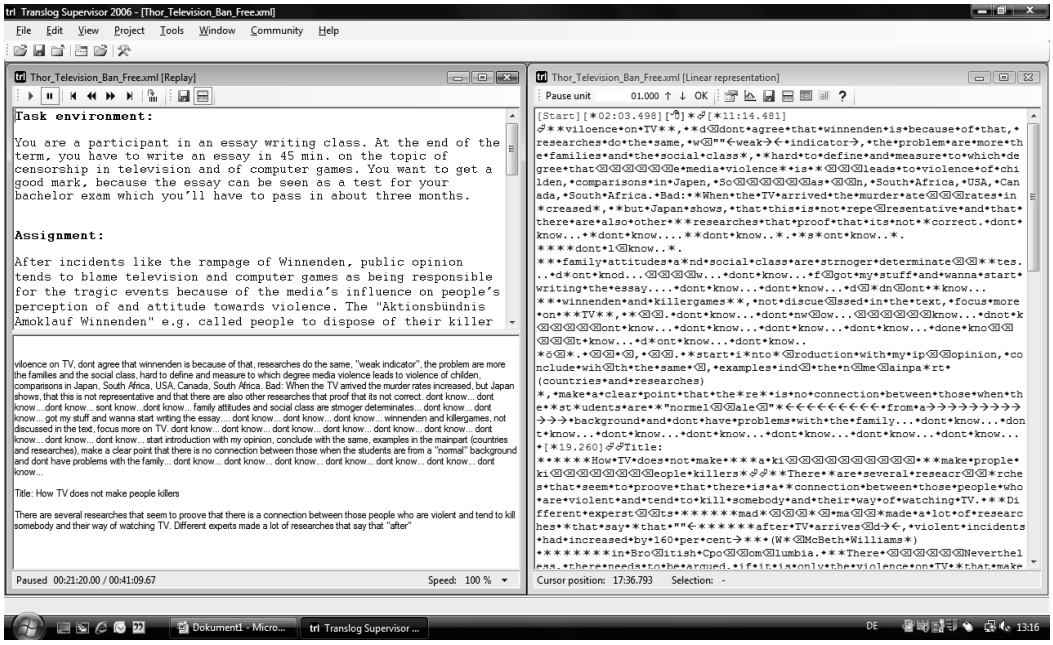

Fig. 4.2 *Translog* supervisor interface

The script can be saved as an Excel document. This document presents each keystroke/movement in an extra row, and it can be used as the basis for further analyses. For example, it can be used to determine how many characters the writers were able to produce in one burst without pausing or revising. The table also includes the time the participants took for the writing task, the process (planning, formulating, revising) they were engaged in at each point in time, and so on. It is possible to evaluate whether corrections were made in an automatised way (deleting unwanted characters/words directly) or whether they took place after a pause, etc.

The results of these analyses were integrated into an SPSS document, which was used for the further statistical analysis of productivity and fluency in the writing processes. Since only ten students participated in the study, it made little sense to conduct significance tests (e.g. ANOVA, Fisher-test), since no reliable probability could be calculated (Cohen, Manion, and Morrison 2007: 93). For this reason, the analysis was made in form of descriptive statistics.

4.2.2 Productivity and fluency

The differences in the production processes of FL versus L1 writing are analysed in different areas (Chapter 5). Because of the higher cognitive demands in FL writing (Olive 2004: 37), the production process in FL writing could be expected to be slower and quantitatively less productive than in L1 writing (van Weijen 2008: 86). Additionally, the less dense network in the FL linguistic structures could lead to problems in formulation and idea generation (Galbraith 2009: 13). This would result in lower productivity; that is,

the final essays might be shorter in the FL than they are in the L1 because the writers are not able to formulate and transform mental ideas into text as efficiently in the FL, due to word-finding problems (Swain and Lapkin 1995: 384) or the less effective activation of the semantic network by the phonological and syntactic structures, etc. In addition, the typing rate might be slower in the FL because the size of the cognitive load also has an influence on these automatised processes. Similarly, the frequency of certain letter strings differs between the L1 and the FL, and this can have an influence on typing speed (Lynn Sturm 2011: 62). Since the participants were required to fulfil the tasks within a certain amount of time, a slower typing rate might also have had an impact on the amount of text they were able to produce. All of these factors could differ, however, depending on the planning strategy used: freewriting might improve the production processes in the L1 as well as in the FL.

In Chapter 5.1, the length of the final texts is analysed with respect to the number of words (5.1.1) as well as the number of characters, not including spaces (5.1.2). In addition, the maximum and the minimum number of words are analysed in order to throw light on the individual differences in productivity among the writers (5.1.3). In a next step, the total number of words and characters produced (and possibly deleted) during the writing process are compared (5.2). This comparison is made in order to see whether there are differences in the quantitative aspects of the revision processes, and whether there are differences induced by the planning process. For example, after the writing process had been activated by freewriting, it is possible that the participants were more apt to produce text and then 'communicate' with it – that is, evaluate it, delete it and substitute it with another variant that came to mind (Elbow 2000: 311, Li 2007: 51).

The amount of time spent on the tasks was also analysed in different respects. The time the participants needed for the whole task (Chapter 5.3.1) and the time they needed for subprocesses such as planning, formulating and revising the texts (Chapter 5.3.2) were examined. Here, 'formulating' refers to the writing of the essay: that is, the production process less the separate planning phase and less the final revision. During this process, some of the writers did extensive revision of the text written thus far. These revision episodes were not separated from the essay writing process, since it was assumed that these revisions were more a method of generating new content or of finding a clearer structure (Flower and Hayes 1981: 374) than they were *final revisions*. The final revision takes place *after* the writer has judged the text to be finished and ready for 'polishing'. Since this

process distinguishes the advanced writer from the novice or weak writer, it is of interest in the present analysis (Lindgren and Sullivan 2006: 42).

Chapter 5.3.3 will present how much time the participants spent on pausing and how much time they spent on execution during the different tasks. This analysis will reveal the cognitive demands made on the writers by these tasks and show how the participants managed to cope with them, for example by slowing the processes down until execution comes to a halt (Alamargot *et al*. 2007: 23). An attempt will be made to determine whether the participants used different writing strategies in the L1 and the FL, and after note-taking and freewriting. The analysis will also indicate whether or not they decided to spend more time on revision in the FL after planning using freewriting, and whether this strategy resulted in a more fluent execution process, etc.

Chapter 5 also contains an analysis of the bursts, including the number of bursts per task (5.4.1), the average number of words per burst (5.4.2), and the average number of characters per burst (5.4.3). A comparison of the individual burst rate is conducted in Chapter 5.4.4. These aspects are examined because they shed light on the fluency of the production processes under the different conditions, and because they allow conclusions to be drawn regarding the underlying mental processes that took place within the participants. They make it possible to judge whether the writers were able to use the writing process for idea generation or for generating new knowledge (Menary 2007: 622, Baaijen, Galbraith and de Glopper 2012: 247), and whether this ability differs between the L1 and the FL and between the two different planning conditions.

The final chapter (5.5) presents the data collected on the types of burst ends in the different tasks (p-bursts and r-bursts, Chenoweth and Hayes 2001: 103): the ratio of p-bursts to r-bursts and the percentages of bursts that ended in mid-word in the different tasks (5.5.2). If more bursts ended in pauses in the FL than in the L1, this would indicate a greater cognitive demand on the writers, resulting in a greater inability to generate the FL and perform the writing processes in parallel (Spelman Miller 2006: 27).

In general, the analysis of productivity and fluency in Chapter 5 will serve to show how the cognitive demands of FL academic writing have a perceptible impact on the writing processes and how writers deal with them under different task conditions.

4.3 Error categories

Since this study is primarily concerned with the influences of L1 on FL writing, the error categories that were developed for the analysis of the errors in the final texts and for the revision processes are concerned with linguistic errors, that have ‘formal’ character, i.e. the

errors and revisions that are 'formal' in that they leave the content unaffected (Faigley and Witte 1981: 402, Lindgren and Sullivan 2006: 40). The only exception is the category *content* which is described in Chapter 4.3.6.

Different studies have shown that FL writers have a tendency – conscious or subconscious – to use their L1 as a 'crutch': for coping with the cognitive demands of FL writing – whether by using the L1's orthographic rules (e.g. Dixon, Jing and Joshi 2010: 211, Saigh and Schmitt 2012: 31), its wording (Murphy and de Larios 2010: 78, Wang and Wen 2002: 226), or its syntax (e.g. Drew 2001, Lozano and Mendikoetxea 2008: 117, Nitschke, Kidd and Sarratrice 2010: 95, Rankin 2012: 154; for a summary of findings see also Leki, Cumming and Silva 2008: ch. 14). In FL academic writing, the challenge of coping not only with the foreign language and its writing system but also with the differing genre features in the foreign cultural context may force even the proficient FL writer into a state of *interlanguage* (Selinker 1972: 209, Horning: 4); here, the tendency to slip from the FL back into the L1 in the writing process can increase as the ability to select only the FL structures weakens (Green 1996: 213). That is, not only fluency and productivity might vary in the different task conditions, but also the linguistic influence of the L1 on the FL might be detectable in the writing processes and in the final texts to different degrees. Complete *code-switches* can take place, meaning that the L1 German writer uses a German word instead of an English one because he or she is not able to find the correct English expression, and perhaps writes down the German word as a place holder with the intention of translating this word later on, or with the intention of rewording the whole sentence in the revision process. The German word can also creep in 'unnoticed' in the formulating process – like a slip of the tongue – to be corrected immediately. Less obvious influences of the L1 on the FL linguistic production and on the final text can also take place, such as *node-switches* (Chapter 2.5).

It was presumed that under the cognitive demands of academic writing, this phenomenon would occur more often than under the lower cognitive demands of writing a simple, vernacular text, since in the former situation, the cognitive demands are high enough to affect the successful inhibition of the L1 (Torrance and Galbraith 2008: 73). In order to analyse this aspect more thoroughly, types and subtypes of node-switches and other relevant error types were defined. They are introduced in the following chapters, after which the error analysis process itself is described (Chapter 4.4).

To define the types of node-switches/errors, first a more general approach was taken in which the errors were divided into the following main categories:

- phonological node-switch
- orthographic node-switch
- punctuation node-switch
- syntactic node-switch
- semantic node-switch
- genre node-switch
- code-switch
- typing mistake
- miscellaneous
- content

Some of the node-switches mirror the structures that are outlined in Chapter 2 (phonological, syntactic, semantic, and orthographic structures). *Punctuation node-switches* were analysed independently of *orthographic* ones because punctuation presents a problem for many students, in both their L1 and in various FLs (Hirvela, Nussbaum, Pierson 2012: 11/12, Timm 2012). *Genre node-switches* were also established as a separate category. Additionally, *code-switches* and *typing mistakes* were included in the error categories. The category *miscellaneous* subsumes all errors which could not be clearly categorised in terms of influences of the L1 or of intralanguage influences in the parallel architecture. These errors likely occurred because the participants were in a state of interlanguage or because they had lost track of what they had written earlier. It is also possible that another FL interfered in these cases, which would mean that the error was the result of an FL-FL node-switch, which could not be analysed more thoroughly here.

The category *content* includes all errors that are related to the documentary information provided to the participants, for example the participant iPhones' reference to Aristotle as a Roman rather than a Greek.

After an initial analysis of the errors, it became obvious that in many categories specific types of errors/revisions were made rather frequently, which points to a differing activation of the rules in the linguistic structures. Where the incidence of certain types of node-switches or errors took place at a noticeably higher rate – for example, the application of the German L1 rule regarding noun capitalisation to English FL writing – the categories were further divided into subcategories.

For phonological and punctuation node-switches, as well as for code-switches and typing mistakes, no subcategories were created, since these were either rare (phonological node-switches) or did not group themselves into particular kinds of errors.

In contrast to code-switches, *phonological node-switches* define those errors in which only parts of a word have L1 phonological structure, as in the word *kinds* used for *children* (=German: *Kinder*): here the writer switched to the German word *Kind* as the root word, but applied the FL orthographic rules (lowercase initial letter) and the FL pluralisation suffix (the English *-s* instead of the German *-er*). *Punctuation node-switches* involve the application of L1 punctuation rules to FL writing. In most cases, these errors are related to the use of the comma. Errors that seemed attributable simply to the writer's pressing the wrong keys were classified as *typing mistakes* (Stevenson, Schoonen, de Glopper 2006: 231).

In contrast to these types of errors, it was necessary to further divide the categories *orthographic node-switch*, *syntactic node-switch*, *semantic node-switch*, *genre node-switch* and *miscellaneous*. The subcategories were developed based on the frequency with which specific error types/node-switches occurred in the analysed texts. The subcategory *other* includes those subtypes of errors in the respective category that occurred only rarely and could not be readily classified. The category *content errors* was also divided into subcategories. Since these errors were of very little importance in the final texts (Chapter 6), but were relevant in the revising processes (Chapter 7), the subcategories of *content errors* are only analysed with regard to the revision processes.

In the following, the subcategories will be described in more detail and the potential problems that could arise in the process of classification are outlined.

4.3.1 Subcategories of orthographic node-switches

Orthographic node-switches were subdivided into *L1 rule*, *capital letter*, *L1 way*, *one word*, *apostrophe* and *others*.

The subcategory *L1 rule* includes errors based on German orthographic rules (see Grosjean 1982: 306–311). Examples of errors in the FL that reflect German orthographic rules include *secondery* (Gio FLF: adjusting the spelling to the pronunciation) or *ment* instead of *meant* (Owlet FLF).

Note that because there have been two rounds of official orthographic reform in Germany in recent years (1996 and 2006), many students have had to adjust the rules stored in the orthographic structure once or even twice. The initial goals of the first round of reforms were to simplify the rule system, to bring spelling in line with pronunciation, to eliminate contradictions, and to 'legalise' orthographic customs that were not in conformance with the rules but were nevertheless used by the majority of people (Klappert 2007: 317). However, since two of Germany's federal states – Bavaria and North Rhine-

Westphalia – did not accept these new rules in 1996, a second attempt involving various compromises was made in 2006. One consequence of this process is that in some cases, the orthographic rules are not strictly defined and writers themselves have the freedom to decide how to spell certain words. Because of this, there is a general feeling among students and others that German orthography is quite loose at the moment – which in fact is not the case (see Jacobs 2007: 43/44). Another negative influence on students' spelling proficiency is that training in the new rules was never made compulsory for grade-school teachers. As a result, many teachers have not yet mastered the new orthography themselves and teach incorrect rules or overgeneralise the new rules (Ickler 2006: 25).

For these reasons it was not possible to determine whether all of the participants in the test really knew the L1 orthographic rules by heart, or that they were able to apply these rules correctly (see the results in Chapter 6.1).

Capital letter is – in a way – a further subcategory of the subcategory *L1 rule*. However, since capitalisation is a very German phenomenon, meaning that the transfer of capitalisation into writing in English is an obvious signal of the influence of the L1 on the FL, and since this error subtype occurred rather frequently, it was recorded separately. As described above, all substantives in German must be written with a capital letter. Babs' spelling of the English words *Notebook* or *Email* with initial capital letters is an example of this subtype of orthographic node-switch. It should be noted that these errors were often associated with words having the same phonological structures and the same or similar orthographic structures in German, or words whose German counterparts are simply adaptations of English words (although in German, the orthographic structure of email is *E-Mail*). In such instances, the blocking of the interface to the German orthography is less powerful (Grosjean 2008: 45). Since the writers are accustomed to seeing these words written with initial capital letters, it is likely also more difficult to find and correct these node-switches in revision.

Errors due to overgeneralisation of the L1 German rule stipulating 'no capitals at the beginnings of words that are not substantives (unless they stand at the beginning of a sentence)' are also included in this subcategory. For example, Krebs (FLN) wrote *mexican* instead of *Mexican*, which for a German native speaker is logical because *Mexican* is an adjective and must therefore be written with a lower case initial letter, according to German orthographic rules. Another example is the personal pronoun *i* instead of *I* (also Krebs).

The subcategory *L1 way* includes words that are very similar in the L1 and the FL, but are written differently – often because of the different orthographic representations of phonological elements. An example of a node-switch in this category is Owlet's writing of *garanties* instead of *guarantees* (FLF), an error that mirrors the orthography of the German word *garantieren*.

Another subtype of an orthographic node-switch which appeared rather frequently in the participants' texts is the *one word* error, which describes FL compounds written according to the way their German counterpart is written. In German, compounds are often written as one word, and in some cases as two (or more) words linked with dashes, but only rarely as two words. An example of an error of this subcategory is Krebs' writing *termpaper* instead of *term paper*.

The subcategory *apostrophe* gathers all orthographic node-switches which are rooted in the German orthographic rules regarding the apostrophe. These rules are several, but in this work, the one governing the use of the possessive suffix *s* is of importance. The suffix itself is the same in German and English, but in English the suffix is separated from the word by an apostrophe, while in German it is not: *Mamas Frittenbude* vs. *Mummy's Chippie*. Nevertheless, in Germany one often finds the apostrophe in front of the possessive suffix – for example in the names of restaurants, on websites and in advertisements – which shows the influence of FL English on L1 German in everyday writing (Kovács 2008: 90). At university, however, this orthographic element is crucial for separating the orthographic 'sheep' from the orthographic 'goats'. Many lecturers mark these errors rather strictly, and because of this, the rule 'no apostrophe in front of the possessive *s*' has been implanted deep in many students' minds. Since the participants in this study were asked to write an academic essay requiring high-standard language, this L1 German rule had the effect of quite frequently overruling the FL English rule regarding the possessive *s*. That is, the frequency of this error subtype (for example, Sarah's writing of *peoples attitude* instead of *people's attitude*) not only shows the L1 linguistic influence in general, but the influence of L1 academic genre standards in particular.

Other subtypes of orthographic node-switches did not occur in any great numbers, and were therefore subsumed into the subcategory *others*. *Others* also includes the instances in which the writers wrote down a word that is not semantically but rather orthographically related to the intended word, for example Sarah's typing (and correcting) of *bad* instead of *bed* (SE).

4.3.2 Syntactic node-switches

The range of error types that could be classified as syntactic node-switches is very wide. They were subcategorised as follows:

- article
- preposition
- tense
- morphology
- sentence construction
- grammar
- others

The subcategory *article* subsumes those errors in which the participants used or did not use the article at the correct place or in which they used the definite instead of the indefinite article (or *vice versa*), and where the use or failure to use the (correct) article is rooted in the L1. Another possible error in this subcategory would be the usage of *this* instead of *the* at an inappropriate place.

The subcategory *preposition* defines syntactic node-switches in which the participants chose a preposition that would be the closest correspondent to the L1 preposition in the corresponding L1 prepositional phrase, as for example in *the increase **of** violence*: In the bilingual tripartite Parallel Architecture, it is proposed that in the syntactic structure, verbs or adjectives that take a preposition are connected with the FL and the L1 prepositions via the interfaces. The German counterpart of the word *increase* is *Anstieg*. The underlying syntactic structure of *Anstieg* in high-standard German takes the genitive for defining the element that has increased, and thus does not need any preposition at all: *Der Anstieg der Gewalt*. In English, the genitive is constructed by adding the preposition '*of*' in front of the NP. In the example above, the intended semantic structure /increase/ activates the L1 and the FL structures at the same time – the phonological as well as the syntactic structures. In turn, the German syntactic structure (+genitive) activates the English phonological structure for the realisation of the genitive (<of>), and this activation is transferred to the orthographic FL structure 'of'. In everyday German, the construction of the genitive often corresponds to the English way of expressing it by adding *von* (=of) + noun (dative): *Die Äste des Baums* and *Die Äste von dem Baum* (=the branches of the tree) are both grammatically correct. This too might have supported the node-switching.

The subcategory *tense* includes all node-switches in which the writer used the wrong tense as a result of L1 interference. Unlike in English, in German the rules for

marking temporal relations with the grammatical tense are applied in a rather lax way. For example, the semantic differences between the imperfect tense and perfect tense are fuzzy for the majority of the population (Myrkin 1994: 168, Schecker 1987: 209), even though German grammar books explain them. Thus the sentences *Ich sah ihn gestern* (imperfect tense) and *Ich habe ihn gestern gesehen* (perfect tense) are usually interpreted in the same way: *I saw him yesterday*. In general, the perfect tense is used more frequently, and any perceived difference is one of register: the imperfect is hardly ever used in vernacular spoken language, but is the preferred tense for marking the past tense in more formal written language (Watzinger-Tharp 1994: 393).

This influence of register on tense is even greater when it comes to the present continuous form. In English, the present (or past) continuous form is very commonly used in all registers to express that an action is (or was) taking place at the moment of speaking. In high-standard German, in contrast, the continuous form does not exist at all; it can only be found in some dialects, for example in the Cologne dialect *Kölsch*. Because dialects may not be used in academic writing, the activation of the German high-standard tense in the L1 syntactic structure overrules the activation of the correct English tense in the FL syntactic structure, with the result that the writer uses the simple present or past tense instead of the continuous form. There are also differences between English and German in the application of future tense. Whereas in English, future events can be marked by the present continuous or the auxiliaries *will* or *going to*, in German, the L1 speaker usually uses the present tense and adds another time marker to indicate the future, for example an adverb such as *tomorrow* or *soon*: *Morgen besucht er seine Mutter* (literally 'Tomorrow he visits his mother', i.e. *Tomorrow, he is going to visit his mother*) (Myrkin 1998: 109).

Morphology is the subcategory of syntactic node-switches in which the errors are the result of the application of L1 word-construction rules to the FL. Errors of this kind mostly occur in cases where the writer derives nouns from verbs or verbs from nouns, or where they derive adverbs from adjectives. For example, in German, the adjective is usually identical to the adverb: *Er ist* ***gut*** and *Er macht das* ***gut*** (= *He is good* and *He does it well*). Applying this morphological rule to FL English can lead to an error such as the following: [*She*] *writes down the introduction as* ***good*** *as she can* (Marissa: SE). The usage of the past participle as an adjective – which is very common in German – is also an instance of morphological node-switching, for example in cases such as *All the summaries of the* ***read*** *text* (= *All the summaries of the text that was read*) (Sarah: SE).

The subcategory *sentence construction* defines node-switches in which the syntactic structure of the FL sentence/phrase mirrors the L1 syntactic structure. Examples of this kind of node-switch include the following: *one might (and should as an academic who mainly works through and with language and rhetoric) wonder* instead of *one might wonder (and should…)* (Owlet: FLN); *What is enough violence that causes children* instead of *How much violence is enough to cause*... (Babs: FLF).

The category *others* subsumes all other kinds of syntactic errors, such as the use of *what* as a relative pronoun (*everything* ***what*** *their children consume* – Owlet: FLF), or the use of the neutral pronoun *it* as the personal pronoun for *child* which is rooted in the neutral substantive quality of the corresponding German word *Kind* (James: FLF).

4.3.3 Semantic node-switches

Semantic node-switch labels the errors in which the participants used inappropriate words or word groups to express the intended meaning. This category subsumes all cases which were identified by the evaluating L1 English reader as making no sense at all, or as distorting the meaning; it also includes the errors that were identified as being instances of "Germanised" English. Sometimes, whole sentences can be classified as semantic node-switches.

In cases where the evaluating L1 English reader was unable to interpret the intended meaning, the error was shown to the evaluating L1 German reader, who attempted to interpret it using her L1 German knowledge. If neither reader could interpret the intended meaning, the error was placed in the category *miscellaneous* because no influence of the L1 could be made out. Such cases (e.g. invented words which do not have any apparent German 'relative' or word that is phonologically close) could possibly be explained as instances of the influence of another activated FL or L1 structure on the phonological structures of the participant.

At times, the classification of the semantic errors in the participants' essays was problematic. Interpreting a writer's intended meaning always involves a certain amount of speculation. In some cases, the interpretation arrived at by the L1 English and the L1 German readers differed. For example, Siebenmorgen wrote in her FLN: *That is why it is so important to be able to have a look at the original text when dealing with a* ***vague*** *passage in a philosophical text*. The L1 English reader understood the intended meaning of *vague* to be 'difficult'. If this were the case, a semantic node-switch would be difficult to substantiate, because the German counterpart of *vague* has nothing to do with difficult. The

German reader, in contrast, understood the intended meaning to be 'unclear', which in German could be translated with *vage*. If this is the case, the activation of the German phonological and semantic structures connected to the word *vage* activated the English phonological and orthographic structure *vague*.

Semantic node-switches were subcategorised into *translation* and *semantic network*. Here, 'translation' is used for words, phrases, or sentences that are one-to-one translations of an L1 word or phrase, but do not activate the same semantic structures in the FL. That is, syntactic errors which are subcategorised as sentence construction errors because they mirror the L1 word order are not classified as translations if the intended semantic structure is still clear, and if the correct FL syntactic structure can be generated by reordering the words. In many cases of translations, the phrases or sentences do not make any sense to the L1 English reader, whereas the L1 German reader does not have any difficulty in understanding them.

The subcategory *semantic network* includes errors in which the chosen word or phrase is not a one-to-one translation, but rather an incorrect synonym. Here, a one-to-one translation could have been correct, but via the activation of the semantic network through the activation of the phonological structure and vice-versa, another phonological structure was activated and transferred to the orthographic structure. Often, these kinds of errors resemble the way in which writers choose the wrong word out of a collection of possibilities offered by a translation dictionary or a thesaurus. Examples of these kinds of node-switches are *unjust* instead of *false*, as used by Owlet in the notes for the FLN-essay: *Ways of using rhetoric in academia – cultural influence as a potential source of unjust judgment*. Here, the synonym of *correct*: *just* is chosen, which in combination with the word *judgment* that, in turn, is semantically and phonologically interfaced with the words *justice* and *just*, offers itself as a plausible choice.

In many cases, semantic node-switches are the result of the very active quality of the linguistic network. Since this network is nested and since it differs from individual to individual, it is possible – or rather probable – that not all of the semantic node-switches could be identified as such. For example, in some cases, words were chosen or even created which did not make sense to either the L1 English reader or the L1 German reader. As noted above, these cases could be the result of the activation of another FL, but it is also possible that the underlying semantic structure of the intended meaning activated the term in the writer's linguistic structure, but that this semantic structure did not occur to the readers. It might also be that some *typing mistakes* were rooted in this kind of node-switch,

in that the semantic structure activated two (or more) L1 and FL phonological structures, and that the parallel activation interfered with execution.

The border between *translation* and *semantic network* is quite fuzzy. In some cases, *semantic node-switches* can be explained by one or the other at the same time. Because of this, some cases were categorised as being both translations and semantic network node-switches. Additionally, the assignment of an error to the subcategory *semantic node-switch* has a stronger tendency to be subjective. Because of this, the number of the errors in the category *semantic node-switch* might be more 'scientifically valuable' than the analysis of the distribution among the subcategories. Still, the subcategorisation is interesting since the network errors show how quickly the interfaces between the language structures operate and how communication failures can be initiated.

4.3.4 Genre node-switches

The category *genre node-switch* contains errors in which the writers chose the wrong register. Registers can be defined as 'labels' which adhere to certain phonological and syntactic structures (Jackendoff 2002: 313). In English, for example, "Helen is a nice kid" can be categorised as being vernacular, because *kid* belongs to the low-standard English register. Other terms are categorised as being very high standard, or, in our case, as being 'academic'. Examples include technical terms, such as *pragmatics* or *burst*, or words borrowed from Greek such as *extract* instead of *remove* or *prophylactic* instead of *preventive*; others include reporting verbs, such as *propose* or *suggest* (Bloch 2010: 230). Registers are not restricted to words or terms alone, but can also be applied to certain linguistic structures. The passive voice, for example, is a syntactic form that is considered appropriate to academic writing, while dialect or colloquial words would be 'unacademic' (Swales 1990: 40).

The errors in this category are subcategorised into *language-independent* and *L1-influenced* genre node-switches. Language-independent genre node-switches are terms or rhetorical features that would be considered equally 'unacademic' in the L1. Examples of these errors include colloquial expressions such as *a horse of a different color* (Artilleryman: FLN) or words such as *huge* (iPhone: FLN), but also stylistic features considered inappropriate to the academic register in English. In these cases, the translations would be unacademic in the L1 as well although they are accepted in online texts (Crawford Camiciottoli 2008: 1228). In the *L1-influenced* cases, the L1 translations of the terms/phrases/syntactic structures would have been perfectly appropriate in the Teutonic academic register, but are inappropriate in the 'Saxonic' academic register. In

these cases, the influence of the L1 on FL writing is more obvious. Sentences that start with *so* (e.g. iPhone: FLN; Owlet: FLN) are examples of clearly L1-influenced genre node-switches. *So* at the beginning of a sentence is very common in German academic writing, and does not have the connotation of informality.

Syntactic node-switches and their subtype *sentence construction node-switches* may often be the effect of genre node-switching as well. Embedded and complicated sentence structures in which as much content as possible is pressed in, such as Owlet's example in section 4.3.2 above, can be activated by the writer-oriented L1 tradition of sentence construction in academic writing (Clyne 1987: 213, Siepmann 2006: 139). Still, since the syntactic node-switch could have been influenced by the register, or it could have been a 'direct record' of a spoken sentence, or it could have been a one-to-one translation of the German to the English syntax, in most cases, these sentences were not judged as being genre node-switches.

4.3.5 Miscellaneous

The error category *miscellaneous* includes all of the errors that cannot be explained by L1–FL node-switching or by language-internal node-switching. Since these errors are of less interest in the context of the influence of L1 on FL writing, the subcategorisation is not as fine-grained as it is in the other categories:

- grammar
- orthography
- punctuation
- others

The subcategory *grammar* includes all errors that involved the application of incorrect syntactic and other grammatical rules, but were not L1-induced (e.g. *more have to be done*; Owlet: FLN). The subcategory *orthography* includes all errors that were evaluated as not being simple typing mistakes, but rather as errors resulting from a lack of orthographic knowledge, with no (apparent) influence of the L1. An example is *e mail*, used by Krebs in the SE. In this case, the incorrect word is problematic in the L1 as well, since many people do not know how to spell it correctly in German, and often write *Email* (='enamel') instead of the correct form *E-Mail.* One could assume that Krebs committed this error because she assumed that a 'compound' written as one word in German would probably be written in two words in English (**e**lectronic **mail**). However, since these assumptions about Krebs orthographic representation of *email/e-mail* in her L1 are purely speculative, this example was not evaluated as an orthographic node-switch, but as an orthographic error of

unknown cause. A similar case is *agressive*, which is written with two 'g's in German just as in English, but which in German is often spelled incorrectly as *agressiv* (a Google search resulted in more than 1,000,000 hits [29.09.2011]).

In the subcategory *punctuation*, those errors were subsumed in which the chosen punctuation would have been an error in the L1 as well. One such common error is the absence of a comma in front of a non-defining relative clause. In German, a relative clause is always separated from the main clause by a comma. Because of this, many of the node-switches in the category of *punctuation* involved the placement of an unnecessary comma in front of the relative pronouns *who, which* or *that*. However, in the case of non-defining relative clauses introduced by *who or which*, the 'no-comma rule' does not apply: when "something or someone is sufficiently identified, the description following is considered nonessential and should be surrounded by commas" (Straus 2007: 55). In this way, punctuation errors of this kind could be evaluated as node-switches in the sense of an overgeneralisation of FL-rules. However, since such errors occur often enough in L1 writing as well (and actually did occur rather frequently in the L1 essays of the participants, see Chapter 6.1), one can also argue that they occurred not because of the misapplication of an FL rule, but because of a general carelessness in punctuating.

The subcategory *others* includes errors that cannot be categorised in any logical way. These errors are for example word-fragments or single letters that give no indication of what the writer intended to express. In the analysis of the revisions and movements of the participants (Chapter 7), *others* was also used in order to label revisions executed by the writers because they were – more or less obviously – in a process of planning and evaluating the text production, or because they were uncertain about what they wanted to write – or rather, they were uncertain about whether the way in which they wanted to express their ideas was appropriate (Edmondson 2009: 170). If the writers deleted an element of a sentence – a blank, a part of a word, or a phrase – only to rewrite it again immediately, these revisions were labelled as *others*. An example can be found in Artilleryman's FLF: at the end of the phrase *until censorship is expanded to coverage of differing*, he added a *p*, deleted it, rewrote it, and deleted it yet again, then continued with the phrase *and perchance unwanted* before finally writing *political views*, which was (probably) the wording Artilleryman already had in mind when deleting and rewriting '*p*'.

4.3.6 Content

In the analysis of the revising processes, the category *content* became more prominent. It is the only error category in this study that analyses "text-base changes" (Faigley and Witte

1981: 403), i.e. revisions that bring new information to the text. It is divided into the following subcategories:

- information
- wording
- sentence structure
- text structure
- numbering

The subcategory *information* includes all revisions in which the writer added to or changed the information provided. These revisions can differ distinctly in the amount of text affected and in the extent of the influence of the revision on the content and the text structure. For example, the adding of a whole paragraph to a previously-written text passage was marked as change in *information* (plus a change in *text structure*; see below), but so too was the adding of an adjective or the changing of a word that was semantically different from the word written before – whether fundamentally or only in notion. Consider the following sentence from the FLN by Babs', in which she changed the word *structure* to *logic*: *All in all, the essay by Hogue and Oshima is a good basis for analysing the [structure →] logic and rhetoric of essays in different cultures*. This change was marked as revision of content. In another sentence in the same essay – *As Hogue and Oshima **try to** present…* – the insertion of *try to* is a case of information revision, because this addition has implications for the content provided

Wording designates revisions that do not have an appreciable effect on the meaning of the content. For example, Babs' decision to change *they* into *the researchers* in one of her sentences did not change the meaning of the sentence, nor did it imply any significant change to the information provided: *Using different elements from Arabic, Persian, Asian and Spanish academic essay writing [they →] **the researchers** try to prove their thesis*. Here, it is assumed that the writer only wanted to make clear who "they" were, because Oshima and Hogue (2003) – the researchers referred to by the pronoun *they* – had not been mentioned in the essay for some time. Still, no think-aloud protocols were made, so the determination of whether a revision was directed at *information* or simply *wording* was to a certain degree subjective and may have overlooked more deeply-rooted intentions on the part of the writer.

The same is also true for the subcategories *sentence structure* and *text structure,* since syntactic structures also play a role in conveying meaning. In both English and German, it is commonly the words or concepts that are uttered/written at the beginning of a

sentence that are perceived as more important by listeners or readers than the ones at the end (Stanovich and West 1979: 82). Usually, the attention of the reader is higher at the beginning of the sentence. This is due to the human tendency to (sub)consciously try to interpret the intended meaning of an utterance from the moment we begin to hear or read it (van Berkum, Brown, and Hagoort 1999: 147). These internal mental processes draw cognitive capacities away from the actual listening/reading process, with the result that the information conveyed at the end of the sentence is perceived as being less central to the content than the information at the beginning, which initiated the whole thinking process. When the change in the sentence structure is executed only for semantic reasons, the subcategory is not compatible with *sentence construction* (the subcategory of *syntactic node-switches*), because here no syntactic errors in the L1 or the FL are changed. An example of this is the following sentence, which Artilleryman produced in his FLF. He started by writing *When it comes to violence, modern –*. He then stopped the formulation process and revised the sentence as follows: *When it comes to violence, there seems to be a consensus in modern-day society that it is unwanted*. Here, it is supposed that Artilleryman initially intended to write something along the lines of *modern-day society agrees that it is unwanted*. It could be argued that he changed the sentence in order to integrate the hedging phrase *there seems to be* into it, which would also imply a genre-node-switch in the revision process, since hedging is popular in German academic writing (Clyne 2003: 226). Still, since the interviews were not reliable (Chapter 4.1.4) such a close analysis of the revisions could not be made.

Text structure is another important subcategory of *content*. It contains those revisions in which the writers change the order of the paragraphs, or add a new paragraph into the text written thus far. *Text-structure* revisions vary between 'smaller' changes and larger changes. The pressing of the 'return' key in order to divide one paragraph into two belongs to this subcategory, as does the deletion of a passage or its transfer to another place in the text. In this study, it was expected that – depending on the individual writer – this kind of revision in content would occur rather frequently, since it is assumed that writers who tend to develop their text structure in the course of the writing process make more extensive use of the freedom offered by the computer to add paragraphs and restructure the text.

Related to *text structure* is the subcategory *numbering*. In planning by note-taking, the participants were explicitly asked to number the ideas that they generated in order to determine the order in which the arguments and ideas would be presented in the essay. In

the analysis of the revision processes, the instances when the participants did not number their ideas when writing them down, but moved to other places in the text written thus far and filled in the numbers, were counted as cases of *numbering*. The subcategory shows when the participants changed the intended text structure in the notes. One can see how and when the participants numbered the ideas, and when they reordered the numbers in the planning process. It was possible to determine whether they reordered the ideas/numbers during the writing process or only after they had realised that they had not been writing according to the plan. The subcategory of *numbering* was included in the category of content because in many cases, *numbering* mirrors the thinking/planning processes of the writers.

4.4 Error analysis and the analysis of revisions

The categories and subcategories of node-switches and other types of errors were used in order to describe the errors made in the final texts and the objects of revision during and after the formulating process.

4.4.1 Error Analysis

For the statistical analysis, the plans and the essays of the participants were read through and after each error/mistake the 'return' key was pressed in order to create an 'error-section' document in which each error represents the border of an entity. This document was inserted into an Excel spreadsheet with drop-down menus in each line, from which one could choose the error category; this in turn activated the drop-down menus for the respective subcategories. For example, if an error is categorised as being a syntactic node-switch in column 3, the dropdown menu in column 4 offers *article*, *preposition*, *tense*, *morphology*, *sentence construction*, *grammar* and *others*. Since in some cases a 'clean' categorisation was not possible, two columns were added for alternative categorisations. Babs wrote in her FLF for instance that *researchers, pupils and teachers are concerned **of** the future*. At first glance, this seems to be a syntactic node-switch of the subcategory *preposition*. However, it could also be that the preposition *of* was activated because the semantic network had initially activated *afraid* instead of *concerned*, and *afraid* takes the preposition *of*. Because of this, the error was evaluated as a syntactic and as a semantic node-switch. The total number of errors was raised by only one.

Table 4.1 gives an impression of how the Excel spreadsheet is structured. In the first line, the writer, Siebenmorgen, made a language-independent genre node-switch, since in the English as well as in the German community, starting a sentence with *but* is

considered unacademic. Other errors presented in the example are a syntactic node-switch of the subcategory *preposition*, a typing mistake, a semantic node switch and a grammatical error that was not L1-induced.

Line	Text	Error category	Error subcategory
1	**But** of course,	genre node-switch	language-independent
2	the influence **from** language	syntactic node-switch	preposition
3	on thought also works the other way around, as **Dufrene**	typing mistake	
4	**states**	semantic node-switch	network
5	as possible. Had **Aristotle theory**	miscellaneous	grammar

Table 4.1 Excerpt from Siebenmorgen's FLN error analysis Excel spreadsheet

Each text by the participants was analysed in this way in the Excel document. The results were then implemented into an SPSS document which was needed for the statistical analysis.

Since the analysis of the influence of the L1 on FL writing is of greater significance in this paper, only a short overview of the types of errors that appeared in the L1 essays is given (Chapter 6.1). The main body of Chapter 6 contains a closer analysis of the relative proportions of the different errors that appeared in the FL texts. Chapter 6.2 presents the total numbers of errors in the different categories, in order to determine whether the influence of the L1 on FL writing is indeed worth a closer analysis – which, as expected, it is. Chapter 6.3 gives an overview of the errors made by each participant; it shows that the results differ markedly between the participants, but that there is a pattern across individuals. Finally, Chapter 6.4 contains an analysis of the errors in the subcategories in both the final essays (FLN and FLF) and in their respective plans (FLNpl and FLFpl). This close analysis is needed in order to see whether there are differences in the activated clusters in the different texts – a result which would indicate that the writing/planning methods activated the rules inside the linguistic structures differently.

In performing the error analysis, the findings of Chapter 5 are included in order to see whether there is a relationship between the degree of fluency and the errors that were committed and left uncorrected in the final texts. If such a relationship could be made out, it would shed light on the participants' strategies of focussing their cognitive capacities differently in the more fluent text production situation compared to the slower and more controlled one; these insights could in turn be used to develop training methods for overcoming certain types of errors.

4.4.2 Categorization of revisions

After the analysis of the node-switches and other errors in the final texts, the keylogs of the participants were looked at with respect to the keyboard movements made and the corrections and revisions carried out during the writing process (Severinson Eklundh and Kollberg 1996: 168, Chapter 7). Here, no distinction was made between L1 and FL writing, since the analysis was intended to determine whether the participants concentrated on different aspects in the L1 and the FL when revising – as a result of a (potentially) different distribution of their cognitive capacities (Stevenson, Schoonen and de Glopper 2006: 223) and/or because of different writing methods in the L1 and the FL (Grabe 2001: 42, Hirose and Sasaki 1994: 204, Wolff 2000: 110) – or whether no distinct difference between the L1 and the FL could be made out. An attempt was made to discover whether the different activation of the language structures with the help of note-taking on the one hand, and with the help of freewriting on the other, made the writers act differently and concentrate on other aspects after the different planning conditions. This analysis had several different aspects.

Text Burst	Ended by:	Revision after pause	Pause after revision	Error Category	Subcategory	Error category	Subcategory
the bais	Backspace			typing mistake			
sis i	Backspace						
of	Key: 'b'			syntactic node-switch	preposition		
both fields	Space bar						
is culture. So	Backspace	1		Content	wording	genre node-switch	language internal
Therefore ,	Key: 'e'						

Table 4.2 Example of revision analysis (Babs FLN)

As in the burst analysis, the keylogs were inserted into an Excel spreadsheet (Table 4.2). The first column contains the elements of each burst in the writing process. The next column contains the key/movement with which the burst ended. Since it was necessary to determine whether each revision was made before or after a pause, this information was entered into columns 3 and 4. In column 5, the type of revision was labelled. Just as in the analysis in Chapter 6, it was possible to categorise or subcategorise a revision in two

different ways if it seemed it could have had either motivation. In the example below, the deletion of *So* and its substitution with *Therefore* could either have been motivated by the decision on another word for aesthetic reasons, or it could have been that Babs realised that starting a sentence with *so* would be unacademic. In cases like this, the revision is registered in two categories, but the total number of revisions rises only by one.

In Chapter 7.1, the statistical analyses of the numbers are presented, followed by the distributions of the different kinds of revisions in Chapter 7.2. The analysis of the revisions in the different categories is presented, and for the categories that were relevant to the outcomes, an analysis of the revisions in the subcategories is given as well.

Not every instance of revision resulted in the successful correction of errors on the first attempt. For example, in her FLF essay, Sarah wanted to write the word *problem*. She first produced the typing mistake *por*, which she 'corrected' to *prolb.* It was not until the third step that she was able to finish typing the word *problem* correctly. Since such corrections influence the writing process by reducing fluency and consuming cognitive capacities (Chapter 3.5), it can be presumed that the repeated correction of a single word had a negative influence on the production processes that followed, as well as on idea generation and on the writer's ability to keep the organisation of the structure and the overall goal of the essay in mind. A tally was therefore kept of how many steps the participants needed to correct an error (Chapter 7.3).

The revisions were analysed as a whole, as well as with respect to when they appeared. To do this, the text production process was divided into three parts: planning (Chapter 7.4), essay formulation (Chapter 7.5), and final revision (Chapter 7.6). In each of the parts, an analysis of the distribution of the revisions was made. Here it was possible to analyse in more detail how the participants distributed their cognitive capacities during the production processes and whether they used different strategies in the L1 and the FL writing processes, as well as during and after note-taking and freewriting.

Chapter 7.7 deals with whether the revisions occurred after pausing or whether pauses took place after the revisions. In academic writing, it was presumed that the higher demands on the cognitive capacities of the writers would result in a higher rate of pausing before content-related revisions than before revisions of typing mistakes, which are often noticed at the same moment they are made. On the basis of other studies (Krings 1992, 1994, Spelman Miller 2005: 310, 2006, see Chapter 3.5), it was also presumed that in FL writing, more pauses would occur before as well as after revisions with more superficial impacts on the texts (such as corrections to orthography) than would occur in L1 writing.

Again, the different activation of the language faculty by the two different planning methods might also have had an impact on these processes: it could be that the higher activation of the FL faculty induced by freewriting might have helped the writers in the formulation process by reducing the demand on cognitive capacities. Because of this, the distribution of pausing could have been closer to that seen in the L1 production process.

4.5 Summary

The analyses of fluency, of the errors in the final texts and of the categories of revisions and keyboard movements in the text production process give a distinct picture of the participants' writing processes, the influence of the cognitive demands of FL writing on these processes, and the impact of the planning methods on the writing strategies. The kinds of linguistic errors that occur and the extent to which they are related to the L1 will also become clearer. If there are differences in the node-switch patterns, this will support Jackendoff's (2002: 42 ff.) proposition that linguistic information is stored in form of rules, and will also shed light on how the rules are stored. For example, if certain kinds of node-switches occur more frequently in the freewriting condition, this might be an indication that they are stored in a mode that is not triggered by the active activation of the linguistic structures. Additionally, the analysis of the revisions will give an idea of the writers' abilities to detect and to block L1 influences. It will also shed light on the focus of the writers' cognitive capacities in the different writing phases in the L1 and the FL, which in turn, will provide a basis for developing instructional material and training in better and more effective writing.

5. Productivity and fluency

Productivity and fluency are important aspects in the analysis of writing processes because they shed light on the cognitive demands that writers face during the writing process, and on the way they deal with them (see Chapter 3.5). In the following, the different results in this area that emerged from the student essays are presented: the lengths of the essays in terms of number of words (5.1.1) and number of characters (5.1.2), and a short comparison of the individual results of the participants (5.1.3). Additionally, the production rate is examined – that is, the number of words and characters that the participants produced (and deleted) during the writing process (5.2). In Chapter 5.3, the amount of time the participants needed for each task is analysed (5.3.1), as well as how this time was distributed among the writing subprocesses (planning, formulation, final revision; 5.3.2) and how much time the participants spent on executing versus pausing (5.3.3). Chapter 5.4 presents the number of the bursts the participants executed during the writing process (5.4.1), the words per burst ratio (5.4.2) as well as the characters per burst ratio (5.4.3), and a short overview of the individual results with respect to characters per burst (5.4.4). These analyses are conducted for the whole writing process, as well as for the individual writing subprocesses (planning, formulation, final revision). Finally, the kinds of bursts the writers produced – i.e. p-bursts of r-burst – will be looked at (5.5.1), and the numbers of bursts that ended mid-word (5.5.2).

5.1 Text lengths of the final essays

The essays were analysed with respect to the number of words as well as the number of characters, not including spaces. It was assumed that the participants would produce longer texts in their L1, because here the cognitive demands are lower and the phonological/semantic network is denser, which should lead to a higher number of generated ideas. In addition, it was assumed that the text lengths would increase after students used the freewriting planning method, since this method is believed to activate the conceptual and the linguistic structures (Elbow 2000: 87, Galbraith 2009: 17).

5.1.1 Number of words in the final essays

Table 5.1 gives an overview of the average number of words in the final essays. The simple essay (SE) shows the smallest number of words (495.5). In the L1 note-taking essay (L1N), the rate lies at 543 words, while in the FL note-taking essay (FLN) it is 549.3 words; in the L1 freewriting essay (L1F) it is 585.3 words, and in the FL freewriting essay (FLF) it lies at 585.1 words. It is noteworthy that the mean number of words in the SE is

only slightly lower than the number of words in the academic essays: 8.75% fewer words compared to the L1N; 9.8% fewer words compared to the FLN; 15.4% fewer words compared to the L1F; and 15.3% fewer words compared to the FLF. Since the time allowed for writing the SE was only 44.4% of that given for the academic essays, this means that the text production rate in the SE was approximately two times higher than in the academic texts. This result indicates that the cognitive demands on the writers were significantly higher when they wrote academically, and that as a result, they were unable to produce the same quantity of text in the same amount of time (see Alamargot *et al.* 2007: 19). Additionally, the higher number of words in the SE points to a less vigilant monitoring of the writing process, meaning that the writers were less critical of their work with respect to content, structure and wording.

	SE	L1N	FLN	L1F	FLF
Mean number of words in final essay	495.5	543.0	549.3	585.9	585.1

Table 5.1 Mean number of words in the final essays

Another noteworthy result is that the mean number of words in the final essays does not differ significantly between the L1 and the FL within the two planning-method categories. The L1N has a mean of 1.1% fewer words than the FLN. In the freewriting texts, the difference between the L1 and the FL is even smaller, with only 0.1% less words in the FLF. However, the difference in the mean number of words between the two planning strategies is relevant: the L1N included 7.3% fewer words compared to the L1F, and the FLN included 6.1% fewer words compared to the FLF. That is, the influence of the differing planning strategies on the lengths of the essays was greater than the influence of the cognitive demands of L1 writing versus FL writing – at least at the word level.

However, comparing the number of words across different languages is difficult since morphology and its realisation in different orthographies may vary. In the case of German and English, this difference is significant. Nominalisations and complex compounds are characteristic elements of the German language. In contrast to English, German compounds which are composed of two root words must be written as one word (Duden 2008: 39). Only in cases when a noun compound is composed of more than two root words is it *possible* (though not mandatory) to add a hyphen between the root words, depending on the writer's expectations with respect to their readers' ability to understand complex compounds. In some cases, using a hyphen instead of writing the compound as a single word also implies semantic differences (e.g. a concrete vs. a metaphorical meaning).

Since in the academic context it is presumed that the readers are operating at an above average intellectual level (Siepmann 2006: 133), the use of hyphens is rather uncommon.

In English, it is often the case that more words are needed to express a semantic element than are necessary in German. The following are examples:

English term	**German term**
▪ living room window	▪ Wohnzimmerfenster
▪ writing something as two or more words	▪ Getrenntschreibung
▪ to walk out on someone	▪ jemanden sitzenlassen (as opposed to *sitzen lassen* in the sense of *to let someone have a seat*)

Because of these differences in the orthographic representation of compounds, and because of the phenomenon of active word formation in German in general, the lengths of the final essays examined in this study were also measured with respect to the number of characters exclusive of spaces.

5.1.2 Number of characters in the final essays

Table 5.2 shows the outcome of the analysis of the text lengths with respect to the number of characters.

	SE	L1N	FLN	L1F	FLF
Characters in final essay	2,159.0	3,554.0	2,782.7	3,774.1	2,918.5

Table 5.2 Mean number of characters excluding spaces in the final essays

The mean number of characters in the texts differs distinctly from the mean number of words. In the SE, the character count is still proportionally higher than in the academic essays, if one takes into account the fact that the participants had significantly less time for production. The average count lies at 2,159.0 characters, whereas the academic essays contain 3,554.0 characters in the L1N, 2,782.7 characters in the FLN, 3,774.1 characters in the L1F, and 2,918.5 characters in the FLF. The difference between the SE count and the counts in the different academic essays is greater than it is with regard to the number of words. Compared to the academic text with the lowest average number of characters (FLN), the SE contains 25.10% fewer characters, while compared to the academic text with the highest number of characters (L1F), it contains 42.79 % fewer characters. That is, in the latter case, the relation of the text lengths to the available time for production is

much closer, although in the less-demanding situation, the participants were still able to produce longer texts in a shorter amount of time.

The method of planning by freewriting led the writers to produce a higher number of characters (excluding spaces), which mirrors the results of the number of words. In the L1F, the number rose 5.8% as compared to the L1N, and the number in the FLF was 4.7% higher than that in the FLN. In both languages, the increase in the number of characters produced after using the freewriting planning method was lower than it was with respect to the number of words. Even more striking, the differences between the two languages are now more significant than the language-internal differences between the planning conditions. The number of characters in the final L1N essays is 21.7% higher than in the FLN essays, and the L1F has 22.7% more characters than the FLF. Although the semantic complexity of the words has not been analysed in detail, the significantly higher average word length in the L1 essays indicates that the words the writers used were often compounds and were therefore semantically more complex.

The assumption that the influence of the planning strategies on the lengths of the final texts is greater than the influence of the language used, as was indicated by the results of the words-per-essay analysis, must therefore be revised. Still, in both languages, the activation of the linguistic structures by freewriting led to longer texts, which shows that freewriting was effective in generating ideas and promoting an active thinking process (Menary 2007: 630).

5.1.3 Individual results with respect to text lengths

The comparison of the number of words and the number of characters produced by the individual writers reveals that these numbers depend heavily on the writer; this was also the result found by van Weijen (2008: 65), for example. Looking at the maximum and the minimum numbers of words and characters in the different tasks (Table 5.3), there are differences of more than 300%:

	Minimum (words)	Maximum (words)	Minimum (chars.)	Maximum (chars.)
SE	281	867	1,192	3,612
L1N	335	807	2,328	5,353
FLN	269	921	1,332	4,922
L1F	446	837	2,982	5,484
FLF	363	936	1,878	4,529

Table 5.3 Minimum/Maximum number of words/characters per essay

In the SE, the minimum number of words (281) is higher than the minimum number of words in the FLN (269); and the maximum number of words in the SE (867) is higher than the maximum number of words in both the L1N (807) and the L1F (837). In the academic essays, the extremes of minimum and maximum numbers of words are found in the FL conditions: the absolute minimum is found in the FLN (269) and the absolute maximum is found in the FLF (936). This represents a difference of 70.8%, which seems to prove that individual differences in productivity are higher in the FL than in the L1 (Hyland 1996). Still focusing on the number of words, the text lengths rose in the freewriting condition – both at the maximum and at the minimum ends of the scale. The minimum rose proportionately more than the maximum, which might indicate that the freewriting planning method is more effective for writers who normally produce a smaller amount of text in smaller bursts.

The number of characters, on the other hand, presents a different picture. Here, the absolute minimum number is again lowest in the FLN (1,332), but it is highest in the L1F (5,484). These results generally show that the average word length is distinctly higher in German than in English. In both planning conditions, the minimum number and the maximum number of characters is distinctly higher in the L1 than it is in the FL. Since longer words tend to be semantically more complex, one can conclude that for the individual participants as well as for the group as a whole, language is more important with respect to productivity than is planning strategy.

Just as with the average number of words, the differences between the minimum and the maximum numbers of characters in the L1N (56.51%) and the L1F (45.62%) are not as high as they are in the FLN (72.94%) and the FLF (58.54%). This means that in the FL, the cognitive demands of academic writing and their impact on productivity differ more strongly among individual writers than they do in the L1 (see Bergsleithner 2010: 12). It is noteworthy that Sarah, who produced the lowest number of characters in the FLN, had spent twelve months in an English-language context, which again supports the conclusion that academic writing is more demanding on writers than is everyday communication.

In the L1, the minimum and the maximum number of characters rose in the freewriting condition. In the FL, the minimum number of characters also rose. However, when one looks at the maximum number of characters in the FLN and the FLF, a peculiarity becomes noticeable: the maximum number of characters in the FLF is lower than it is in the FLN, even though the number of words in the final essay rose in both

cases. That is, James, who is the author of both the FLN and the FLF with the highest numbers of characters, used different types of formulation in the FLF – i.e. simpler/shorter words – than he did in the FLN. This might be an indicator that James made use of more vernacular and more common words in the FLF – and thus moved away from the Teutonic mode of academic writing. In other words, this result might indicate that the freewriting method induced James to write more in the intended Saxonic mode with respect to wording than did the note-taking method.

Looking at the individual patterns of the number of characters per participant in the final essays (Fig. 5.1), one observes that for nearly all of the participants, the plotted line forms an "M" with more or less sharp angles. With most of the writers, the number of characters rises between the L1N and the L1F, but it falls between the FLN and the FLF. Sarah is an exception in this respect: for her, the freewriting method was not effective in augmenting productivity in German, and thus (presumably) increasing idea generation (Galbraith 1999: 138); rather, her text grew shorter. In her FLF essay, however, activation by freewriting worked very effectively: whereas in the FLN condition her text is markedly shorter in comparison to the L1N condition, in the FLF condition, it is nearly the same length as in the L1F condition. Another interesting case is Artilleryman, the only writer whose data not did form an "M" when graphed. In both planning conditions, he was more productive in FL writing than in L1 writing, and in both languages, he was more productive in the note-taking conditions. Another interesting participant is Krebs, who was most productive in the SE. Since she had been living in the U.S. for 31 months while doing sports training, this high productivity shows that she does not have any problems in writing in everyday language, but that the extra demands of academic writing minimised the advantage gained by the higher language proficiency she acquired in her time abroad. This in turn suggests that the language of academia is indeed a language of its own.

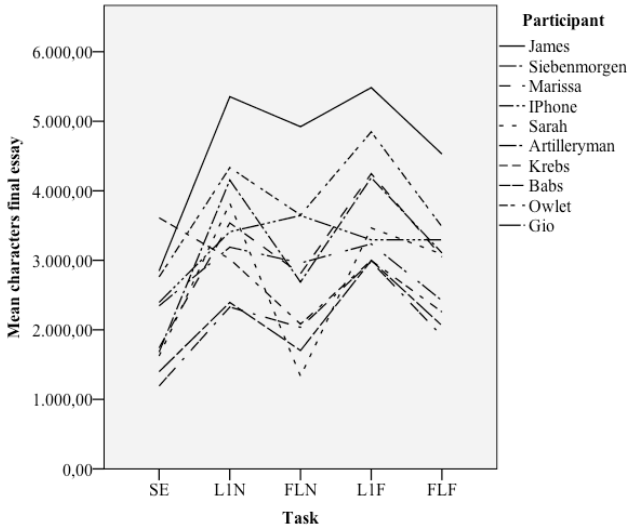

Fig. 5.1 Number of characters per participant (final essay)

In summary, the analyses of the text lengths in the different conditions show that the participants were more productive in characters in their L1 German than in the FL English, and that freewriting had an enhancing effect with respect to productivity in both languages. The higher average word length in the L1 also indicates that the writers made use of more complex words in the L1 in both planning conditions. In the FL, the participants used less complex words after freewriting, which points to the usage of simpler language – a feature which would be more appropriate to writing in the Saxonic mode.

5.2 Production rates

In terms of productivity, not only the length of the final texts is revealing, but also – and perhaps even more so – the number of words and characters the writers produced, evaluated and deleted during the writing process. If more words/characters were produced and deleted after using the freewriting planning strategy, this would indicate that the writers engaged more intensively with their texts and used writing in order to think (Elbow 1973: ch. 3). If there were differences between the L1 and the FL in this respect, it would suggest that different methods were used to generate text in the two languages.

Figure 5.2 gives an overview of the average number of words produced and deleted by the participants during the entire writing process (white) in comparison to the number of words in the final essays (striped).

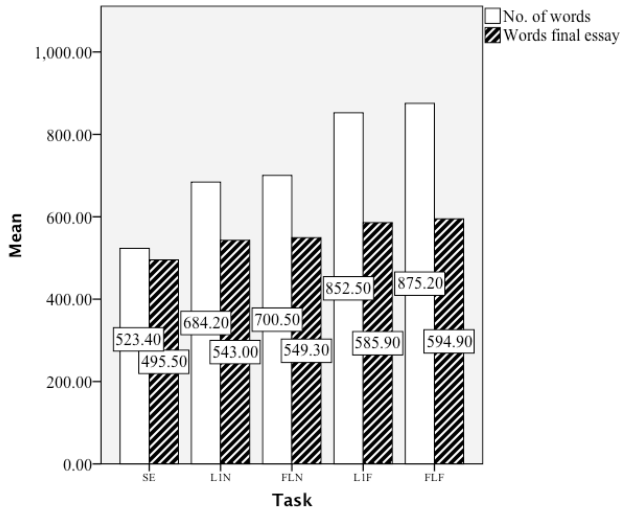

Fig. 5.2 Words produced vs. words in final essays

As with the general number of words in the final essays, the differences in word production between the languages within each planning condition were minimal. In both planning conditions, the writers deleted marginally more words in the FL than in the L1. In the academic essays in both languages, more words were deleted in the freewriting condition (L1F: 31.27%; FLF: 33.03%) than in the note-taking condition (L1N: 20.64%; FLN: 21.58%). The lowest number of word revisions was done in the SE (5.33%). The low number of deletions in the SE production process indicates that this process resembles that of speaking. When one looks at the time needed to generate the text (Chapter 5.3.1) and the amount of pausing and executing that took place (Chapter 5.3.3), it

seems likely that the lower number of word deletions in the note-taking conditions is the result of a more pre-planned or strictly controlled way of writing. The participants paused more than they executed, and it is assumed that the pauses were used for planning. In the freewriting condition, in contrast, the writers used the writing process itself for planning and structuring; they evaluated the text produced during the production process, and because of this, there was a higher rate of inaccurate wording or content provision with later revision.

Owing to the complexity of German compounds, however, one also has to take the number of characters into account (see Chapter 5.1.2). Thus the numbers of written and deleted characters were analysed as well (Fig. 5.3). Again, the spread between the number of executed characters and the number of characters in the final text in both languages differs between the note-taking and the freewriting condition. In the SE, 8.44% of the produced characters were deleted, in the L1N 25.32%, in the FLN 26.32%, in the L1F 33.24%, and in the FLF 35.10%. The relative difference between the deletions in the L1 and the FL within the different planning strategies is insignificant, and is only slightly higher in the L1.

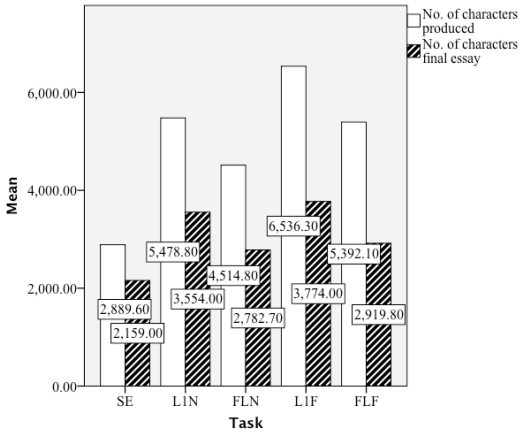

Fig. 5.3 Characters produced vs. characters in final essays

This means that in purely quantitative terms, the number of evaluations and revisions did not differ between the L1 and the FL, but they did differ between the planning conditions. During and after note-taking, the writers did a higher amount of monitoring before writing the text down, whereas during and after freewriting, they used the writing process itself more extensively for thinking and text generation. Whether this is also true for the qualitative aspects of the revisions will be presented in Chapter 7.

5.3 Time

Different studies have shown that writers need more time to complete a writing task in an FL than in their L1 (e.g. Alamargot *et al*. 2007: 23, Dansac and Alamargot 1999: 95). It has also been found that the distribution of time among the different writing subprocesses is of relevance for the quality of the final papers (e.g. Breetvelt, van den Bergh and Rijlaarsdam 1994: 119, Cumming 2001: 5). In the following, an overview is given of the average time the writers in the current study needed for the different tasks, and the subprocesses on which the writers concentrated most are identified.

5.3.1 Time required to complete the tasks

The analysis of the mean amount of time the participants took to complete the different tasks shows that the language conditions as well as the planning conditions influenced this amount. The FLN task required the greatest amount of time, while the L1F took the least amount of time (Table 5.4).

	SE	L1N	FLN	L1F	FLF
Mean time (total)	19.37	43.45	44.61	40.27	43.37

Table 5.4 Average amount of time taken for the tasks

The participants needed the most time for the essays that were shortest in terms of the number of characters, and the least time for the essays that were longest in this respect (see Table 5.2). The different planning methods in both languages had an effect on the time the participants needed to complete the tasks, and this impact was significantly higher in the L1 than in the FL: 7.3% more time was needed for the L1N task than for the L1F task, and only 2.8% more time was needed for the FLN than the FLF. A direct comparison between the L1N and the FLN as well as between the L1F and the FLF also illustrates that the activation effect of the different planning methods was not as significant in the FL as it was in the L1. Whereas in the note-taking condition, the time difference between the L1N and the FLN was only slight (2.7%), in the freewriting condition, the time difference between the L1F and the FLF was 7.1% greater.

The results achieved by the individual writers show that in certain conditions, the individual time requirements did not vary widely, whereas in other conditions, the results were exceedingly varied (Fig. 5.4). As could be expected from the results of other studies (e.g. Roca de Larios, Marín and Murphy 2001: 524, van Weijen 2008: 62 ff.), the time needed to complete a writing task generally differs from one writer to another. In the current study, the shortest task (SE: 20 minutes' time given) took a minimum of 15.36 minutes (Marissa) and a maximum of 21.42 minutes (Krebs), a difference of 28.29%. In the L1F condition, this difference was highest: the minimum time required was 31.38 minutes (Artilleryman) and the maximum was 46.58 minutes (Marissa), a difference of 31.15%. In the FLN condition, the time difference was smallest at only 7.61% (min. Krebs 42.35 minutes, max. Gio 45.84 minutes). Since this FLN is the task type and the planning form that students often practice in their English essay-writing classes, a possible explanation for the small degree of individual variation might be the fact that the participants' experience enabled them to manage their time in a standardised, efficient

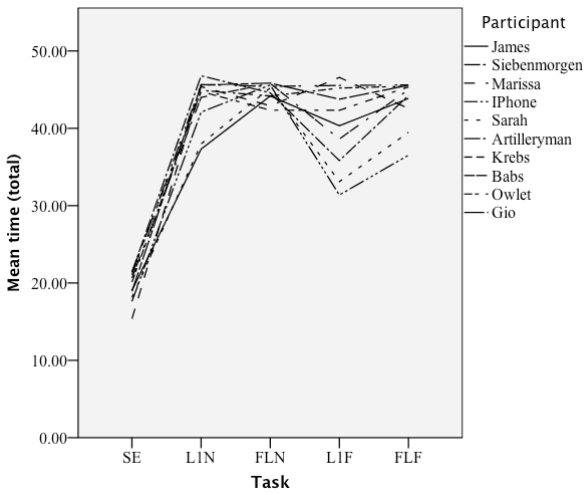

Fig. 5.4 Time for the tasks per participant

way. However, when one looks at the time the writers spent on the writing subprocesses (Chapter 5.3.2), it becomes obvious that the similar overall amount of time they required for FLN writing was not the result of efficient time management, but rather a consequence of the task's cognitive demands, which forced the participants to use as much time as possible to deal with it.

In contrast to the results obtained with regard to the numbers of characters, there is no clear pattern across all conditions to the amount of time needed by the individual participants. In the note-taking condition, six of the ten participants needed less time for the L1N task than for the FLN, while four needed less time for the FLN than for the L1N. In contrast to this, in the freewriting condition, only one participant (Marissa) needed less time in the FL than in the L1. For all of the other participants, the activation of the writing processes via freewriting led to more efficient writing in the L1 than in the FL.

Comparing the time differences between the tasks language-internally, it emerges that 80% of the writers needed less time for the production of the L1F essay than for the L1N essay. For the FL essays, there was no general tendency: although here, too, 80% of the participants needed less time for the freewriting task than for the note-taking task, this difference was often minimal (less than a minute). As was the case with the number of characters in the final texts, Artilleryman and Sarah were exceptions in this regard (see also Chapter 5.1.3). Both these writers needed distinctly less time for the FLF essay than for the FLN essay (although they needed more time for the FLF than for the L1F).

The results of the time analysis show that although the number of characters in the final texts did not rise as markedly in the L1F essays as they did in the FLF essays, in comparison to the note-taking conditions in the respective languages, the shorter amount of time needed for the L1F task proves that the activation by freewriting had a greater impact in the L1 – not so much in the amount of productivity, but in the speed of processing. That the positive effect of freewriting with regard to the time required to complete the task is higher in the L1 than in the FL is probably due to the higher cognitive demands of FL writing, which prevented the writers from executing more subprocesses in parallel.

Additionally, in the L1, fewer word finding problems likely hindered the writing process since there are more interfaces here between the conceptual and the phonological structure.

The following section presents an analysis of the extent to which these factors also had an effect on the distribution of time among the different sub-processes.

5.3.2 Time distribution among the different writing processes

It is generally agreed that writers need different strategies for FL writing than for L1 writing, and that they are best served by distributing their cognitive capacities differently among the writing processes (e.g. Bereiter and Scardamalia 1987: 356 ff., Hayes 2008: 29, Pritchard and Honeycutt 2008: 279). For example, in FL writing, better results are achieved when writers spend more time on final revision than they might do in L1 writing, because the revising that is executed during the formulation process is less successful in the FL than it is in the L1 (Sasaki 2000: 261, Zimmermann 2000: 89).

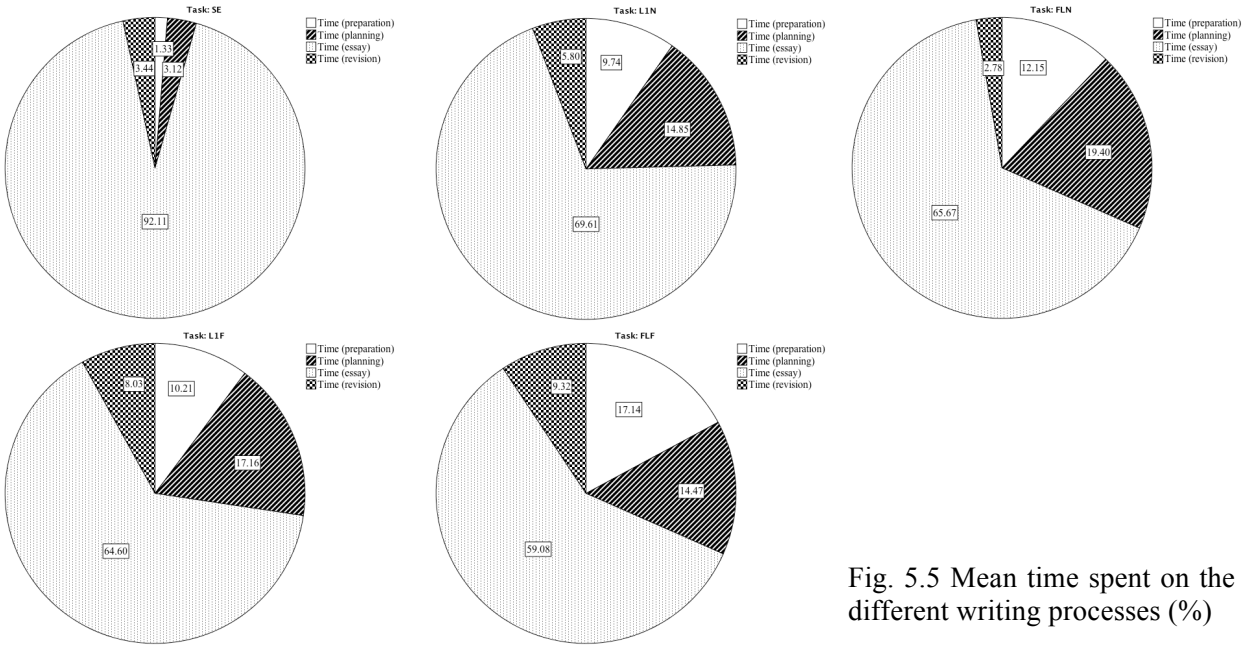

Fig. 5.5 Mean time spent on the different writing processes (%)

As could be predicted from the data regarding the overall time required to complete the tasks, the distribution of time spent on the different writing subprocesses varied between the L1 and the FL as well as between the two different planning conditions. Figure 5.5 visualises the percentage of time spent on the different writing processes in the different writing conditions.

In the SE task, the distribution of time among the different writing subprocesses differs distinctly from that in the academic essays: the participants spent 92.11% of their time on formulating the text, 3.12% on planning, and 3.44% on revision. The remaining 1.33% of the time was spent on preparation (reading the task). The distribution of time among the writing subprocesses in the SE was therefore similar to the distribution among

the processes in speaking, and the writers were in a knowledge-telling condition (Bereiter and Scardamalia 1987: 8). Seven of the ten participants spent no time on revising the SE at all. Sarah is an exception in that she spent 22.7% of the time on revision, thus somewhat skewing the total rate of revisions.

In the academic essays, the distribution of time was clearly different. The percentage of time spent on formulation was markedly lower than in the SE, although it still occupied the greatest proportion: 69.61% in L1N, 65.67% in FLN, 64.60% in L1F and 59.08% in FLF. The rest of the time (between 30.02% and 40.02%) was spent on the other writing sub-processes. The distribution of time among the subprocesses differed among the assignments. In all of the academic essays, the time spent on preparation was higher than in the SE; this was expected, since in order to fulfil the task, the participants had to read the more complex assignments as well as the source texts. However, in all of the conditions, the proportion of time spent on preparation differed distinctly: they were lowest in the L1N condition (9.74%, compared to L1F 10.21%) and highest in the FLF condition (17.14%, compared to FLN 12.15%). As the source texts were of approximately the same lengths, reading the source text in the L1 was likely accomplished more quickly because of the higher language proficiency (Yamashita 2002: 82). Because note-taking is the planning condition that the students are best acquainted with, they were ready to start taking notes sooner in this condition than they were in the unfamiliar freewriting condition. This might have been an effect of the participants 'preplanning' the freewriting text: some stated that they did not 'trust' the efficiency of freewriting as planning method. For example, Artilleryman noted in his questionnaire on FLF that planning by freewriting seemed to him "confused, muddled", whereas note-taking allowed him to build up a "clear, concise, step-by-step structure". Babs wrote that she liked the freewriting planning method because it made it "easier to write", but at the same time "there are also problems because you are not allowed to think" – a statement which indicates that she did not experience writing as thinking (electronic appendix, folder "4_Questionnaires").

The amount of time spent on planning also differed distinctly between the different planning conditions and the different languages. A noteworthy result is that the lowest proportions of time spent on planning occurred in the FLF task (14.47%) and in the L1N task (14.85%); that is, the time spent on planning was lowest and most similar in the task conditions that were most distinct. The highest amount of time spent on planning occurred in the FLN task (19.40%). Here the participants performed under the foreign language condition using the planning method they were best acquainted with. The result points

towards a high usage of L1 in planning, which made the participants literally translate the ideas they generated into the FL, as was found by Manchón, Roca de Larios and Murphy (2000: 21) or Sasaki (2000: 274). The percentage of planning time in the L1F task (17.16%) lay between the two extremes.

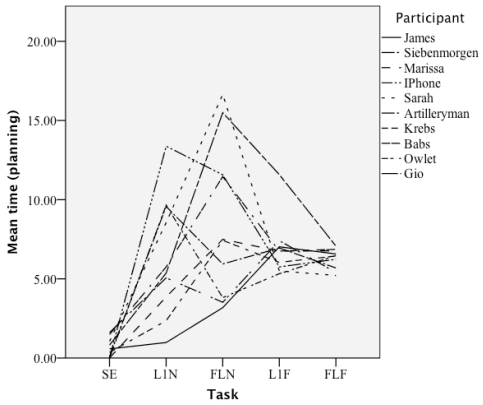

Fig. 5.6 Time for planning per participant

It is necessary to be careful when generalising these findings, however, because planning times differed distinctly among the individual participants (Fig. 5.6). In contrast to the results on the number of characters in the final essays, no overall pattern can be made out here. What all participants share in common, however, is that none took more than 10% of the entire time contingent for planning the SE, and the differences between the planning times for the academic essays were lowest for the FLF essay (5.2%). Most of the participants stopped planning after they were told that the time frame of five minutes was over. In the case of German freewriting, this also held true for most of the participants, but here more of them entered into a text-and-idea-generation process which led them to continue freewriting after the obligatory planning time was over. This means that the process of thinking through writing worked better in the L1 than in the FL.

The individual results in the time spent on planning differed most markedly in the note-taking condition: here the difference was 29.15% in the L1N and 29.62% in the FLN. Since the participants did not have any set time frame for taking the notes, they were free to decide how much time they wanted to spend on planning. Because of this, they could work planner-type appropriately (Boehm 1993): that is, those who need a detailed plan before starting to write (Mozartians) could spend a greater amount of time on planning, while those who tend to plan during the writing process (Beethovians) could start more immediately. For example, James is a prototypical Beethovian in that he needed less time for planning the L1N essay (2.63% of the total amount of time) than for planning the SE (3.03%). He did not write down any information about the content to be provided, but simply sketched the intended text structure ("Einleitung", "Hauptteil", "Schluss" = introduction, body, conclusion) and the metacontent to be provided (e.g. "Problemaufriss" = description of problem, and "Tese" [sic] = thesis). That is, he did not use note-taking in order to relieve his working memory by writing down his ideas (Piolat 2007: 111), but kept

them in his head or generated them during the writing process; as a result, his was the text with the highest number of characters (Chapter 5.1.3).

Still, the planner type cannot be the only explanation for the differences in planning time; rather, there are other relevant factors. Siebenmorgen, for example, spent almost the same amount of time on planning the FLN (7.75% of the total amount of time) as on planning the SE (7.64%), but more time on planning the L1N (11.08%). On the questionnaire, this participant stated that she had attended a seminar on Aristotle's *Analytic Posteriora* during the previous semester and because of this felt at home with the topic. It seems that she solved the task by knowledge-telling rather than by knowledge-transforming.

With respect to revision, for 70% of the participants the SE did indeed resemble speech written down, in that they did not revise the texts at all, although they would have had the time to do so. Only Sarah spent a significant proportion of the available time on revision (22.66%). In the academic writing processes, the amount of time dedicated to revision again differed distinctly between the planning conditions and the language conditions: revision took the least time in the FLN (2.78%) and the most under the FLF condition (9.49%). In the FLN, the low revision rate in most of the cases cannot be seen as the result of a conscious choice by the participants, but in many cases was simply due to a lack of time. In this condition, Krebs, Babs and Gio did not have any time left over for revision once they had finished writing, while Marissa and Sarah had barely 1% of the time left. Many participants had to stop writing the essay before having properly finished it. In the L1N, 5.8% of the time was spent on revision, and in the L1F 8.03%.

%	SE	L1N	FLN	L1F	FLF
James	0.00	6.11	1.02	1.08	4.69
Siebenmorgen	4.81	5.19	6.08	23.93	25.90
Marissa	0.00	13.58	0.31	0.62	13.66
IPhone	7.23	0.00	7.36	7.36	0.00
Sarah	22.66	6.43	0.76	0.00	19.99
Artilleryman	0.00	2.98	7.56	7.84	11.76
Krebs	0.00	14.91	0.00	17.42	7.07
Babs	0.00	9.15	0.00	10.93	7.59
Owlet	0.00	0.00	4.46	8.88	4.26
Gio	0.00	0.00	0.00	0.00	0.00

Table 5.5 Percentage of available time used by each participant for revision

Table 5.5 shows the percentage of time spent on revision by the individual participants. It is interesting that the low revision rate was not necessarily a consequence of the lack of

time in every case. iPhone, for example, who spent only 7.36% of the time for revision in the L1F, had nearly 9.17 minutes left when he finished the task. Similarly, Artilleryman, Babs and Owlet had more time left over for revision after the formulation process than they actually used. All read their texts through only once – although they claimed differently in the questionnaires, which does not conform to the keylog protocols. This strongly suggests that these participants did not use a strategy for revising their texts in a structured way, as is taught for example in writing guides or writing classes; such classes usually recommend that writers revise in (at least) three steps, concentrating successively on content, structure and orthography. Since their texts would in fact have benefited from more revision, as is shown in Chapter 6.1, the participants in the study fit the profile of novice or insecure writers rather than accomplished ones in this respect (Becker 2006: 30).

Generally, it is clear that the writers felt most constrained by the time limit when writing the FL texts: compared to the L1, the preparation process was slower, more time was necessary for planning by note-taking, and planning by freewriting was less extensive. However, in the FL tasks, the shorter amount of time dedicated to planning meant that a longer time contingent was left over for final revisions, whereas the higher productivity that resulted from planning by freewriting in the L1 led to a higher interaction between text and writer, which in turn left some of the participants with less time for revision. Still, the distribution of time among the different writing processes varied across the different tasks and between individuals. This points to the existence of individually varying strategies for dealing with the tasks and with the different language and planning conditions. Writers may respond to different planning conditions differently in different languages: in the L1, freewriting might activate the thinking process, whereas in the FL, the same strategy might be ineffective, or vice versa.

5.3.3 Time for execution and time for pausing

With respect to time, the analysis of the periods spent on execution and on pausing (used for thinking or reading) is also of relevance. In Alves *et al.*'s (2007: 64) studies on writing productivity, the participants spent more time pausing than executing during the writing processes. The relative rates of each activity revealed whether the writers encountered difficulties in dealing with the tasks or were able to perform various processes simultaneously.

In the study presented here, pausing is likewise an important element of the writing process, but the proportional distribution of pauses and periods of execution differed distinctly between the languages and between the planning processes (Table 5.6)

	%	SE	L1N	FLN	L1F	FLF
Execution		51.04	40.16	34.64	51.50	44.46
Pauses		48.96	59.84	65.36	48.50	55.54

Table 5.6 Proportional distribution of average time spent on execution and pausing

The results in the SE and the L1F are basically identical. That is, the task which made the lowest cognitive demands with respect to register and content, and the task in which the L1 linguistic faculty was activated by freewriting, were the ones best suited to executing the various writing processes in parallel. In the SE this was to be expected, since here the complexity of the task was rather low (Alamargot *et al.* 2007: 14). In the L1F, the result might be the consequence of a different method of text production, namely the use of 'writing as thinking' (Menary 2007), or of a decision to produce text more fluently and spend more time on revision (which indeed took place, albeit not to an appropriate extent, as noted above).

In all of the other task environments, more pausing than execution took place. The lowest rate of execution was found in the FLN, where the participants spent only 34.64% of the allotted time on this activity. The L1N demanded on average 40.16% of the time for execution, and the FLF 44.64%. In both languages, the freewriting planning method had an influence on the execution rate, causing it to rise by about 10%. This increase was not limited to the planning process itself, in which the participants were explicitly asked not to stop writing, but also carried over into the formulation of the essay proper. Because of this lower amount of time spent on pausing and higher amount of time spent on execution, the participants were able to produce a larger amount of text in terms of words and characters within a shorter total time in the freewriting condition (Chapters 5.1 and 5.3.1).

Since in formulating the academic essays generally, the cognitive demands in L1 and FL writing did not change between the note-taking and the freewriting conditions, it is possible to conclude that the language-internal rise in productivity during and after freewriting was the result of a different interaction among the writing processes, as well as a different way of dealing mentally with both the text produced thus far and the text yet to be produced (Dansac and Alamargot 1999: 95, Olive and Kellogg 2002: 594, Ong and Zhang 2013: 225). The fact that more pausing took place in the FL than in the L1 is an indication that the cognitive demands are higher in FL (academic) writing, and that because of this, productivity was lower and parallel processing worked less efficiently (see also Alamargot *et al*. 2007: 23).

5.4 Bursts

Previous experiments showed that the number and length of bursts are factors that indicate how successfully the writing process is functioning (e.g. Berman 1994: 34; Van Weijen 2008: ch. 5; Wolfe-Quintero, Inagaki and Kim 1998: 48; for an overview see: Alves, Castro, de Sousa and Strömqvist 2007: 57/58). One can generally say that the longer the average length of the bursts – that is, the more fluent the formulation process – the more readable, comprehensible, and interesting the final text (e.g. Galbraith 2009: 17, Kellogg 1996: 67). In the following, the average lengths of the bursts in the whole writing process and in the different subprocesses of planning, formulating, and revising are analysed. As explained in Chapter 5.1, looking at the lengths of bursts only with respect to the number of words per burst is problematic when comparing two languages which differ in their orthographic representation of compounds and in compounding in general. Because of this, both the number of words and the number of characters are analysed here.

5.4.1 Numbers of bursts per task

The average numbers of bursts per task are presented in the first line of the table in Table 5.7. The lowest number of bursts was executed in the production process of the SE – an average of 188 bursts. In academic writing, the highest numbers of bursts were recorded in the note-taking conditions (L1N: 356, FLN: 359), while the lowest numbers of bursts occurred in the freewriting conditions (L1F: 329, FLF: 336). The comparison between the L1 and the FL within the same planning condition shows only marginal differences. Thus, with regard to the number of bursts needed for the production of the academic essays, the planning conditions were more influential than the language conditions.

As one might expect, the nature of planning by freewriting – which involves writing with as few pauses as possible and without revising – means that the number of bursts during this stage was higher in the note-taking condition (Table 5.7). Here, the participants took more time to think about the quality of the ideas that came to their minds before writing them down and when revising them (see Chapter 7.4.1).

	SE	L1N	FLN	L1F	FLF
Total no. of bursts per task	188.00	356.00	359.00	329.00	336.00
Bursts (planning)	0.00	60.70	69.00	55.40	50.80
Bursts (essay formulation)	182.00	285.40	281.60	259.80	263.40
Bursts (revision)	18.33	14.00	11.29	17.13	27.00

Table 5.7 Number of bursts per task and in the writing subprocesses

Similarly, in the formulation process of the academic essays, fewer bursts were needed in the freewriting condition. This indicates that the participants' fluency in formulating the L1F and the FLF was higher than their fluency in the L1N and the FLN; this in turn proves that the activation of the linguistic structures via freewriting had an enhancing effect on fluency, even after the freewriting stage was finished (Elbow 2000: 43). The participants were also able to produce more text in less time using a lower number of bursts. This may have been the result of less revising in the freewriting conditions compared to the note-taking conditions (see Chapter 7.1). It could also be that the writing processes did not slow down significantly, since parallel processing worked better and it was possible to activate and translate present knowledge into language more easily (Tynjälä, Mason and Lonka 2001: 10/11).

The average number of bursts in *revisions* is only analysed for the essays in which the participants made revisions after the formulation of the essay. As expected, the number of bursts in revisions was highest in the freewriting conditions, where participants also dedicated the highest proportion of the allotted time to revision: the average number of bursts in revisions was 17.13 in the L1F and 27.00 in the FLF. The average number of bursts was lowest in the FLN (11.29), where the smallest proportion of time was spent on revision. The fact that markedly fewer revisions were made in the L1F than in the FLF is noteworthy, since the participants had more time for revision in the former case than in the latter. Chapter 6.1 will show that the error rate was quite high in the participants' L1, which suggests that the activation of formulation via freewriting and the reduction in monitoring had a negative effect on the awareness of errors, even after the actual formulation of the essay was completed, and no need for further revision was recognised.

Looking at the rate of bursts per minute (Table 5.8), one notes that it does not differ significantly between the academic essays across the two planning conditions and the two language conditions: the rate ranges between a low of 7.76 bursts per minute in the FLF condition and a high of 8.23 bursts per minute in the L1N condition. Again, the SE does not conform to this pattern, in that here 9.65 bursts per minute were executed.

	SE	L1N	FLN	L1F	FLF
Total bursts/minute	9.65	8.23	8.05	8.21	7.76
Bursts/minute (planning)	0.00	9.35	8.47	8.18	8.22
Bursts/minute (formulating)	10.35	9.56	9.58	9.92	10.31
Bursts/minute (revising)	6.87	3.82	7.15	5.73	4.44

Table 5.8 Bursts per minute

The numbers of bursts per minute in the planning processes (pl) are fairly consistent across the FLNpl (8.47), the L1Fpl (8.18) and the FLFpl (8.22), but they are distinctly higher in the L1Npl (9.35). In the note-taking condition, the pauses between the execution periods were used for conscious planning, for the mental evaluation of the plans and for the conscious search for content and structure of the essays, both in the L1Npl and in the FLNpl. However, in the L1, these pauses were shorter and the typing speed was higher. Thus, one can say that the pause-executing strategy (Alves *et al.* 2007: 55) was more effective in the L1Npl than in the FLNpl. In the freewriting condition, no significant differences were found in this area.

Across all planning conditions, the number of bursts per minute was higher in the writing process of the essay proper (pe) than it was in the planning processes. This could be the result of various additional factors that play a role in the formulation process of academic essay writing. First of all, the participants were aware that the academic essays were the ones to be formally evaluated. Because of this, their internal monitors were more vigilant about ensuring that the writing would be of the highest possible quality – that is, their monitors were kept busy checking whether the content provided was relevant and the structure logical. The writers had to meet the demands of the academic genre as well as the readers' expectations with regard to correctness and appropriate academic style (Bhatia 2010: 37, Curry and Lillis 2004: 683, Kennedy and Smith 2010: 21, Morita 2004: 577). Because of this, the cognitive demands in the formulation process were higher than in the planning process, and the writing processes as a whole slowed down. At the same time, during formulation the participants were more self-critical with respect to wording and orthography than they were during the planning of the essays, and because of this, more revisions took place. The higher typing speed induced by freewriting led to more typing mistakes, which were detected more effectively and corrected more immediately than other errors (see Chapter 7.5). These processes led to a faster production of bursts and at the same time a higher rate of immediate revisions (see Chapter 5.5.1).

The bursts-per-minute rate in the final revision processes (r) differed markedly between the two planning conditions and the two languages. It was highest in the FLNr (7.15), followed by the SEr (6.87). In the L1Fr it was distinctly lower (5.73), while in FLFr it was 4.44 and in the L1Nr only 3.82. The high number of bursts per minute in the FLNr and the SEr could indicate that only quick proofreading with marginal revisions was performed (Bereiter and Scardamalia 1987: 22), whereas in the other conditions the writers took – or were given – more time for evaluating their texts and for producing better

alternatives to the passages they found unsatisfactory (see Chapter 7.6). As was shown by the percentage of time spent on revisions (Chapter 5.2.2), in these conditions, the writers either ran short of time for deeper revision (FLN) or did not perceive the necessity for it (SE).

In the L1N, the L1F and the FLF, the writers had more time for revisions, and the lower number of bursts indicates that they either evaluated the texts more consciously and revised more thoroughly or that they were more satisfied with the texts produced and therefore did not feel the need to make further revisions. This is analysed in Chapter 7.6.

5.4.2 Words per burst

Table 5.9 gives an overview of the words-per-burst rate in the different tasks and in the different writing processes. The analysis shows that the total words-per-burst rate was highest in the simplest task (SE): 2.89 words per burst. In the L1F and the FLF, the rate was quite close to that of the SE, with 2.73 words per burst in the L1F writing process and a slightly higher rate of 2.77 in the FLF writing process. The difference between the L1 and the FL is insignificant, however. In the L1N and FLN conditions, there was no difference at all: both conditions resulted in 1.98 words per burst.[3]

	SE	L1N	FLN	L1F	FLF
Total words/burst	2.89	1.98	1.98	2.73	2.77
Words/burst (planning)	0	1.92	1.64	6.50	8.88
Words/burst (formulating)	2.91	2.10	2.11	2.45	2.43
Words/burst (revising)	1.24	0.66	1.04	0.80	1.24

Table 5.9 Number of words per burst

The average number of words per burst in the different writing conditions varied distinctly. This indicates that the planning type had an effect in the L1 similar to that in the FL. As expected, the rates of words per burst differed most clearly in the planning processes. Since none of the participants spent any time on planning the SE, there is no result for this aspect in this condition. Comparing the different tasks, the highest words-per-burst rate (FLFpl) is 81.5% higher than the lowest words-per-burst rate (FLNpl). The fact that the lowest and the highest rates occur in the same language indicates that the participants had different (subconscious) strategies for executing note-taking and freewriting in the L1 and in the FL. In the L1 notes, it was easier for the participants to formulate the mentally

[3] The numbers of words per burst are lower than the results in most other studies (e.g. Chenoweth and Hayes 2001, Galbraith 2009) because the pauses that end revisions in those tests are longer than one second as defined in this study.

generated ideas and the articulatory buffer was larger. The generation of ideas itself also worked more fluently in the L1Npl than in the FLNpl, since in the former, the participants were able to produce longer bursts and higher numbers of bursts per minute than in the latter. Some of the participants did not feel the need to write down a significant amount of information in the L1 tasks, whereas in the FL tasks they used their notes more extensively in order to relieve the working memory. In the FL this process was more laborious, again indicating that the participants made more use of the L1 here to generate ideas, which made formulation more difficult (Poulisse and Bongaert 1994: 53).

The fact that more words per burst were produced in the FLFpl than in the L1Fpl could be explained in different ways. For one, it could be that the writers' internal monitors were generally more apt to notice errors in the L1 than in the FL, and it was more difficult to switch the monitors off in the L1 condition. The participants could not resist making automatic corrections in their L1, which some of them noted explicitly in the questionnaires. Gio, for example, wrote that she would not use freewriting as a planning method again, because it influenced her use of language in a negative way. Additionally, as noted above, German and English morphology differ, and because of this, the lower number of words per burst does not necessarily reflect a lower rate of idea generation activity.

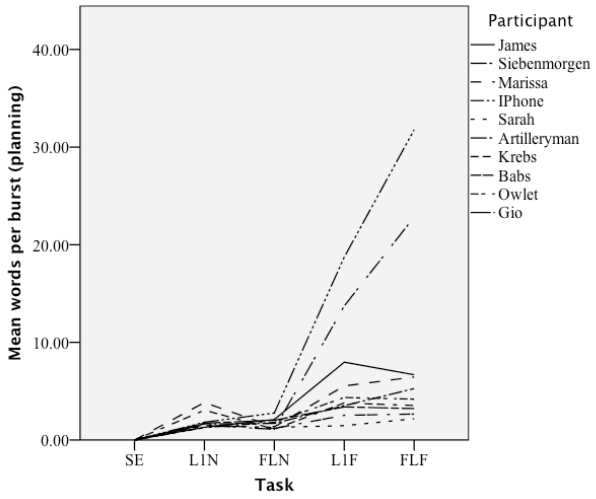

Fig. 5.7 Words per burst per participant in planning

The individual results of words per burst in planning (Fig. 5.7) reveal that the distinct differences in the words-per-burst rate between freewriting and note-taking arise in large part from the results of Artilleryman and Siebenmorgen, who produced an average number of words per burst of 13.73 (Siebenmorgen) and 18.73 (Artilleryman) in L1 freewriting and an average words-per-burst rate of 22.83 (Siebenmorgen) and 31.78 (Artilleryman) in FL freewriting. With all the other participants, one can also see that the words-per-burst rate in the freewriting planning process was distinctly higher than in note-taking in both languages, but now there is no overall tendency toward a higher number of words per burst in the L1 or the FL: four

of the eight participants (excluding Siebenmorgen and Artilleryman) produced a higher rate in their L1 and the other four produced a higher rate in their FL. That is, the reasons for the higher productivity in the FL compared to the L1 in the freewriting condition apply to 60% of the participants (including Siebenmorgen and Artilleryman), indicating again that the performance of the writing processes – and that of the planning processes to an even larger extent – depends on the individual writer (Bräuer 2009: 56, Torrance, Thomas, and Robinson 1999: 190, van Waes 1992: 185) as well as on language proficiency (Francis 2012: 112).

In the formulating process of the proper essays, the differences in the results regarding words per burst across the different task conditions converge. Overall, the highest rate is found in the SE, which yielded 2.91 words per burst. Among the academic essays, the lowest words-per-burst rate occurred in the L1N (2.10), and the highest was found in the L1F (2.45). The differences between the languages within the different planning conditions were only marginal. That is, the production rate in the formulating process after note-taking rose significantly from the planning to the formulating process (L1N: 9.37%; FLN: 22.3%) and fell even more significantly from planning to formulating after freewriting (L1F: 62.3%; FLF: 72.3%). The rise in the former instance is the result of a relocation of the cognitive capacities from note-taking to the elaborate formulation of the ideas. The fall in the latter – i.e. the reduction of the words-per-burst rate in the freewriting condition – was also predictable, since in formulating academic essays, monitoring is activated in an intensive way, since it is necessary for the writer to develop a structured and well-formulated way of conveying their intentions to the reader. Still, the words-per-burst rate is higher in the essay written after freewriting than in the one written after note-taking, which proves that the activation of the linguistic interfaces keeps on working after the actual freewriting stage is finished. Now the effect is slightly higher in the L1, which might be the result of higher proficiency in typing and the broader network of the phonological/ orthographic and semantic structures.

	SE	L1N	FLN	L1F	FLF
James	3.33	3.75	2.70	3.42	3.87
Siebenmorgen	3.01	1.84	2.15	2.62	2.21
Marissa	3.29	1.86	2.36	2.08	2.42
iPhone	2.22	2.01	1.88	2.49	2.00
Sarah	1.67	1.65	1.35	1.65	1.65
Artilleryman	4.29	2.56	3.25	3.18	3.77
Krebs	4.07	1.71	1.81	2.24	2.21
Babs	2.11	1.81	1.84	2.43	1.75
Owlet	2.46	2.05	1.88	2.18	2.25
Gio	2.67	1.75	1.92	2.21	2.15

Table 5.10 Words-per-burst rates of individual participants (proper-essay writing)

Among the individual writers, there are significant differences in the

production rates (Table 5.10). James and Artilleryman were very productive in all task conditions, having results of more than three words per burst in nearly all conditions – a result which, according to Galbraith (2009: 17), could be an indicator of a higher rate of idea generation in the writing process, especially if one considers that the bursts in the analysis are ended by pauses no shorter than one second, which is, as suggested above, rather strict.

All of the participants with the exception of James, iPhone and Babs achieved the highest words-per-burst rate in the SE. iPhone and Babs were more productive in the L1F, while James was the only participant more fluent in all tasks other than the FLN academic papers. The words-per-burst rates differed between the tasks for every writer. Only in Sarah's case were the results nearly static: 1.67 words per burst in the SE and 1.65 in the L1N, L1F and FLF; the exception was the FLN, with 1.35 words per burst. Since Sarah was the candidate who was not able to produce a freewriting text according to Elbow's (1973: 3) rules (writing a linear text *without* paragraphing), but instead wrote the freewriting text in list form, the consistent words per-burst-rate demonstrated by her indicates that the new planning condition did not help to improve her fluency, but did facilitate a faster production process, which in turn gave her more time for revision.

With all of the other writers, fluency improved under the freewriting condition. Only Babs was least fluent in the FLF condition, but her words-per-burst results in the L1F were significantly higher than in either of the note-taking conditions and in the SE. Since her results in the FLN condition were higher than in the L1N and the FLF, the language factor is not the obvious explanation for her less fluent performance in the formulation of FLF. In the questionnaire, she noted that during the FLF formulating stage, more typing mistakes occurred, perhaps hinting at the problem of coordinating the faster internal formulation processes with motoric movements, which are generally better trained in L1 orthography than in FL orthography. This again points to the importance of doing more research in the area of executing processes and their influence on text production (see Chapter 3.1.4).

As in planning, there is no obvious overall interrelationship between the words-per-burst rates in the two languages. In the note-taking condition, six of the ten participants were more productive in the FL, while in the freewriting condition, five of the ten participants were more productive in the L1, four were more productive in the FL, and one obtained the same result in both conditions.

When it comes to the revisions, on the other hand, it is noteworthy that language

does seem to have an effect on the words-per-burst rate. The lowest rates were found in the L1, whereas in all of the FL texts (including the SE), the rates were higher. This indicates that here – at least to a certain degree – the participants concentrated on different aspects in the revisions. They reformulated more passages or added more content in the FL, which again shows that they were more critical or less content with their FL texts than with their L1 texts. The remarkably high number of words per burst in the FLN revisions was not expected, since here the bursts-per-minute rate was the highest rate, and it was assumed that only marginal revisions were carried out, such as corrections of typing mistakes (Chapter 5.4.2). Chapter 7.6 will show that although the number of corrections of typing mistakes and punctuation errors in the revisions of the FLN were high, other elements can be evaluated as being equally important.

5.4.3 Characters per burst

In the analysis of the overall character production and the characters-per-minute rate, it became obvious that in this area language played a significant role. Because of this, it was expected that in the characters-per-burst rate, the language aspect would also be significant. The overall characters-per-burst rate (Table 5.11) does indeed show that language has a major influence. Interestingly, here the average production rate in the SE (13.08) was lower than that in the L1N (13.80), the L1F (18.24) and the FLF (14.24), whereas with respect to words per burst, the SE was the task in which the writers were most productive. The low number of characters in the SE indicates that the writers used less complex words in this task than in the academic essays. Only in the FLN was the rate lower (10.66), but here the words-per-burst rate was also low. As in the words-per-burst rate, the total characters-per-burst rate in the freewriting condition was higher in both languages: in the L1F it was 31.88% higher than in the L1N, while in the FLF it was 38.52% higher than in the FLN.

	SE	L1N	FLN	L1F	FLF
Characters/burst	13.08	13.80	10.66	18.24	14.24
Characters/burst (planning)	0.00	14.80	9.86	41.79	44.07
Characters/burst (formulating)	13.15	14.36	11.13	16.53	12.58
Characters/burst (revision)	6.17	5.13	5.06	6.12	6.78

Table 5.11 Characters per burst

In contrast to the words-per-burst rate, when it comes to characters per burst, there is a distinct difference between the L1 and the FL in note-taking and in freewriting. In the note-taking condition, the L1N characters-per-burst rate was 22.75% higher than the rate in

the FLN; in the freewriting condition, the L1F characters-per-burst rate was 21.92% higher than that in the FLF. That is, both the language and the planning condition had a relevant impact on the overall production rate, and in case of characters per burst, the writers were more productive in their L1. That the number was lowest in the FLN indicates that here the writers encountered the greatest problems in formulating their ideas.

Looking at the characters-per-burst rates in the different writing subprocesses, this impression changes slightly. In the planning process, the differences between the planning conditions were relevant for the lengths of the bursts in both languages. The burst lengths in the L1Fpl were 64.58% higher than in the L1Npl; the difference between the rates in the FLFpl and the FLNpl was even higher at 77.26%. However, what is conspicuous with respect to characters per burst in planning is that although in the note-taking condition the rate was lower in the FL than in the L1 (difference: 33.38%), in freewriting the characters-per-burst rate in the FLFpl was higher than that in the L1Fpl (difference: 5.17%). In revision, the differences between the languages in the note-taking essays were very minor (1.38%); that is, the language difference did not have any significant impact on the production process with respect to characters per burst. The FLFr characters-per-burst rate was again higher than the L1Fr characters-per-burst rate (10.78%). This shows that for the planning process as well as for the revising process, the freewriting planning condition enhanced productivity in planning and revising more significantly in the FL than in the L1.

The higher total characters-per-burst rate in the L1 as compared to the FL in both planning conditions was the result of higher productivity in the L1 formulation process. In the L1Npe, the participants produced 29% more characters per burst than in FLNpe, and in the L1Fpe they wrote 31.4% more characters per burst than in the FLFpe essay. In the L1N, the production rate was only slightly lower in the formulation than in the planning process, whereas it was distinctly lower in the L1F and the FLF; only in the FLN did the production rate rise. It was expected that in the freewriting condition, the writers would be less productive in the formulation process than in the planning process, because here the monitoring and the more calculated writing processes would be in operation. At the same time, it was expected that in both languages the formulation process would be distinctly more fluent following the planning phase using note-taking. In the L1Npe, however, this was not the case. This indicates that thinking is indeed more related to the L1, which could be explained in the model proposed here by the denser network of phonological structures, which in turn activate other phonological structures and the semantic structures connected to them. Because of this, the participants did not face many problems in formulating these

ideas in their L1 notes, whereas in the FL, they had to struggle to translate their thoughts into FL words. As a consequence, the cognitive demands in the FL note-taking were so high that the participants had to slow the writing processes down significantly in order to cope with the task. When it came to generating a coherent text from these notes, in the L1Npe the writers faced the problem of finding the genre-appropriate wording and of generating a coherent, appropriately structured text. The tendency in Teutonic academic writing to use loanwords and complicated words and to generate complex sentences (Thielmann 2009: 26 ff.) might have caused problems in formulation. In FL writing, formulation was more fluent after note-taking, which indicates that after the main ideas had been put into words in the notes, the elaboration of the notes was easier than the linguistic realisation of the ideas in the notes. Additionally, the register of academic writing might not be perceived in as strict terms in the FL as in the L1, and therefore the participants may have been less critical with their formulations (see Chapter 7).

On the whole, the higher fluency and productivity in the formulation stage in the L1 indicate that writers are better equipped to handle parallel processing in their L1 than they are in an FL. This could be the effect of a larger articulatory buffer in the L1, which enables the participants to spend less cognitive capacity on language generation, or it may be that the participants focused on different aspects in the L1 and the FL (see Chapter 7). However, as was seen in the discussion of the words-per-burst rate, one has to take into account the individual results before drawing more general conclusions.

5.4.4 Individual results of characters per burst

The results of the individual participants with respect to characters per burst differed exceedingly (Table 5.12). Looking at each individual writer, it is clear that just as in the words-per-burst analysis, there is no regular pattern to the rise in productivity between the L1 and the FL.

Four of the participants produced more characters per burst in total in L1 freewriting, while the other six wrote more characters per burst in FL freewriting. The generally much higher fluency in freewriting is again attributable to the extraordinarily high fluency of Artilleryman and Siebenmorgen in the planning process, which raised the total characters-per-burst rate; for the other participants, the rise in fluency was less extreme – although it was present in every participant.

	SE	L1N	FLN	L1F	FLF
James	0.00	12.15	13.93	56.18	32.34
Siebenmorgen	0.00	12.25	7.46	**80.59**	**110.00**
Marissa	0.00	**26.76**	**8.00**	29.04	31.16
IPhone	0.00	12.36	10.45	21.49	21.61
Sarah	0.00	11.10	7.90	11.66	13.22
Artilleryman	0.00	13.41	16.00	**125.91**	**158.44**
Krebs	0.00	**23.94**	**6.06**	25.34	18.35
Babs	0.00	12.15	8.30	17.42	18.12
Owlet	0.00	10.39	9.33	27.87	20.98
Gio	0.00	13.48	11.20	22.38	16.46

Table 5.12 Characters/burst in planning for each participant

In the note-taking planning condition, the burst outcomes of Marissa and Krebs were remarkable as both were far more productive in the L1 than in the FL, whereas in the freewriting condition, the differences between the results in the two languages were rather low in their cases. In note-taking, James and Artilleryman were more productive in the FL than in the L1, while the rest of the participants produced more characters per burst in the L1 note-taking condition. Thus it seems that generally, the influence of the L1 on the writing process is higher in the note-taking condition than in the freewriting condition. In FLN tasks, the conscious search for ideas and for possible structures may be impeded by the extra demands of translating the generated ideas into the FL, while in the freewriting planning condition, the subdued monitoring may reduce this impeding effect on the writing process.

The results with regard to the burst lengths in the formulating process (Fig. 5.8) exhibit a clear pattern for all of the participants. Just as in the case of the mean numbers of characters of the essays (Figure 5.1), for most of the writers the graphed results form an "M". Only in the SEpe condition did some of the writers produce more characters per burst than in the L1Npe condition. With all of the participants, the characters-per-burst rate was higher in their L1 essay than in the FL essay under the same planning conditions. Most of them produced more characters per burst in the freewriting condition in both of the two languages. Freewriting did not show an activating effect in the FL for iPhone and Babs; Sarah's rate did not go up in the L1, but

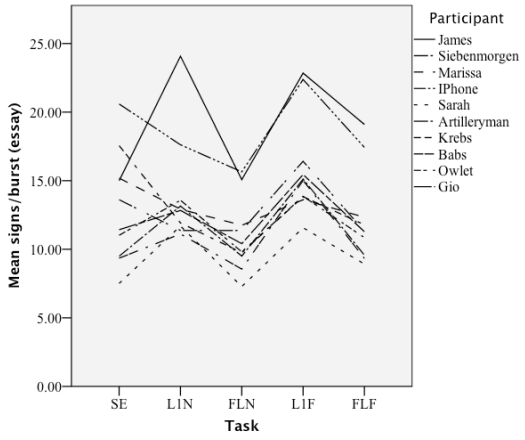

Fig. 5.8 Characters per burst per participant (proper-essay writing)

stayed stable, whereas in the FL, it increased after freewriting, which mirrors her overall productivity in this condition. James' results in the L1 condition actually went down in the context of L1F formulation, dropping from 25.38 characters per burst in the L1Npe to 23.10 characters per burst in the L1Fpe. In the interview and in the questionnaire, he remarked that he consciously curbed his production rate after freewriting because he felt that such "uncontrolled" writing might not be appropriate for an academic essay, and he was afraid of writing down too many irrelevant points in an inadequately structured way. Since in the FL his characters-per-burst rate increased, it can be assumed that generally, the effect of more fluent formulating after freewriting might have benefited him in the L1 as well, had he not consciously decided to repress this effect.

One can therefore conclude that with respect to formulating, the higher cognitive demands of writing in the FL and blocking the L1 are relevant for the production process. Since in the freewriting planning processes, this influence could not be made out, it is proposed that – due to the demands of writing a coherent, logically-structured, carefully-worded and convincing essay in a foreign language – the monitor was forced to slow down the production process in FL formulating in order to cope with the high level of different demands simultaneously.

5.5 Ends of bursts

As noted by Spelman Miller (2005) and Chenoweth and Hayes (2001: 88), the way in which the bursts end reveals many things about the processes that underlie FL writing.

> The analysis of pausing and revision behaviour in relation to certain key locations, defined here as framing device locations, allows us insight into the way the second language writer juggles constraints to address both local and global issues in the construction of the text. (Spelman Miller 2005: 306)

For the analysis here, the ends of bursts were classified into those that were followed by pauses (*p-bursts*) and those that were followed by revision (*r-bursts*; Chenoweth and Hayes 2001: 88). In a next step, these categories were further subdivided into p-bursts in which the pause was followed by revision and r-bursts in which the revision was followed by a pause. The types of revisions that were made in the p-bursts and in the r-bursts (e.g. revision of typing mistakes or content revisions) will be presented in Chapter 7.7.

5.5.1 P-bursts and r-bursts

In Figure 5.9, the leftmost bar in each group presents the bursts that were ended by pauses (≥ 1 sec.). The next bar presents a subsection of this type of burst-end, namely those p-bursts in which the writers did not resume formulating after the pause, but instead made a revision – be it a correction to something written in the burst before the pause, or else a revision of or addition to any part of the text written thus far. The third bar in each group represents the bursts that were ended by a revision (r-bursts) or by a movement of the mouse to another position in the text. The rightmost bar in each group presents the r-bursts in which the participants paused after the revision was executed.

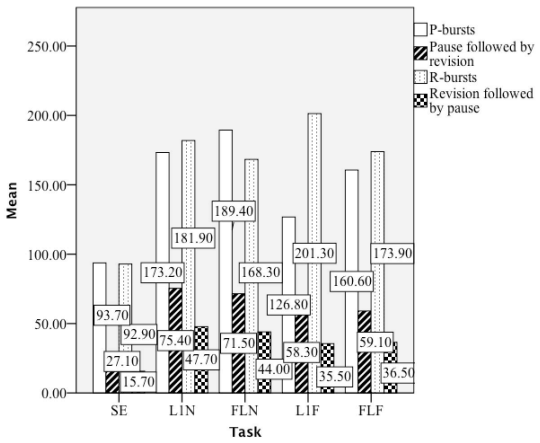

Fig. 5.9 Ends of bursts in the different tasks

In the SE, the average number of p-bursts (93.7 = 50.21%) and r-bursts (92.9 = 49.79%) is virtually the same. If one takes into account that the writers had only twenty minutes' time for this task and did not do any planning before starting to write, the high number of p-bursts could indicate that a large amount of the planning was done during the formulating process and that many pauses were used for further planning; it could also mean that planning during the writing process slowed the process down to such an extent that a pause set in. Only 29.83% of the pauses in the SE were used for evaluating and then revising the text written thus far. At the same time, the revisions in the r-bursts did not have a larger impact on the fluency of the formulation process. In 83.1% of the r-bursts, the writers continued the formulating process after revising without any further pauses for planning, searching for words or working to return to the train of thought.

Since the focus in this study lies on academic writing, in the following, the results of the burst-ends in the academic texts will be analysed more closely.

The results of the p-bursts and the r-bursts in the academic texts show that both the language and the planning method had an impact on the distribution of the types of burst-ends in the different tasks. First of all, the number of p-bursts in both planning conditions

was lower in the L1 than in the FL (L1N - FLN = -4.78%; L1F - FLF = -7.65%). This shows that the production process was generally more effortful in the FL than in the L1 because the higher amount of pausing indicates that the writers were not able to process as effectively in parallel as they did in the L1, probably because the articulatory buffer is smaller. They were forced to use the pause-execute strategy (Alves *et al.* 2007: 55). At the same time, the number of p-bursts fell sharply in the freewriting condition: the number of p-bursts in the L1F was 26.79% lower and the number of p-bursts in the FLF 15.21% lower than in the respective note-taking essays. The manifestly greater difference between note-taking and freewriting in the L1 shows that the activation of parallel processing via freewriting is more effective in the L1 than in the FL. The number of p-bursts followed by revision was also higher in the L1 than in the FL: 43.53% in the L1N and 45.98% in the L1F, versus 37.75% in the FLN and 36.8% in the FLF. The intralanguage differences between the percentages were only marginal.

In other words, in both the L1 and the FL, freewriting led to more fluent text production, which was interrupted more often by the results of the parallel processes (evaluating the text written thus far and reacting accordingly) than by the need to slow down the writing processes because of high cognitive demands. This effect was stronger in the L1 since here the higher automatisation and the denser network of phonological, syntactic and conceptual structures allowed the processes to work more effortlessly.

The results of the analysis of the p-bursts can be seen as an indicator for a different planning/formulating/revising strategy in the L1 as opposed to the FL. In the L1, the participants seem to have spent more pausing time on revising the text written thus far; that is, they evaluated the texts more often – and more consciously – during the essay writing process than they did in FL writing. In contrast to this, the pauses in the FL writing processes were more often an indicator of a slowing down of the parallel processing to the extent that it did not proceed at all, and the pauses were used more often for planning the next word, sentence or paragraph and for searching for appropriate FL vocabulary and expressions. Although in the interviews the participants could often not recall what they had been doing during the pauses, in the L1 condition they answered more frequently that they had been reading the text written thus far or the source text, whereas in the FL condition, it was more often the search for the right word or the need to translate a word from German to English that was given as a reason for pausing (see also Chanquoy, Foulin and Fayol 1990: 533).

In both planning conditions, the number of r-bursts was higher in the L1 than in the FL (L1N - FLN = 7.48%; L1F - FLF = 13.61%), and the number of r-bursts rose in both languages during and after freewriting; again, the difference was more distinct in the L1 (9.64%) than in the FL (3.22%). This outcome strengthens the suggestion that in their L1, the writers were able to produce and control more processes simultaneously than they were in the FL. They were able to formulate new text and revise the text written thus far at the same time – both with respect to orthography and content (see Chapter 7.7). Although in the FL the number of immediate corrections of typing mistakes was quite high as well, here the participants more often did not notice the typing mistakes (and other errors) instantly, but noticed them after having typed some more characters, or after separate revising in (short) production pauses.

In the L1F and FLF tasks, the lower proportion of r-bursts in which the revision was followed by a pause provides further proof that freewriting helps to enlarge the articulatory buffer. In the L1N task, the proportion lies at 26.22%, in L1F at 19.62%. In the FLN this percentage is only fractionally lower than in the L1, at 26.14%. In the FLF, the percentage is 20.99%. That is, the freewriting condition in both languages has an activating effect on the writing process. It enables the writers to keep the train of thought active in their minds and to continue the writing process without the need to consciously 'return to the task' and to consciously order their thoughts.

Looking at the results of the individual writers in the academic essays (Fig. 5.10), one sees that they generally mirror the overall impression. What is remarkable is that the differences between the highest and lowest numbers of r-bursts are larger than the differences between the highest and lowest numbers of p-bursts. The deviation for the p-bursts ranges from 25.49% in the L1F to 48.04% in L1N. For the r-bursts, the standard deviation ranges from 75.63% in the FLN and 91.84% in the L1F. That is, the capacity for parallel processing varies widely from individual to individual (Bergsleithner 2010: 12). Since the deviations between the maximum and minimum numbers of r-bursts were highest in the freewriting condition, one can say that the activating effect exerted by this planning

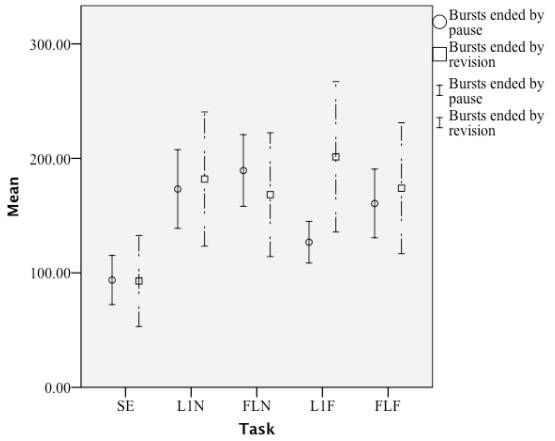

Fig. 5.10 Ends of bursts for individual participants

condition is different for each individual. In FL writing, one participant (Artilleryman) even registered a decrease in the number of r-bursts from note-taking to freewriting. This could have been the effect of (a) the openness to using the new method (Troia, Shankland and Wolbers 2012: 26) and/or (b) the fact that not all writers respond equally to writing strategies, depending on whether they are high self-monitors or low self-monitors (Alamargot, Favart and Galbraith 2000: 6–8, Torrance, Thomas and Robinson 1999: 196). James and Siebenmorgen, for example, stated that they deliberately slowed down their formulating processes in the freewriting condition in order to be able to write the proper essay in as controlled a manner as possible.

5.5.2 Bursts ending in mid-word

Different studies show that most bursts end at the end of paragraphs, sentences, or phrases, and only rarely inside a word (e.g. Levy and Marek 1999: 35, Matsuhashi 1981: 125 ff.). In these studies, the pauses that define burst-ends are usually three seconds or longer. Since in this study the relevant pause length is much shorter, it was presupposed that more bursts would end in mid-word, since these small pauses are not conscious choices but rather the effect of the slowing down of parallel processing to the point of non-execution (Just and Carpenter 1992: 136).

%	SE	L1N	FLN	L1F	FLF
Mid-word bursts / total bursts (%)	37.02	39.55	37.44	50.94	41.55

Table 5.13 Percentage of all bursts ending in mid-word

Table 5.13 gives an overview of percentages of the bursts which ended in the middle of a word (*mid-word bursts*). One sees that a high proportion of bursts ended in mid-word. The lowest proportion (37.02%) occurred in the SE setting. In the FLN, the percentage of mid-word bursts is lowest with 37.44%. The highest percentage of mid-word bursts was found in the L1F (50.94%). This was not expected since the general fluency was highest in this condition.

%	SE	L1N	FLN	L1F	FLF
R-bursts / mid-word bursts	96.14	84.66	81.77	87.65	84.53

Table 5.14 Percentage of mid-word bursts that are r-bursts

However, when one looks at the proportion of mid-word bursts that are r-bursts (Table 5.14), this number also increases in the freewriting setting. It is highest in the SE: here, 96.14% of the mid-word bursts are r-bursts. In these cases, the participants detected

and corrected a typing mistake or another type of error immediately after they had made it. The writers were able to stop the executing process the moment they realised the error/mistake, often when they were still in the process of making it.

In the academic essays, the rate of mid-word r-bursts is also high: from 81.77% in the FLN-condition, to 84.53% in the FLF condition and 84.66% in the L1N condition, and on up to 87.65% in the L1F condition. That is, most of the mid-word bursts were not the result of a slowdown in the writing process, but rather an effect of monitoring and parallel processing. The rate of mid-word r-bursts was higher in the L1 than in the FL across the different planning conditions. That the rate of immediate revision was higher in the freewriting condition shows that this planning method indeed activated the formulating process, but also that this higher activation had a disadvantage, namely that the motor movements could not be executed properly. Because of the higher typing speed, more mistakes occurred and more bursts were stopped in the middle of the word. This effect was stronger in the L1 since formulation is easier in the native language than in the FL. Even though the motor control was no longer working efficiently, the writers were able to evaluate the text written thus far – at least with respect to the orthography of the recently-written text – and at the same time to mentally formulate the text to be executed next.

Table 5.15 gives an overview of the mean number of mid-word bursts in the planning process.

	%	L1N	FLN	L1F	FLF
Mid-word bursts / total bursts (planning)		38.22	35.36	63.90	62.60

Table 5.15 Percentage of all bursts in planning that end in mid-word

The table shows that in the planning processes, the distribution of mid-word bursts differs more strongly between the planning conditions than between the language conditions. In the note-taking condition, the percentage of mid-word bursts is lower than that of bursts ending after a complete word, while in the freewriting condition, the opposite is true. This indicates that in note-taking, due to the lack of cognitive demand to produce language without pausing, the writers were better able to write without making many errors/mistakes that had to be immediately corrected. In freewriting, on the other hand, mid-word bursts make up the majority of all burst-ends, which could be the consequence of the higher number of typing mistakes that occur in freewriting and the automatic correction that often takes place (see Chapter 7.4).

%	L1N	FLN	L1F	FLF
R-bursts/mid-word bursts (planning)	72.84	67.62	78.81	71.38

Table 5.16 Percentage of mid-word bursts in planning that are r-bursts

However, Table 5.16 shows the percentage of mid-word bursts in the planning processes that were r-bursts. These mid-word r-bursts were less often the consequence of noticing errors and subsequently revising them than was the case for mid-word bursts in general (Table 5.14). More often, pausing occurred in mid-word in planning by freewriting – although mid-word r-bursts are still the majority. This is also true for the percentage of r-bursts in the mid-word bursts for note-taking. For the freewriting condition, this points to high cognitive demands with respect to coordinating the active thinking process, the need to keep on thinking and writing in parallel, and the execution processes, which in some cases resulted in a total break in writing. In note-taking, formulations were produced more deliberately, and the writers evaluated the content and the wording more consciously; as a result, the writers more often slowed down the execution in the evaluation than they did in the formulation of the essay.

To sum up, it is clear that the planning methods as well as the languages had an impact on the frequency with which mid-word bursts occurred and on the type of mid-word bursts that were found. Due to the freewriting planning method and the increase in typing speed it encouraged, the mistake/error rate in the freewriting tasks – and because of this the number of r-bursts that ended in the middle of a word – also rose. This effect was stronger in L1, first of all because the typing speed increased more in the L1 than it did in the FL, and second of all because parallel processing (simultaneous monitoring and revising during formulating) was more efficiently performed in the L1 than in the FL, and more immediate corrections could be executed.

5.6 Discussion

The analysis of the final essay texts and of the participants' writing processes with respect to fluency and productivity show that the language conditions as well as the planning conditions have a distinct influence on these aspects of writing. The writers were able to produce more text in less time in the freewriting conditions. This is true for the number of characters in the final essays as well as for the total production process (total number of characters produced, including those deleted). This rise in productivity was found in all of the writing processes, from planning to formulating to revising. That is, in all of the writing processes, the planning conditions modified productivity in the same way in both languages. Generally, the writing process was more productive and more fluent in L1, and

the increase in fluency in the freewriting planning condition was higher in the L1 than in the FL. The writers needed less time in the L1 in both planning conditions, and less time in the freewriting condition than in the note-taking condition. The time-reducing effect of the freewriting condition was higher in the L1 than in the FL.

Furthermore, the time spent on the different subprocesses differed between the languages and between the different planning conditions. Whereas in the note-taking planning condition, the participants needed more time in the FL, they spent less time on planning in the FLF. Among all the task conditions, they spent the least amount of time on revision in the FLN – mostly due to time constraints – and the most on revision in the FLF. These results show that the planning condition changed the writing processes in both languages, but that it changed them differently in the L1 and the FL.

The results of the analysis of the different kinds of bursts (r-bursts and p-bursts) point in the same direction. Here, the number of p-bursts indicating a slowdown in the writing processes was higher in the FL, and this number was reduced in both languages in the freewriting condition. The number of r-bursts was higher in the L1, and this number rose in both languages in the freewriting tasks. Many of the r-bursts ended in the middle of a word (more so in L1), which indicates that they were not ended in order to make a larger revision, but rather to immediately correct a typing mistake, with no further influence on the fluency of the writing process (see Chapter 7.7).

The quantitative results thus show that planning by freewriting is indeed an efficient way of increasing writing productivity (Bräuer 2006: 27). This effect can be attributed either to the higher activation of the formulation process or to the explicit subduing of monitor control, or else to a combination of both. The effect is stronger in the L1 than in the FL. This is likely a consequence of the generally higher automaticity of formulation and motor execution in the language that is more frequently used – in this case, German. By activating these processes deliberately, the cognitive demands of applying the academic genre – itself a kind of 'FL', even in the L1 context – and the resulting slowdown were apparently reduced. Because of this, more parallel processing became possible; the participants were able to plan, to formulate and to revise simultaneously more often.

Looking at the writing processes and the time spent on the different subprocesses – planning, formulating, revising – one notes that the unfamiliar freewriting condition not only changed the productivity of the writers, but also the writing processes – and did so differently in the L1 and the FL. Whereas in the FLN task, the writers used distinctly more

time for planning than in the FLF task, exactly the opposite was true in the L1N and L1F tasks. This indicates that in the L1, the freewriting method was more effective in helping the writers to generate ideas than it was in the FL. Because of this, they were more eager to write down their ideas for a longer period of time than they were asked to do by the analyst. That is, idea generation (and thus the thinking process) is to a certain degree dependent on whether the writer is using their L1 or an FL. This may be because the conceptual and phonological structures in the L1 are branched and the network is denser, and thus more conceptual and phonological nodes are activated, which in turn activates even more nodes; or it may be because in the FL, a lack of vocabulary knowledge makes the writer stop and feel uncomfortable about writing.

In note-taking, the results with respect to the amount of time spent on planning showed the opposite effect. Less time was needed for planning in the L1 than in FL. This again is an indicator that planning is not language-independent. Although the underlying semantic moves are assumed to be the same in the L1 and the FL by Jackendoff (2002: 124), Beare (2000: 93), Berman (1994: 30) and others, in conscious thinking – which is needed for academic writing – the language used plays a role (see also Au 2001: 444, Cook *et al*. 2006: 149, Oksaar 2003: ch. 3.3.2–3.3.3, Slobin 2002: 7, 2003: 158). In the L1, it was easier for the writers to 'condense' the complexity of their thoughts and ideas into keywords, whereas in FL writing, this process took more time and more effort. This could be the result of a lack of appropriate vocabulary; or it could be due to the lower activation of the interfaces between (FL-)phonology, (FL-)syntax, and the semantic structure in note-taking. Studies by Cumming (1990, 2001), (Krings 1989) and Uzawa and Cumming (1989) also show that students tend to use their L1 in planning, even if the text to be produced is to be written in the FL. That is, in FL planning a translation process may have been going on as well, which slowed down productivity.

To sum up, the cognitive demands are higher in FL academic writing, and more and different factors are at work in FL writing as compared to L1 writing, which has an impact on productivity and fluency (see Leki, Cumming, and Silva 2008: 127). The suppression of the linguistic influence of L1 on FL writing is one of these factors. The extent to which this influence becomes visible in the texts produced by the participants is the subject of the following chapters.

6. Error analysis

The analyses of fluency and productivity have shown that these processes work better in L1 than in FL. They have also underlined the high cognitive demands on the FL academic writers, which might lead to a lowering of the monitor's awareness of L1 use in FL writing. Because of this probability of L1 influence, the error analysis in this study is based on the model of node-switches (Chapters 2.5 and 4.4.1). Since the influence of L1 on FL writing is the focus of this study, the main part of the following chapter deals with the phenomenon of node-switching in the FL texts. Only a short overview of the linguistic results of the L1 texts is presented in Chapter 6.1. Both the errors and mistakes in the proper FL essays (FLNpe and FLFpe) and in the plans (FLNpl and FLFpl) are analysed in the following chapters, with respect to the frequency of instances in the error categories and in the error subcategories that were introduced in Chapter 4.3. The analysis takes place in two steps: first, the total number of errors in the main categories is presented. After this, an analysis of the outcomes in specific categories is made in the respective subcategories. An analysis per T-unit (Hunt 1965: 20) was not conducted because of the differences between L1 and FL syntactic complexity (see Badovi-Harling 1992).

6.1 Errors in the L1 essays

With respect to errors in the L1 final essays, it was presumed that the errors to be detected would mainly be located in the categories of typing mistake and language internal node-switches in *genre*. To a certain extent, errors were also expected in *miscellaneous* in which linguistic errors are subsumed that are not rooted in FL English, but rather represent a false application or a missing knowledge of L1 rules. Since all of the participants were L1 German speakers, it was assumed that the number of errors in the latter category would be rather low, especially in those texts in which the writers had had enough time for revision. It was presumed that the L1-competence would interfere with more severe linguistic errors, and that the average error rate would be highest in the freewriting plan (L1Fpl), since the assignment here asked for the omission of corrections.

Table 6.1 presents the numbers of errors and mistakes in the plans (L1Npl/L1Fpl) and in the proper essays (L1Npe and L1Fpe). It becomes obvious that the presumptions that were made were erroneous in some important aspects.

The presumption that the highest overall error rate would occur in the L1Fpl was correct, which is due to the effort that the participants made in not making any revisions during freewriting (that they were not too successful in suppressing the urge to revise will be shown in Chapter 7.4.1). Nearly ten times more errors were found in the L1Fpl in

comparison with the L1Npl, which means that an error occurred every 5.22 words in the L1Fpl, whereas the rate lies at only one error in 22.36 words in the L1Npl. In the essays, the total number of errors is only irrelevantly higher in the L1F. When one takes the higher number of words in the L1Fpe essays into account, the rate in the L1Fpe becomes even lower than in the L1Npe: in the L1Npe, an error occurred every 25.92 words; in the L1F, every 26.45 words. That is, in the L1 academic essays, the different planning types and the different activation of the linguistic structures did not have a relevant effect on the quantity of the errors in the proper essays.

	L1Npl	L1N	L1Fpl	L1F
Total number of errors	4.60	20.95	45.85	22.15
Phonological node-switch	0.10	0.00	0.00	0.10
Orthographic node-switch	1.70	1.00	16.50	0.50
Syntactic node-switch	0.00	0.00	0.00	0.00
Semantic node-switch	0.30	2.10	0.50	2.40
Genre node-switch	0.00	0.80	0.10	1.00
Code-switch	0.20	0.30	0.10	0.00
Typing Mistakes	0.90	5.60	18.80	7.60
Miscellaneous	1.40	10.50	10.70	11.20
Content	0.10	0.90	0.00	0.00

Table 6.1 Errors and mistakes in the L1 texts (plans and proper essays)

Yet, there is a difference in the distribution of errors in the categories (Fig. 6.1). The diagrams show that the distribution differs most strikingly between the plans; however, the pattern also varies in some important aspects in the final essays.

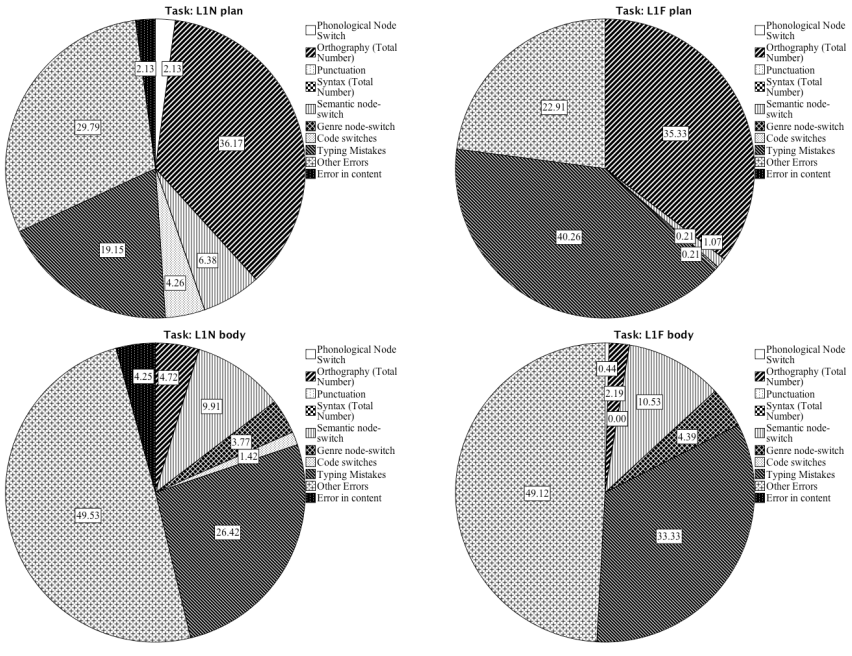

Fig. 6.1 Distribution of errors in the L1 texts

In the L1Npl, the variance of the categories in which errors occurred is distinctly higher than in freewriting. The largest amount of errors is located in the category *orthographic node-switches* (36.17%). Additionally, one

finds errors in the category *miscellaneous* (29.79%), *typing mistakes* (19.15%), but also in *semantic node-switches* (6.38%), in *code-switches* (4.26%), in *phonological node-switches* (2.13%), and in *content* (2.13%). The latter errors are actually the result of an orthographic problem. As was noted in chapter 4.3.1 in more detail, the possessive suffix *-s*, which is separated from the noun by an apostrophe in English, does not take an apostrophe in German. However, in the L1N assignment three of the participants misinterpreted the name of the author of the source text as being *Schneiders*, instead of *Schneider*, because they did not realise that the final *s* was the possessive marker. This is quite astonishing since *Schneider* is a far more popular name than *Schneiders* – only three entrances of "Schneiders" were actually found in the German telephone register (www.dasoertliche.de [2012-08-05]).

In the L1Fpl, the category of *typing mistakes* dominates (40.26%), which only takes the third position in the L1Npl. *Orthographic node-switches* make up 35.33% of the errors (which is very close to the percentage in the notes), and errors in the category miscellaneous make up 22.91%. Only insignificant proportions of errors could be found in *semantic node-switches* (1.07%), *genre node-switches* (0.21%) and *code-switches* (0.21%).

The types of errors in the proper essays also differ between the planning conditions, although the ranking is similar. The error category *miscellaneous* is dominant in both essays (L1Npe: 49.53%, L1Fpe: 49.12%), followed by *typing mistakes*. They are more dominant in the L1Fpe (33.33%, compared to 26.42% in the L1Npe) which is probably the result of the higher typing speed in these essays (chapter 5.3.1). In both L1 essays, *semantic node-switches* take the third rank (L1Npe: 9.91%, L1Fpe: 10.53%). After this, the positions differ: In the L1Npe, the ranking is *orthographic node-switches* (4.72%), *content* (4.25%), *genre node-switches* (3.77%), and *code-switches* (1.42%); in the L1Fpe, it is *genre node-switches* (4.39%), *orthographic node-switches* (2.19%), and *phonological node-switches* (0.44%).

In the following, the errors in *miscellaneous* are presented in more detail, as well as the incidents of *orthographic node-switches*. Semantic node-switches are not discussed in detail, since they were not related to FL-influences, but were language-internal semantic node-switches in which the semantic structure activated phonological and orthographic structures that did not precisely fit the intended meaning.

6.1.1 L1 Errors in *miscellaneous*

In the L1 essays, the majority of errors are located in the category *miscellaneous*, and the number of errors in this category is also very high in the plans. This is astounding since it

was presumed that not many 'real' errors would occur in L1 linguistic aspects because the participants were students at the faculty of philology, and they were expected to be rather experienced in writing and that no profound linguistic problems would occur.

%	L1Npl	L1Npe	L1Fpl	L1Fpe
Grammar	14.29	28.57	4.67	19.82
Orthography	35.71	35.24	41.12	39.64
Punctuation	50.00	32.38	45.79	39.64
Others	0.00	3.81	8.41	0.90

Table 6.2 L1 errors in *miscellaneous*

Table 6.2 shows the distribution of the errors in the subcategories of *miscellaneous*. In both conditions, the majority of errors occurred in the subcategories *orthography* and *punctuation*. This tendency is higher in freewriting, whereas in the L1Npe the proportion of errors in *grammar* is also strong. Many of the errors in orthography and punctuation could be explained by the fact that the proficiency in L1 orthography and punctuation in pupils and students is generally low and that the teaching of these writing components at school is rather lax (Ickler 2005: 394/395, Grund 2008: 1).

What is more remarkable than these errors is that a high percentage of errors was found in the subcategory *grammar*. Examples for these errors are cases when the participants wrote sentences in which they used a singular verb form in combination with plural nouns (see Negro and Chanquoy 1999: 234) or in which the prepositions did not fit the verb phrases or the adjective phrases they belonged to. In other cases, verbs were missing or sentences were ended with a full stop, although they were neither syntactically nor semantically complete. This indicates that the writers planned, formulated and mentally revised in parallel, but because of the high cognitive demands of this parallel processing, they did not take into account that the mental revisions had had an effect on the text produced thus far. They, therefore, did not notice that the text they had completed was grammatically incorrect, which in some cases made it difficult for the L1 readers to understand the underlying meaning. The tendency to commit grammatical errors and/or to leave them uncorrected is lower in freewriting than in note-taking – in the plans as well as in the essays. This shows that in this respect freewriting was helpful in the L1: it made the essay production more fluent and because of this the participants did not loose the thread while pausing and planning. Additionally, the method seems to have helped to enlarge the articulatory buffer (see also Chapter 5.4.3).

The gravity of the errors proves that the demands of academic writing on the L1 writer are so high that they can lead to severely defective language production. The time

pressure and the slower production processes in the L1N also had an impact on the writers, in that they did not have enough time to revise the texts (chapter 5.3.2), which would possibly have made the writers more aware of the committed errors. The lack of time thus had a negative effect on the linguistic quality of the papers (as was also found by Braaksma *et al.* 2004: 27). Still, since in the L1F most of the participants would have had enough time for more revision, the errors are also the consequence of missing or inappropriate revision strategies and not only the result of a pure stress factor.

6.1.2 *Orthographic node-switches* in the L1 texts

The high number of *orthographic node-switches* in the L1 texts was not expected either. However, most errors occurred in the subcategory *capital letters* – in the L1Npl and the L1Fpl 100% of the orthographic node-switches are located in this subcategory. That is, the participants wrote nouns in lower case letters instead of in capital letters. This phenomenon could have been expected – especially in the plans – since there has been an increasing tendency during the last decades in Germany not to mark the nouns with a capital letter in everyday SMS-communication, in emails or in web exchange, but to write every word (even at the beginning of a sentence) with lower-case letters (Androutsopoulos 2011: 11). Because of this, one can say that the influence of this FL orthographic rule is not a node-switch in the sense of an on-line intervention of FL-orthography in L1-orthography, but that spelling exclusively with lower-case letters has become a part of the German orthography for some writers. For some students, writing in lower-case letters has become a more automatised process than writing in capital letters. Yet, writing in lower-case letters is completely inadequate in the academic register.

	L1Npl	L1N	L1Fpl	L1F
Rules	0.00	0.00	0.00	0.00
Capital letters	100.00	20.00	100.00	80.00
FL Orthography	0.00	10.00	0.00	0.00
One word	0.00	0.00	0.00	0.00
Apostrophe	0.00	10.00	0.00	0.00
Others	0.00	60.00	0.00	20.00

Table 6.3 Percentage of errors in the subcategories of *orthographic node-switches* in the L1

In the L1 academic essays, the distribution of errors in the subcategories of *orthographic node-switches* differs strongly between the L1Npe and the L1Fpe. After freewriting, it had been more difficult for the writers to impede the tendency of writing nouns in lower case letters, probably because the participants wrote faster. Since most of the participants named email-writing as one of the writing tasks that they performed most frequently

(Chapter 4.1.1), these errors probably took place because using the shift lock is not an automatised process for them.

Whereas 80% of the errors are still located in the subcategory of *capital letters* in the L1Fpe, this rate is only 20% in the L1Npe. Here, more errors occurred in the subcategory *others*, in which orthographic node-switches that were not necessarily node-switches between L1 and FL but were rather language internal orthographic node-switches (or phonological/orthographic associations) were subsumed. The participants spelled words that are orthographically close to the intended word, but are semantically completely different. For example, James used the German word *aktuale* which is not the German counterpart of the English word *actual*, but is the feminine form of a German adjective that is based on the Latin word *actualis* (=effective, active). This was not what was intended by James – at least it would not be sensible if it were – but he probably had an orthographically related adjective in mind: *aktuelle* (=current). Here, it might not have been the orthographic relatedness alone that caused the orthographic node-switch, but also the academic register that is attached to the foreign word *aktual*. In freewriting, the proportion of *others* is not as high, although errors in this subcategory were found as well. This indicates that the writers' revisions were not thorough, or that the mental picture of the intended words overruled the actual writing.

Other errors were found in the subcategory *apostrophe* in which the writers separated the genitive marker *-s* from the word by an apostrophe. Errors were also found in the category *FL orthography*, in which the participants used English spelling for parts of the German words. For example, Krebs wrote *sociale* instead of *soziale*. Yet, in both conditions, the number of errors in this sub-category is rather low. Because of this, one can say that the influence of FL on L1 orthography is only marginal, although perceptible (see also Lemhöfer *et al*. 2008).

The results of the errors in the L1 texts show that writing academic texts makes strong demands on the writers' cognitive capacities, which – to a certain extent – are dealt with by lowering the monitoring with respect to language accuracy and correctness. The effect that was had on this lowering of the monitoring on the FL texts is looked at in the following.

6.2 Errors in the FL texts

Since the participants had to deal with two foreign languages in FL academic writing – English and the academic genre – it was proposed that more errors would be found and

that because of the lowering of linguistic monitoring, which was already found in the L1 texts, the blocking of the influences of the L1 on FL writing would be less successful. Since the writing processes worked faster and more fluently in and after freewriting (see Chapter 5.3), it was also assumed that more typing mistakes would go unnoticed here, but that, on the other hand, less node-switches would occur because of the activation of the linguistic structures.

Table 6.4 gives an overview of the total number of errors in the simple essay, in the plans (FLNpl and FLFpl), and in the final texts (FLNpe and FLFpe). The table also includes the rate of words per error.

	SE	FLNpl	FLNpe	FLFpl	FLFpe
Total number of errors	17.70	3.30	38.40	18.70	40.00
Words per error	27.99	33.33	14.30	12.79	14.62

Table 6.4 Mean number or errors in the FL texts (plans and essays)

The lowest number of errors is found in the FLNpl, the highest number of errors is located in the FLFpe, followed by the FLNpe, the FLFpl and the SE. With respect to words per error, the ranking stays rather stable: In the FLNpl, errors occur most seldom (every 33.33 words), the SE is still the text with the second best words-per-error rate, but the FLFpe now takes rank three, the FLNpe rank four, and – as was expected – the lowest words-per-error rate is found in the FLFpl. The latter is the consequence of the assignment which asked for as little revisions/corrections as possible. In contrast to this, the slow writing process in the FLNpl made the participants commit and overlook errors less frequently. In both types of plans, the words-per-error rate is better than it is in the L1 plans. In the L1Npl, the rate is 22.36 words without error, and in the L1Fpl the rate is as small as 5.22 words without error. This indicates that the L1 writers were more concerned about content and the intended structure of the text to be produced and did not bother as much about orthography or grammar; whereas in FL English, linguistic aspects were more in the focus of monitoring and revision (see also Breetvelt, van den Bergh and Rijlaarsdam 1994: 105, Hayes 1996: 18, and Chapter 7.4.2). Additionally, the slower production rate in both planning conditions in the FL made the execution proceed in a more controlled way than in the L1.

In the final essays, the words-per-error rate is distinctly poorer in the FL than it is in the L1. In the FLNpe, it is 14.3 words without error (L1Npe: 25.92), in the FLFpe, the rate is 14.62 words without error (L1Fpe: 26.45). The accumulation of the cognitive demands of writing a coherent, logical and well-formulated FL text in the academic genre obviously

had the effect that the monitoring was less able to deal with the FL linguistic text production processes. During and after the formulation process, the writers were not able to detect the errors as efficiently as they were in their L1 (although, as was noted above, the error rate in the L1 texts is still rather high). This might have been the effect of the errors' rootedness in the L1: since L1 linguistic rules that were erroneously applied to FL text are correct in L1 structures, they might not have been rated as errors by the monitor.

Before this aspect is looked at in more detail, a short overview of the individual error rates is given in the following chapter.

6.3 Total number of errors per participant

The number of errors per participant (Table 6.5) shows that the quantity of errors differs strongly between the writers. Additionally, the group seems to be split in two with respect to the usefulness of the two planning strategies in terms of the activation of the FL structures and the successful subduing of the L1.

	SE	FLNpl	FLNpe	FLFpl	FLFpe
James	20.00	1.00	41.00	19.00	41.00
Siebenmorgen	8.00	1.00	47.00	24.00	36.00
Marissa	9.00	0.00	34.00	16.00	38.00
iPhone	22.00	1.00	49.00	20.00	36.00
Sarah	7.00	4.00	12.00	5.00	39.00
Artilleryman	4.00	4.00	15.00	36.00	38.00
Krebs	67.00	9.00	55.00	18.00	49.00
Babs	9.00	0.00	36.00	10.00	22.00
Owlet	20.00	3.00	73.00	24.00	56.00
Gio	11.00	10.00	22.00	15.00	45.00

Table 6.5 Mean number of errors per participant

Babs made fewer errors in her FLFpe than in the FLNpe (-38.9%). So did iPhone (-26.5%), Siebenmorgen (-23.4%), Owlet (-23.29%), and Krebs (-11%), while others produced fewer errors in the FLNpe: Sarah (-69.2%), Artilleryman (-60.5%), Gio (-23.3%), and Marissa (-10.5 %). James' numbers of errors in the final essays stayed exactly the same under the different planning conditions.

Figure 6.2 sets the number of errors in relation to the number of words. Here too, the words-per-error rates of each participant in the SE, the plans and the essays do not show a regular pattern. A difference to the results in fluency and productivity (Chapter 5.1.3) is that the results are unique and unpredictable for each participant. Babs, for example, produced fewer errors in the FLFpe, although she produced more text, which means that the activation of the FL structures via freewriting was extremely useful for her.

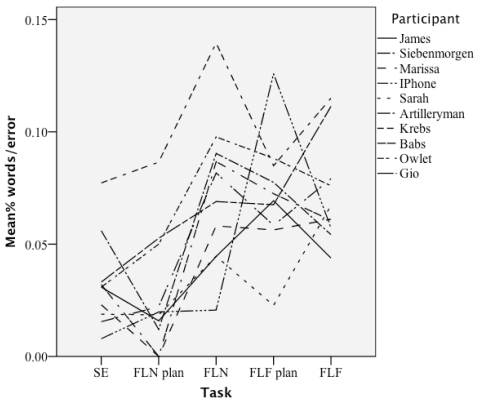

Fig. 6.2 Mean number of words per error per participant

Sarah produced distinctly more text in the FLFpe than she did in the FLNpe, and the error rate rose excessively. In contrast to this, Artilleryman's FLFpe was slightly longer than his FLNpe, but the error rate decreased. That is, the different writing conditions, initiated by the distinct planning conditions, had different effects on the linguistic quality of the texts for each writer.

The words-per-error rate in the FLFpl is also interesting. Eight of ten participants had fewer errors per word in this process than they did in the FLNpl. Although they were explicitly asked not to mind errors or language in general, the freewritten texts were of a higher linguistic standard than were the notes, which hints at a stronger use of the L1 in the FLNpl (see also van Weijen *et al*. 2009: 245, Whalen and Ménard 1995: 407 ff.). This was also found in the analysis of time for the writing subprocesses (Chapter 5.3.2) and the distribution of execution and pauses (Chapter 5.5.1).

The different patterns in the words-per-error rate in the academic essays could be the effect of the writers' individual methods of focusing their cognitive resources adequately and flexibly on the different writing processes, or of different strategies to manage the monitoring appropriately in the different writing conditions. For example, with the participants who made most errors per words in the FLNpe, this could have been the effect of their higher usage of the L1 in the FLNpl, and their inability to block the L1 in the following text production process. Additionally, most of the participants did not have much time for a final revision in this condition, but spent most of their time on planning and writing (Chapter 5.3.2). The analysis of the revision processes during the formulation (Chapter 7.2) additionally indicates that the writers did not have an eye on L1 influences during the writing processes.

On the other hand, the participants who showed more errors in the FLFpe might have continued to generate ideas during the production process of the proper essay, and because of this spent less working memory capacities on the monitoring of the formulating and executing process. Because the monitor was 'advised' not to correct linguistic errors during freewriting, the subdued monitoring might have been less efficiently consolidated

for the essay writing, and the blocking of L1 in the FL context worked less successfully for these writers, than in the more controlled note-taking condition.

In short, with respect to the quantity of errors, there are individual differences. However, the analysis of the quality of the errors shows regular patterns in the distribution of the errors over the different text types. The results are presented in the following chapters.

6.4 Categorical distribution of the FL errors

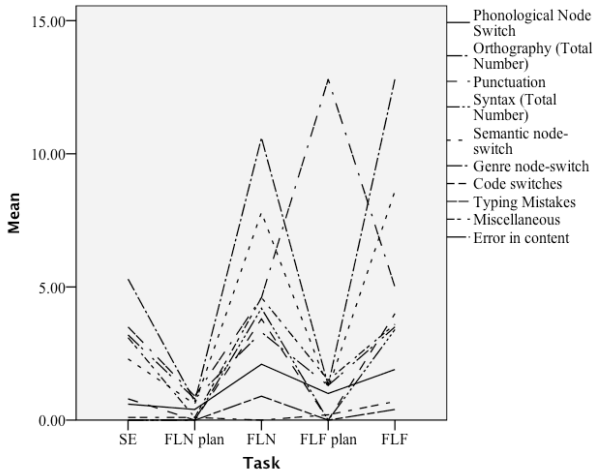

Fig. 6.3 Distribution of errors in the categories

Figure 6.3 shows the average number of errors in the different categories, while Table 6.6 presents the proportional distribution of the errors. The percentage of errors in the categories varies between plans and essays and between the essays written after note-taking and after freewriting. For example, the proportion in *syntactic node-switch* was highest in the FLFpe (29.16%), and lowest in the respective plans (6.74%). Interestingly, the percentage was rather high in the FLNpl (19.44%), although most of the participants simply wrote down keywords. This is the consequence of the low total numbers of errors found here (Babs and Marissa, for example, did not leave any error uncorrected), because of which single errors had a large impact on the statistical results.

%	SE	FLNpl	FLNpe	FLFpl	FLFpe
Phonological node-switch	3.17	11.11	5.01	5.18	4.33
Orthographic node-switch	16.93	22.22	7.88	6.74	7.97
Punctuation node-switch	4.23	0.00	9.07	0.00	9.11
Syntactic node-switch	28.04	19.44	25.30	6.74	29.16
Semantic node-switch	12.17	16.67	18.62	6.22	19.59
Genre node-switch	0.00	0.00	10.02	0.00	7.74
Code-switch	0.53	2.78	0.00	1.04	1.59
Typing mistakes	18.52	25.00	10.98	66.32	11.39
Miscellaneous	16.40	2.78	10.98	7.77	8.20
Content	0.00	0.00	2.15	0.00	0.91

Table 6.6 Proportion of errors in the different categories

Typing mistakes were distributed to the opposite of *syntactic node-switches*. Due to the

higher typing speed and the setting low of the monitoring process, and also because of the productivity in idea generation, the percentage is highest in the FLFpl (66.32%). It was also rather high in the FLNpl (25.00%) as a result of the cognitive focus on idea generation and controlled planning. Since none of the participants corrected their plans in the final revisions (at least not in linguistic aspects, see Chapter 7.6), these errors went unnoticed. In the final essays, the percentage of typing mistakes is comparatively low (10.98% FLNpe and 11.39% FLFpe).

Other categories that show strong differences in the distribution of errors in the different conditions are *orthographic node-switches*, which is very strong in the SE and the FLNpl, but less relevant in the essays or in the FLFpl, and *semantic node-switch* which are frequent in the FLNpl, the FLNpe, and the FLFpe, but distinctly less important in the SE and the FLFpl. *Miscellaneous* is strong in the SE, but less relevant in the other conditions. This is probably the result of the preference of fluency to correctness, which made the participants continue writing without thorough revision – even when the part of the sentence that would be executed next did not fit the sentence written thus far, either grammatically or syntactically.

Hardly any errors were committed in terms of *content*.

The differences in the distributions show that the cognitive capacities activate the FL structures (or the rules in the structures) differently in the simple texts, in the plans and in the academic texts. In the following, this phenomenon is analysed within the different categories. The committed errors are described in more detail, and an analysis of the distribution of the errors over the subcategories is performed in order to explore whether one can make out finer-grained differences in these processes.

6.4.1 *Phonological node-switches*

The number of *phonological node-switches* is rather low in the different task types (SE: 0.06, FLNpl: 0.4, FLNpe: 2.1, FLFpl: 1, FLFpe: 1.9) Because of this, the category was not subdivided any further. In this category, not only clear phonological node-switches (e.g. writing *gable* instead of *fork*) were included, but also less clear incidents. An example of a clear phonological node-switch appears in iPhone's FLNpe. To iPhone's mind, in Aristotle's time there had been a unity in logic, which has changed during the last centuries. He wanted to give a reason for the process: "Today this process takes place ***while*** different cultures…have their own style of writing." The conjunction that he intended to use was *because*. However, the semantic structure activated the L1 and the FL phonological structures via the interfaces. The monitor did not suppress the L1

phonological structure effectively, and the German *weil* (=because) triggered the English *while* in the orthographic structure – a word which is phonologically close to the German conjunction <vaɪl>.

In other cases, the German way of pronouncing letters is taken over to the English orthography, which resulted in misspelling. For example, in German, consonants are devoiced at the end of a syllable: *d* and *b* are pronounced <t> and <p>, respectively. Because of this, German English-language learners pronounce *extend* and *extent* identically (Cheung *et al.* 2001: 230/231, Lombardi 2003: 225, Simon and van Herreweghe 2010: 304, Smith and Hayes-Harb 2011: 115/116). In the essays, three candidates made node-switches in this aspect. In her FLFpe, Siebenmorgen wrote *extend* when she wanted to write the noun *extent*. Marissa wrote *advice* instead of *advise* in the SE. The majority of the phonological node-switches were rooted in this kind of German realisations of English phonemes. They are encouraged by the existence of the executed words, which are stored closely to the intended words in both the phonological and the orthographic structure.

Another error which is marked as a grammatical error in exams but in the model proposed here is seen to be rooted in German phonology, is the use of *this* instead of *these*: German *diese* represents *this*, if the noun to which it is connected is singular and feminine. In plural masculine, feminine or neutral forms *diese* represents *these*. German learners of English learn the distinct English expressions at the beginning of their language acquisition, and it may be assumed that students of English philology generally know the difference. Because of this, it is estimated that an error like *this notes* (Babs: SE) occurs because of the L1 influence rather than because of her missing knowledge of the underlying grammatical rule: English and German phonological and syntactic structures were activated by the semantic structure, which, in turn, activated the respective orthographic representations via the interfaces. For the German writer, the phonological element *diese* activated the FL orthographic elements *these* and *this*. The singular form 'won', probably because *this* is a word that is more often used than *these*, and as a result of the combination of frequency, automaticity and L1 phonology, the writer executed the incorrect word.

In some cases, the instances which were judged to be *phonological node-switches* might have been simple typing mistakes. Here think-aloud protocols would have helped to judge more clearly whether writing *und* instead of *and* (James: FLFpl) took place because of activating the wrong interface between phonological and orthographic structure, or whether a complete code-switch took place. In this case, it is assumed that James did not

have problems in finding the correct FL word, and because of this, it is presumed that the German phonological structure initiated the more automatised execution of *und*. In contrast to this example, errors like *accoung*, instead of *account* (iPhone: FLN) cannot indisputably be judged as phonological node-switches, because here it is not clear whether a typing mistake occurred or whether the error was initiated by the activation of the German translation of account *Rechn**ung***. Since a typing mistake could also be the consequence of the frequent letter combination *-ung* which is a common noun-suffix in German, a combination of typing frequency and L1 phonology could have led to the error. That is, phonological node-switches are often cases of errors which are not exclusively valued as being *phonological node-switches*.

Although the number of phonological node-switches is very low in all conditions, it is note-worthy that 11.11% of the errors in the FLNpl could be labelled as phonological node-switches, which once more supports the thesis that the writers made a more extended use of their L1 in FL note-taking, and because of the higher activation of the L1 phonology in planning, the L1 phonological structure more often interfered with the FL phonology and subsequently with the FL orthography. In all other texts, the rate is distinctly lower. It is lowest in the SE (3.17%), and only slightly higher in the FLFpe (4.33%). One can therefore generally conclude that L1 phonology only had a minor impact on FL writing in the more fluent text production (Chapter 5.4).

6.4.2 *Orthographic node-switches*

Orthographic node-switches took place more often than phonological node-switches and their occurrence with respect to their distribution in the different task types differ distinctively (SE: 16.93%; FLNpl: 22.22%; FLNpe: 7.88%, FLFpl: 6.74%, and FLFpe: 7.97%).

As was described in Chapter 4.3.1, orthographic node-switches were subcategorised in *L1 rule, capital letters, L1 way, one word, apostrophe*, and *others*. Fig. 6.4 shows the distribution of the errors in the subcategories of *orthographic node-switches* for each text type.

The proportional distribution of orthographic node-switches in the subcategories differs strongly between plans and essays, and also between the FLNpl and FLFpl and between the FLNpe and FLFpe. Distributional tendencies in the subcategories in the plans are taken over to the academic essays in some subcategories. In other cases errors in certain subcategories occur in the proper essays, but they do not occur in the plans.

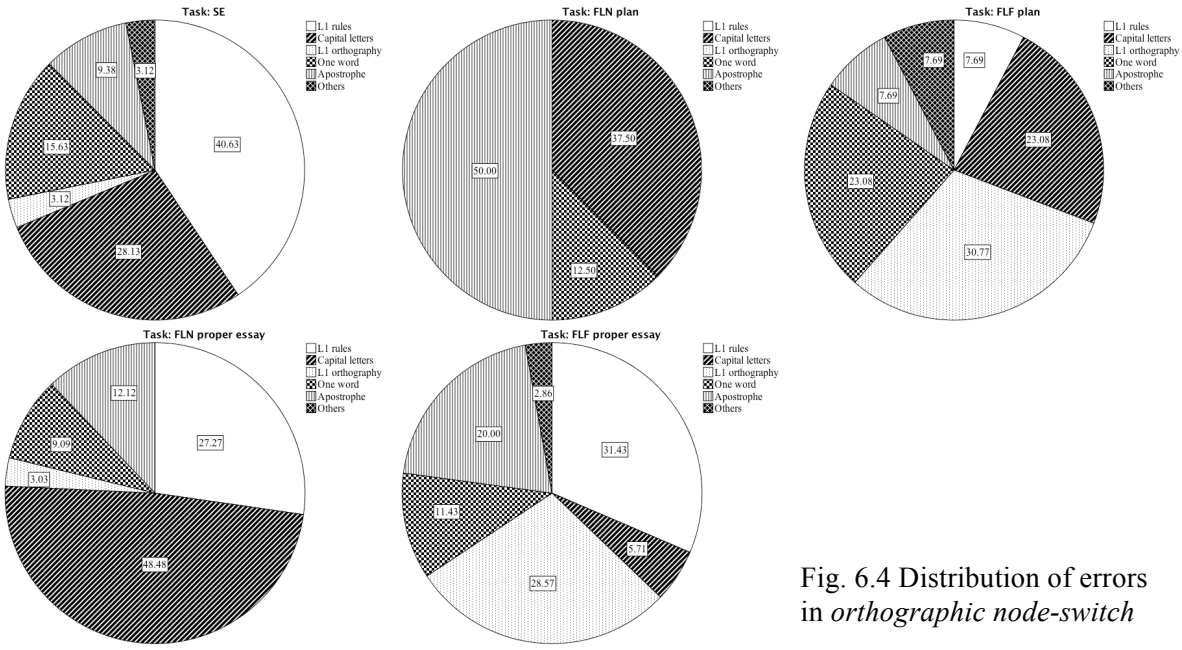

Fig. 6.4 Distribution of errors in *orthographic node-switch*

In the SE, 40.63% of the errors were found in the subcategory rules, 28.13% in the subcategory *capital letter*, 15.63% in *one word*, 9.38% in *apostrophe*, and 3.12% in *L1 orthography* as well as in *others*. In the FLNpl, only three of the subcategories are involved. 50% of the orthographic node-switches are located in the subcategory *apostrophe*, 37.5% in the subcategory *capital letters* and 12.5% in the subcategory *one word*. In the FLFpl, no orthographic node-switch in the subcategory *apostrophe* occurs at all, but 30.77% of the errors are located in *L1 orthography*, and 23.08% in *one word* and *capital letter*, respectively. *L1 rules*, *apostrophe*, and *others* all take 7.69%. In the FLNpe, the majority of orthographic node-switches are located in *capital letters* (48.48%) and in *rules* (22.12%). Node-switches in *apostrophe* make 12.12%, *one word* 9.08%, and *L1 orthography* 3.03%. In contrast to this, in the FLFpe *capital letter* is rather unimportant with only 5.71%, but here *L1 rules* (31.43%), *L1 orthography* (28.57%), and *apostrophe* (20%) provide the majority of node-switches. *One word* occurs in 11.43% of the cases, *others* in only 2.86%.

The differences in the results show that the planning methods have had an impact on the types of orthographic errors that occur. In planning, the writers concentrated on other features than in essay writing – in note-taking as well as in freewriting. At the same time, the different activation of the FL structures in the planning processes influenced the distribution of the errors in the subcategories in the final essays. The results also underline that the monitoring focused on different orthographic aspects in SE and in academic writing.

The majority of orthographic node-switches in the SE and a high proportion of orthographic node-switches in the final essays are located in the subcategory *L1 rule*. In the FLFpl it took place in only 7.69% of the cases, and none occurred in the notes. The "rule" that was applied in many cases was that the orthography should represent the pronunciation (see Simon and van Herreweghe 2010: 303). Of course, these errors could be the result of missing orthographic proficiency, but since the FL words that were used are mostly not uncommon and it can be presumed that the participants know them well (e.g. *pitty* instead of *pity*; iPhone: SE), it is rather the application of the shallow German orthographic rules on the English deep orthography. The fact that these node-switches mainly occur in the proper texts which would be evaluated in 'real-life' (the SE and the final academic essays), but only rarely in the FLFpl and non in the FLNpl is interesting, since no final revisions were made in the plans. This suggests that the higher cognitive demands of writing a coherent text without planning (SE) and a well-structured text on a high stylistic level (academic texts) supported the application of the German orthographic writing rules. This could be due to the fact that the application of the German orthographic rules requires less effort than activating the correct FL English orthographic representations that are stored in long-term memory. Thus, the application of shallow L1 orthographic rules could be seen as a subconscious method of reducing the cognitive demands of FL writing (see also Figueredo 2006: 887).

The writers in the FLFpe and the FLFpl also executed the German orthography in words that are spelled similarly in the L1 and the FL more often than in any of the other texts (e.g. *adress*–'Adresse' instead of *address*, Owlet: SE). That is, in the process of freewriting in which monitoring was consciously lowered, German orthographic representations were more often the triggers for errors than German orthographic rules, and in the text produced *after* freewriting, both the direct L1 orthographic representation of the semantic entity and the L1 rule system had an impact. This indicates that in the FLFpe, in which hardly any of the writers took the time to read the freewritten text and to generate a text structure *before* starting to write the essay, the writers frequently diminished the demands of FL orthography by misusing L1 orthography.

In the FLNpe, the most prominent error subcategory in *orthographic node-switches* is *capital letter* (48.48%). This subcategory is also dominant in the FLNpl (37.5%). In the SE (28.13%) and the FLFpl (23.08%), the results are high as well. In contrast to this, the proportion is very low (5.71%) in the FLFpe. In the FLNpe and in the notes, the missing activation of FL and the higher usage of L1 in planning might have been the reason for

marking nouns with the help of a capital letter. One could argue that the academic genre also had an influence on the orthographic structures in this aspect in the FLNpe. The participants' conceptual structures 'knew' that the usage of lower-case letters at the beginning of nouns is negatively evaluated in the academic context in German. Because of this, the academic register might have activated the capital letter rule in the L1 orthographic structure more strongly; it was executed, and was not perceived by the monitor as an error. In the FLFpe, the proportion of *capital letter* was lowest, because here the participants had actively activated the FL orthographic structures.

However, this explanation has two flaws: For one, the number of capital letter errors during freewriting itself, was high as well. In contrast to this, the participants in the L1Fpl committed a high number of errors in the subcategory *capital letter* (chapter 6.1.2), in that they used lower case letters at the beginning of nouns. That is, the academic register in the L1 was not successful in activating the L1 rule whereas in the FL it was, although it should have been more dominant in the L1 context. Still, this could be explained by the more automatised typing of lower-case letters in L1 vernacular writing and the higher productivity in L1 (Chapter 5.2), which made the participants overlook these errors. Yet, in the FLFpl the writers also worked quite fluently, and this explanation would be self-contradictory.

For two, in the case of *apostrophe*, the results were converse in the FLFpe, because the writers more often applied the German apostrophe rules (which are crucial for high standard writing) to the FL text (FLFpe: 20%, FLNpe: 12.12%). They did not separate the genitive marker *-s* from the word with the help of an apostrophe. These orthographic node-switches are more or less irrelevant in the FLFpl. On the other hand, in the FLNpl 50% of the orthographic node-switches are located in this category. The latter, again, speaks for a use of L1 in planning by note-taking. In the FLFpe, it might be that *apostrophe* is such a relevant error subcategory not because of node-switching in the strict sense but rather because of the less automatic pressing of the apostrophe key, and that the writers rather committed this error than slow down the writing process (which also led to the correct using of lower-case letters). Here, more tests are needed to come to a substantial explanation.

One word is another subcategory which, on first sight, might have been influenced by the L1 academic genre conventions. In the Teutonic academic register complex compounds are regarded as being academic (Clyne 1981: 213). The participants applied the L1 compound rule, which regulates that writers must write a compound as one word if

it consists of not more than three words. However, the subcategory is mainly relevant in the FLFpl (23.08%), and in the vernacular writing in the SE (16.63%). In all other tasks it is less important (FLNpl 12.5%, FLNpe: 9.09%, FLFpe: 11.43%). Because the error incidents in this subcategory is rather low in the final academic texts, it is proposed that the higher amount of *one word* incidents in the SE and the FLFpl are more often the result of typing speed. Because L1 Germans are accustomed to long compounds, they failed to notice these errors.

The subcategory *others* was active in only three text types. In the FLFpe, the FLFpl and in the SE, the participants used orthographically related, but semantically unrelated words. The participants were least aware of these phonological associates that made the reading/understanding of the texts more difficult in the writing tasks in which they were the most productive. In these conditions, the monitoring of the text production is lower in this respect than in the FLNpe or FLNpl, which might have been the result of the more fluent writing process in which the writers were more concerned with generating ideas and inserting them. This higher 'traffic' in the interfaces between conceptual structure and phonological and syntactic structures triggered more mismatches, which were overlooked.

All in all, the differences in the distribution of errors in the subcategories of *orthographic node-switches* point toward an on-line generation of orthographic representations in cases where rules can be applied (cf. Jackendoff 2002: 157). This works faster than the retrieval of representations that are stored in long-term memory. However, in FL academic writing in cases where the orthographic representation cannot be generated from rules because the structure is too deep, the application of the correct FL rules or the retrieval of the orthographic representations from long-term memory was unsuccessful in some cases, and either the L1 rule was applied or the orthographic representation of the L1 words was executed. This is probably due to the high cognitive demands in FL academic writing and the subconscious strategy of applying the 'simpler' rules in order to cope with the task. The proportions' conspicuous differing in the subcategories indicates that the rules were triggered differently in the different conditions, and that because of this, some orthographic node-switches would occur more probably than others. This might be the result of an influence of the way the rules are stored and of the way in which these rules have been learned – whether they were explicitly taught or whether one acquired them more implicitly through reading and listening (see also Ellis 2002: 173, Mulligan 2003: 1114). Another possibility is that the different productivity and the differences in the speed

of execution made the participants use different strategies for generating the orthographic representations for their ideas.

6.4.3 *Punctuation node-switches*

The category of *punctuation node-switches* was not subdivided any further. Most of the punctuation node-switches are cases in which the participants applied German punctuation rules. Examples for these are *Aristotle was a highly educated man, surrounded by a circle of others**,** with whom he had various discussions* (Sarah: FLNpe) or *The problem in analyzing different languages is**,** that all languages are different...* (Babs: FLNpe). In the first example, the L1 rule of setting a comma between the main and the relative clause is applied, whereas in the latter example, the rule is that when a subordinate clause starts with *dass* (= 'that', as for example in: *He said that the weather was fine*) the main clause is always separated from the subordinate clause with the help of a comma.

Another type of punctuation error that takes place rather frequently is leaving out a comma in places where it is obligatory in English, but incorrect in German. In cases like: *In addition to that there will be...* (iPhone: FLFpe), or: *In the following essay this explanation is examined...* (Babs: FLFpe), putting commas before *there will be* and *this explanation is examined*, respectively, would be a validation of the L1 punctuation rule that no commas are set inside clauses apart from those between enumerations (*Der Mann, die Frau und das Kind gingen über die Straße* – 'The man, the woman (,) and the child crossed the street.') or in front of conjunctions which mark a counterpoint: *Georg lachte nicht, aber Günther tat es* (= 'George did not laugh but Günther did'). In German, although the speakers and writers are rather free in ordering their words, there is no need to put a comma in cases as with the ones noted above, since the declinations make the semantic relations clear.

	%
SE	4.23
FLNpl	0.00
FLNpe	9.07
FLFpl	0.00
FLFpe	9.11

Table 6.7 Proportions of *punctuation node-switches*

The results of the punctuation node-switches are summarised in Table 6.7. It contains the percentage of errors in this category compared to the other error categories.

In the planning processes, no punctuation errors were found at all. In the FLNpl, this result was to be expected, since here only in rare cases was punctuation needed at all. The fact that no punctuation errors occurred in the FLFpl is, however, remarkable. Since the participants were meant to write down everything as fast as possible, it was expected that the sentences produced would have the tendency of being embedded and complicated, and that they would contain extra-information/excursions

which, in turn, would expect strict and elaborate punctuation in order to structure the sentences. However, no punctuation problems took place in freewriting, because the semantic and syntactic structure of the produced sentences was in no way complicated, but rather straight and linear, which did not expect too much effort in punctuation.

In the SE, the error rate in punctuation was also very low. Again, the simpler sentence constructions, the simpler wording and the straight line in text development helped the writers to produce sentences which did not ask for punctuation in cases which work differently in German and English. For example, there were hardly any cases of more than one subordinate clause per sentence, there was no relative clause which was embedded in another relative clause, and there was usually only one topic per sentence. Main clauses were separated by full stops and not compressed into one sentence. That is, the demands on the writers' punctuation competencies were low in the SE.

In both forms of the academic essays, the rate of punctuation node-switches is distinctly higher and differs only marginally from the other (FLNpe: 3.8 = 9.07%; FLFpe: 4 = 9.11%). Many of these errors were the results of the complicated sentence structures which, in turn, led to *syntactic node-switches* (see Chapter 6.4.4). Since sentences produced in the Teutonic academic writing have the tendency to be long and embedded (Clyne 1981: 63, 1987: 213), this was to be expected if the participants took this L1 academic register feature over to FL writing. In German, the commas help the reader to find structure in the long and embedded sentences, and the participants felt the necessity for doing so in the FL as well.

Another frequent type of punctuation node-switch was the choice of 'weak' punctuation where 'strong' punctuation was asked for. In German, it is possible to add two main clauses to each other without any punctuation (neither comma nor semicolon), if the sentences are linked by conjunctions like *und* (=and) or *oder* (=or). In English, this would be a major punctuation error, and often even a comma is not strong enough to separate one main clause from the other. In some cases, a semicolon is the least that is needed for making the structure clear. Again, since the sentence structure in the Teutonic academic genre has the tendency of incorporating more than one main clause (combined with a high number of subclauses) in one sentence, these kinds of errors are not only punctuation node-switches, but also the result of applying L1 academic genre features to FL writing.

In short: As long as the participants did not execute terribly complicated sentences, punctuation node-switches were rare. L1 induced errors in punctuation occurred mostly in the more complex sentence constructions of the academic essays. They illustrate the

writers' efforts to structure the (L1 genre induced) sentence structure visually. Here, no significant differences between the FLFpe and the FLNpe were detected, that is, neither the activation of FL structures through freewriting nor the slower and more controlled writing after note-taking had a positive effect on FL punctuation in the final essays. These results are remarkable because in the L1 texts (chapter 6.1), the proportion of punctuation errors was high in all conditions – even in planning. The participants probably concentrated on different aspects in monitoring in the L1 than they did in the FL, which might be the result of the general feeling that one is better able to write correctly in the L1 than in the FL. Because of this, the participants were keener on visually structuring their sentences in the FL by misusing L1 rules than they were in L1.

6.4.4 *Syntactic node-switches*

Many errors in the texts are contained in the category *syntactic node-switch*. The proportion of syntactic node-switches is high in all writing conditions (SE: 28.04%, FLNpl: 19.44%, FLNpe: 25.3%, FLFpe: 29.16%), apart from the FLFpl with only 6.74%. In all final texts (SE, FLNpe, FLFpe), *syntactic node-switch* was the category in which the majority of errors occurred. In the FLNpl, *orthographic node-switch* was more relevant and in the FLFpl, *typing mistakes* dominated.

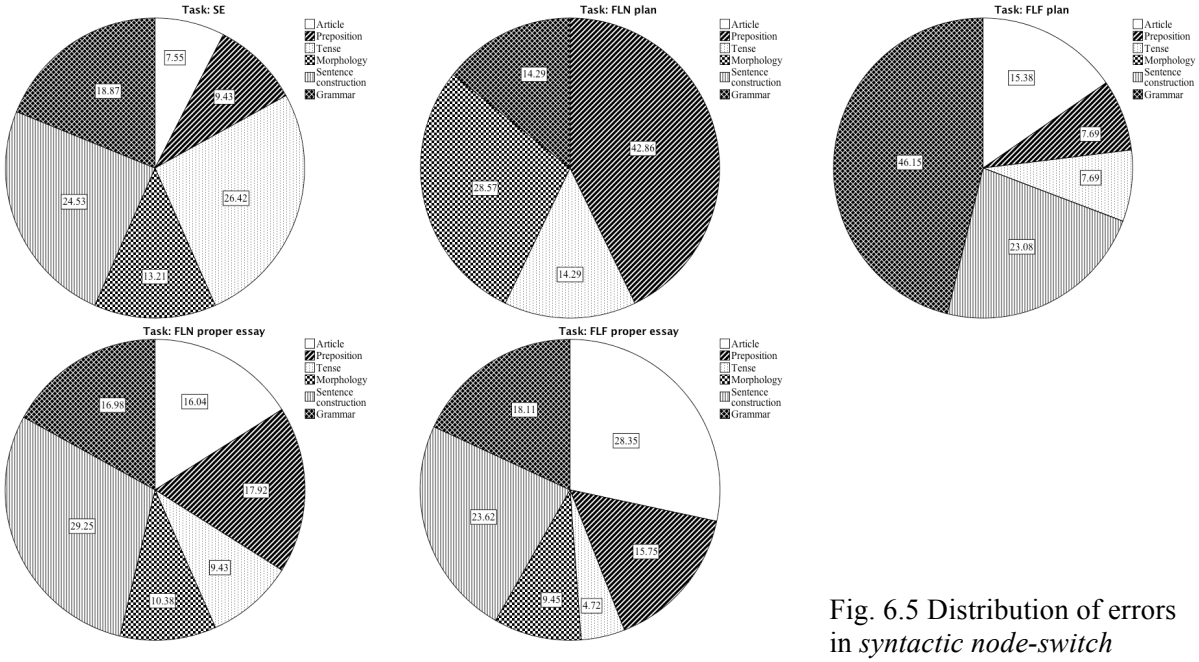

Fig. 6.5 Distribution of errors in *syntactic node-switch*

Figure 6.5 gives an overview of the results in the subcategories of syntactic node-switches. As in *orthographic node-switch*, there are differences in the distribution of the errors in the subcategories in the different text types.

The most obvious differences are found between the plans and the final essays. In the FLNpl, only in four of the six subcategories did node-switches occur; in the FLFpl, only in five. In the FLNpl, these subcategories were *preposition* (42.86%), *morphology* (28.57%), *tense* and *others* (both: 14.29%). Since in the FLNpl, the participants usually did not write whole sentences, but scribbled down keywords, the absence of errors in the subcategories *sentence construction* and *articles* was to be expected. In the FLFpl, no *morphological node-switch* took place. Instead of this, *sentence construction* node-switches and node-switches in the usage of *articles* occurred. Additionally, the ranking is different from the ranking in the FLNpl: *Others* is the most relevant subcategory (46.15%), followed by *sentence construction* (23.08%), *article* (15.38%), *preposition* and *tense* (both: 7.69%). The reason for no morphological errors occurring might be an indicator that the freewriters did not make any subconscious or conscious effort to find words that fit the intended meaning and the target genre best, but made use of the words that came to mind quickly, with less regard to the complete adequacy of the terms and without an attempt to express meaning in a compact and 'expert' way.

There are also differences between the SE and the academic texts, as well as between the academic texts after the different planning conditions. In all but one case, there is an overall tendency for the academic texts either being higher or lower in the proportions than in the SE. These differences become most obvious in the subcategories article (SE: 7.55%, FLNpe: 16.04%, FLFpe: 28.35%), preposition (SE: 9.43%, FLNpe: 17.92%, FLFpe: 15.75%) and tense (SE: 26.42%, FLNpe: 9.43%, FLFpe: 4.72%). In the subcategory *morphology* (SE: 13.42%, FLNpe: 10.38%, FLFpe: 9.45%), the differences are not as distinct, and in *sentence construction*, there is a closer relation of the SE (24.53%) and the FLFpe (23.62%) in comparison to the FLNpe (29.25%). The percentages of *others* in the SE and the FLFpe are both higher than in the FLNpe (SE: 18.87%, FLNpe: 16.98%, and FLFpe: 18.11%), but here the difference is rather marginal.

The fact that there are comparatively few node-switches in *articles* in the SE might be the result of the choice of more concrete nouns in those texts, since the differences in this aspect in the usage of articles in the L1 and the FL are less high (Jaensch 2009: 239/240). In both the FLNpe and the FLFpe, the participants produced distinctly more errors in this subcategory. In the FLFpe the percentage is 43.42% higher than in the FLNpe. Since there are no differences in the choice of words with respect to abstractness in both essays, it is probable that the monitoring concentrated on other syntactic aspects after planning with the help of note-taking, and after planning with the help freewriting.

Here, it is note-worthy that the more subconsciously learned rules of when to set an article in English and when not, is better applied in the more consciously formulated FLNpe than in the fluent FLFpe.

The comparatively high number of node-switches in *preposition* in the academic texts is probably due to the wording of the academic essays, in which the writers often use more complex verb phrases or adjective phrases than in the SE. Additionally, the verbs or adjectives which are the heads of the phrases in the academic texts, are much less frequently used in vernacular language. The interfaces between the conceptual and the FL syntactic structures are not employed regularly, and the activity level of the L1 syntactic interfaces might have been higher than those of the FL syntactic interfaces (Dijkstra 2007: 261).

In the subcategory *tense*, many node-switches occurred in the SE because the participants did not choose the continuous form when needed or because they mixed the past and present tenses, which in some cases is common in German. The former errors are the result of the L1 'prohibition' of using the continuous form in a written text (see Chapter 4.3.2). The mixing of present and past tense and the high percentage of errors in *sentence construction* (24.53%) and *others* (18.87%) however, hints at a general lower monitoring of syntax in the SE. This is probably the result of the lack of plans: The participants generated the ideas and the text structure during the writing process. Because of this, there were changes in the conceptual text structure. These led to new temporal relations in the texts which would have asked for changes in the sentence structures that were, however, not performed (see Chapter 7.5). What is more, the attitude of writing-like-speaking, which became visible in fluency, also had an impact on syntactic composition. Speakers often are not as precise in respect to times in speaking – especially not in German – and they tend to change the syntax without correcting the sentence parts that were uttered before – preferring fluency to correctness (Seyfeddinipur, Kita, and Indefrey 2008: 840).

In the subcategory *sentence construction* and in the subcategory *others*, which subsumes all other kinds of syntactic node-switches, the results in the SE and in the FLFpe are higher (*others*), respectively lower (*sentence construction*) than those in the FLNpe. In the notes, the writers concentrated on idea generating and structuring the academic text to be written, they did not activate the phonological/orthographic and syntactic FL interfaces in the same way as they did in the FLF condition; and they probably made more use of the L1 in planning. Because of this, the L1 academic genre was also more active, leading the participants to prefer German 'academic sentence constructions' to (correct) sentence

constructions in English. Another factor which might have been relevant in this aspect is that in formulating the FLN, the idea generating effect that was activated by the writing process was initiated *after* the planning phase, and the adding of phrases at inappropriate sentence positions was the effect of adding an idea to the text that came into the writer's mind while writing (see van der Bergh and Rijlaarsdam 2007: 146/147, and Chapter 7.5.2).

In the SE and in the FLFpe, the fluency of the executing processes was higher, which had the positive effect that the texts became more readable and reader attuned with regard to sentence constructions. This is also the result of the less complicated sentence structures in the texts, which was already perceptible in the lower number of punctuation node-switches. However, the proportion of *sentence construction* node-switches is still high in all texts – SE, FLNpe, and FLFpe. This indicates that, due to the cognitive demands of writing in the FL in an unplanned manner (SE) or in the academic genre, the monitoring was often unable to block L1 syntactic rules, which was encouraged in the case of academic writing by the taking over of Teutonic genre characteristics. In these texts, *sentence-construction* node-switches often occur in long sentences which are semantically dense, and which – in Anglophone writing – would have been split in two (or three) sentences. Their formulation and their execution thus required a high amount of cognitive capacities.

In the SE and in the academic texts, *others* also was a rather strong subcategory. Here, the errors varied extensively and no cluster could be designed. Yet, the high proportion of *others* shows that the L1 syntax was very active in all aspects of syntax in the text production processes of the texts to be evaluated. This and the variances in the results of the distribution of syntactic node-switches in the different subcategories show that the different demands of the tasks had different effects on aspects of syntax in the writing processes. This, in turn, supports the thesis that the syntactic rules are stimulated in different ways by the different writing conditions, and that the writers use different methods for dealing with these demands in the respective conditions.

6.4.5 *Semantic node-switches*

Semantic node-switches are found in all text categories and in all planning activities (Table 6.8). In the FLFpe, 19.59% of the errors are semantic node-switches, followed closely by the FLNpe (18.62%), and the FLNpl (16.67%). In the SE, the semantic node-switches are less prominent (12.17%), but they are lowest in the FLFpl (6.22%). That is, the smallest number of semantic node-switches occurred in a phase of (more or less) unmonitored writing, which indicates that in formulating in a comparatively 'uncontrolled' way, the

	% of total	% trans	% network
SE	12.17	26.09	73.91
FLNpl	16.67	50.00	50.00
FLNpe	18.62	39.74	60.26
FLF pl	6.22	41.67	58.33
FLFpe	19.59	51.16	48.84

Table 6.8 Distribution of *semantic node-switches*

interfaces between cognitive structure and the FL phonological structure worked better in activating fitting FL expressions than in the more controlled writing processes. However, this quality was not taken over to the FLFpe, but was even lowered and made the writers more insecure in expressing their intended meaning than they were in the FLNpe. The return to 'controlled' writing seems to have had a negative effect on formulation with respect to blocking the L1.

In the SE, the FLNpe and the FLFpl, most of the semantic node-switches are located in the subcategory *network*. In the SE, this subcategory makes up 73.91%, in the FLNpe 60.25%, and in the FLFpl 58.33%. That is, in the (presumed) simplest task, the least monitored task, and in the academic essay in which FL was *not* explicitly activated in planning, it happened more often that the conceptual structure activated an FL word that represented a concept that was close to the intended meaning, but did not really fit it. This result was expected for the first two types of texts, because of the lower monitoring and the higher (less controlled) activation of the conceptual structure (see Edmondson 2009: 170/171). In the FLNpe, the result was unexpected – here it was expected that more direct translating would take place. As was shown in Chapter 5.3.3, the participants in the FLNpe only spent 34.64% of their time on executing, and the rest on pausing, which was less used for revising the text written thus far than for planning the text to be produced and for searching for words (Chapter 5.5.1). In doing this, the conceptual structure activated the semantic network which, in turn, activated phonological nodes that were related to the intended words, but another node was more successful and was executed.

In the FLNpl (translation: 50%/network: 50%) and in the FLFpe (translation: 51.16%/network: 48.84%), the distribution of semantic errors in the subcategories was equal or it was slightly biased in the direction of translation. In the FLNpl, the higher degree of translations was expected, since here the results in fluency (e.g. Chapter 5.4.3) and the results of revisions of code-switches (Chapter 7.4.2) indicate that the participants made use of L1 to a large extent. It was not expected, however, that the FLFpe would include more L1 induced semantic node-switches than node-switches in the semantic-phonological FL network. The results might be due to a more deliberate attempt to control the activated writing process after the 'uncontrolled' freewriting, which was caused by the

writers' feeling that thinking with more effort about wording was needed in academic writing to a greater degree than in freewriting, as was noted by James in the interview afterwards. Because of this conscious decision to control the writing process and the formulation to a larger extent, the L1 might have interfered with word finding more directly, which was supported by the higher speed in writing.

All in all, in the most visible category of the relationship between conceptual and phonological structure of semantic node-switches, one can see that the different writing processes and the different planning conditions had an impact on FL language production.

6.4.6 *Genre node-switches*

Genre node-switches occurred only in the academic essays. They were more prominent in the FLNpe (10.02%) than in the FLFpe (7.74%). The deviation of the node-switches in the subcategories differs between the FLNpe and the FLFpe (Table 6.9). In the FLNpe, genre node-switches are more often induced by the L1 academic genre (40.48%) than in the FLFpe (20.59%), although the language independent node-switches make up the majority in both texts. In the FLNpe, 59.52% of the genre node-switches were language independent, and in the FLFpe, 79.41%. Most of this subtype of *genre node-switches* were the results of wording that was not register adequate. In the FLFpe, the writers more often used vernacular words/phrases instead of high-standard ones than in the FLNpe.

%	FLNpe	FLFpe
Language independent	59.52	79.41
L1 induced	40.48	20.59

Table 6.9 Distribution of *genre node-switches*

As the proportions show, in most of the cases no direct relationship between L1 and FL term/phraseology could clearly be made out. In the majority of genre node-switches, the participants seem to have used the terms that came quickest to their minds. This could have been the effect of a missing monitoring because of the high cognitive demands of writing academic texts in a foreign language, or it might have been the effect of a missing labelling of the terms with respect to register (Chapman 1982: 113, see also Fillmore 2006: 374).

An interesting case of a genre node-switch is the usage of the word *kid* (e.g. Marissa: FLF, Owlet: FLF). With *kid*, one can propose that the participants knew that the word is colloquial. The fact that two participants used *kid* in the academic texts, however, points at the participants' general tendency to focus the monitoring on other aspects of the academic genre than on the words (for example on creating complicated syntax, which is incorrectly labelled as being academic). In the case of *kid*, the influence of L1 phonology is

also perceptible, since the German translation of *child* is *Kind*, and the parallel activation of the phonological structures might have had the effect that an underlying phonological node-switch caused the genre node-switch. In the case of Owlet's usage of *kid*, this explanation is highly probable since she executed the complete phonological node-switch *child -> kind* during the planning of the essay.

This example is, however, not the general case. In most cases, the words that were judged to be informal by the evaluators are neither phonologically related to German counterparts, nor are they taught as being informal at school. Therefore, one can conclude that the labelling of expressions as belonging to a specific register or not is rather fragmentary in the FL.

6.4.7 *Code-switches*

The number of code-switches is low in all of the texts. Only four of the ten participants left code-switches unrevised. In some cases, errors that are code-switches were probably not even registered by the participants as being switches into the L1. For example, the use of *amoklauf* instead of *random shooting* in the FLF by eight participants was evaluated as a complete code-switch by the L1 English reader. However, none of the participants was aware of the fact that the term does not exist in English. Since it is (in parts) a foreign word in German, too, they believed that it was an FL technical term for incidents like the killings in Winnenden (statements in the interviews).

Another case of code-switching that was found is the use of *false friends*, e.g. of *talk master* instead of *talk show host* (Sarah: FLFpe). For a German L1 speaker/writer, the (German) term *Talkmaster* is an English term, since both parts of the compound are English, and they are pronounced in the FL way. However, when this term was included into the German lexicon, it was an adaptation of English words into the German language without checking whether the compound actually exists in English. This phenomenon is well known in Germany (e.g. *Handy* instead of *mobile phone* or *Public Viewing* for watching football games in a public area or in a pub). In other words: although the usage of *talk master* is a code-switch, it is probable that Sarah did not even notice this.

% of total	
SE	0.53
FLN plan	2.78
FLN	0.00
FLF plan	1.04
FLF	1.59

Table 6.10 Proportion of *code-switches*

All in all, the proportion of code-switches is very low (Table 6.10). Most of the code-switches took place in the FLFpe. In the FLNpe, no code-switch was left uncorrected. In the SE and in the FLNpl the number was low with only one incident of code-switches in all papers. Only four of the ten participants

left code-switches uncorrected: Siebenmorgen made one in the SE (*grobfahrlässige Übersetzungen Shakespeares* = 'grossly negligible translations of Shakespeare's [work]), one in the FLFpl (*Einstellung* ='attitude') and one in the FLFpe (*vernachlässigen* = 'neglect'). iPhone switched code in the FLFpe (*auffälliges* = 'conspicuous, noticeable', *Amoklauf* ='rampage'), Sarah did so in the FLFpe (*talk master* = 'talk show host'), and Owlet had one code-switch in the FLNpl (*Auswirkungen* = 'effects'), one in the FLFpl (*amokläufer* = 'crazed person that commits a rampage), and three in the FLFpe (*amokläufer* (2x), *Giftschrank* = 'poison cupboard').

The fact that the proportion in the FLNpl is higher than in the SE is the consequence of the generally low number of errors in the FLNpl. It is remarkable that only in Owlet's plan a code-switch was found, although other results in the node-switches and the analysis of productivity show that the participants used the L1 in planning by notes. In the other conditions, the participants who used code-switches stated that they did not do this unintentionally, but that they used the German terms in order to proceed with the writing processes without having to search further for an FL expression, or without having to describe the intended meaning. In contrast to this, in the questionnaires after planning by notes, some of the participants stated that they had difficulties in idea generation because of the lack of words. They were dissatisfied with their planning because they spent too much time searching for the exact term to express the intended meaning for which they had a term in the L1. For them, it might have been more productive to use more code-switching in order to execute idea generation and planning more fluently. That is, the method of using L1 for mental idea generation but not for formulating the ideas had the negative impact of adding a further demand on the act of idea generation and planning in the FLN, which suppressed the compensatory strategy of L1 use for idea generation (Wolff 2000: 110).

6.4.8 *Typing mistakes*

Errors were labelled as *typing mistakes* when letters were mixed or when the participants' fingers slipped – e.g. Krebs (FLFpl): disucced (=discussed), differnent (= different); Artilleryman (FLFpl): aubout (= about); or Gio (FLFpe): shool (= school); when words were written as one with no morphological intention of compounding – e.g. Siebenmorgen (FLFpe): *Eattitudetoward* (=attitude toward); or iPhone (FLFpl): *oneanotherthere* (= one another. There ...) – or when keys were pressed that did not make any sense at all and it may be presumed that the writers simply missed the correct key – e.g. Owlet (FLFpl): increasingl<y (=increasingly). In some cases, the evaluation of whether an error was a

typing mistake, or whether it was an error which was made because of the lack of orthographic knowledge, had to be made in a rather subjective way, based on the assumption that students of English philology who passed the language test on a high level should know how to spell e.g. *media* correctly (instead of *meadia*), or how to write *researcher* (instead of *reasercher*, both Gio: FLFpe), although in both cases, one could argue for orthographic node-switches, since the chosen letter combination could be a possible variant in a more shallow orthography. Still, as in the first case the German word is written *Medien*, and in the latter case the vowel/vowel combination is switched, it is assumed that the incorrect spelling took place because of a failure in the coordination of the execution processes.

Whether the typing mistakes might have been triggered by key combinations which are more common in German than the correct FL ones (and in this sense were L1 related), was not further analysed. Examples for these kinds of typing mistakes would be Babs' *importanat*, which might have been incensed by German words like *Internat* (boarding school), or Gio's *lach* instead of *lack* (FLF), which in German would be the imperative form of *laugh*.

	%
SE	18.52
FLN pl	25.00
FLN	10.98
FLFpl	66.32
FLF	11.39

Table 6.11 Proportion of *typing mistakes*

The number and the percentage of typing mistakes differ distinctly between the different planning processes and the different text types (Table 6.11). It was highest in the FLFpl, and lowest in the academic essays.

The high proportion of typing mistakes in the FLFpl was expected, since the participants' typing was very fast (Chapter 5.4.1) and the participants were explicitly asked to ignore mistakes. In contrast to this, the high rate of typing mistakes in the FLNpl was not expected, since the participants did not write many words in the first place, and they typed more slowly. The fact that the number of typing mistakes was still so high in comparison with the other types of errors indicates that the monitoring of the typed text was rather low, and that the participants shifted most of their cognitive capacities on other aspects than orthography, which also became visible in the proportion of orthographic node-switches. Since the plans were not revised afterwards, no corrections were made here either.

As in code-switching, there is no relevant difference in the percentages of typing mistakes between the FLNpe and the FLFpe. As a difference to node-switches, noticing typing mistakes does not seem to be influenced by the activation of FL by freewriting (see Chapter 7.5). The proportional difference between the academic essays and the SE text is

high. Because of the high typing speed in the SE, typing mistakes were more likely to occur. Obviously, the participants did not spend much cognitive capacity on monitoring orthography, and only the minority made a final revision at all (Fig. 5.5). The high rate of typing mistakes, therefore, underlines the writing-like-speaking attitude in the SE.

6.4.9 *Miscellaneous*

The proportion of errors in *miscellaneous* again differs between the texts: 16.4% in the SE, 2.78% in the FLNpl, 7.77% in the FLFpl, 10.98% in the FLNpe, 8.20% in the FLFpe. The percentage of errors in the different subcategories of *miscellaneous* varies between all writing processes and text types (Fig. 6.6).

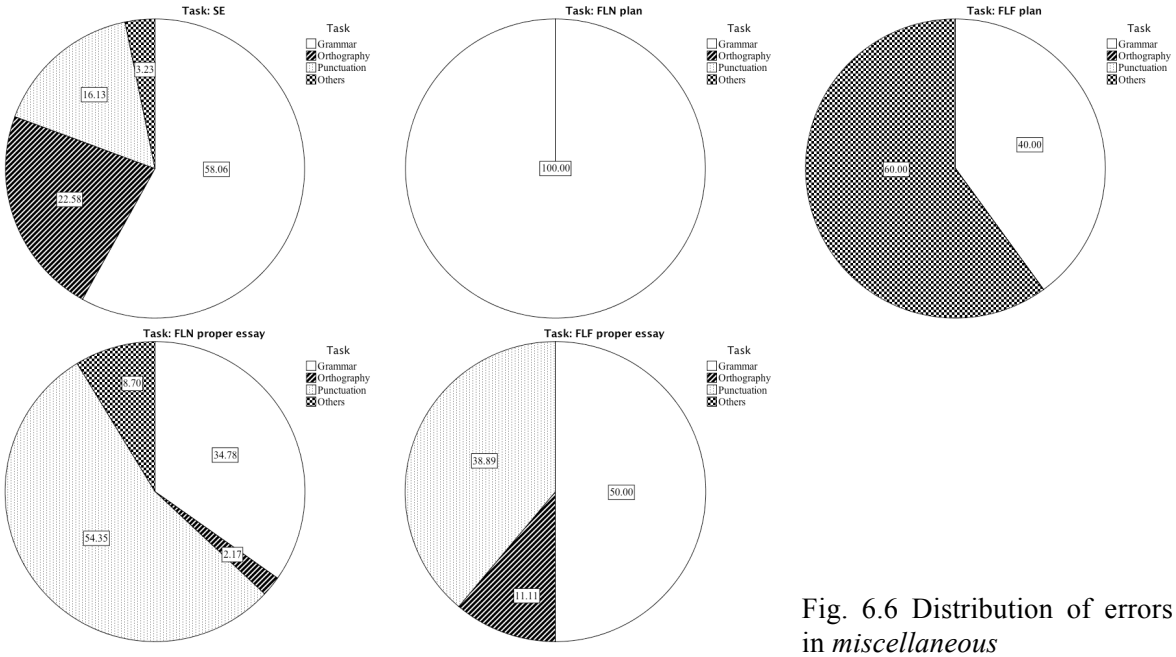

Fig. 6.6 Distribution of errors in *miscellaneous*

In all texts, *grammar* is either the most dominant subcategory or one of the major subcategories in *miscellaneous*: SE: 58.06%, FLNpl: 100%, FLNpe: 34.76%, FLFpl: 40% and FLFpe: 50%. Another important subcategory is *punctuation* with 16.13% in the SE, 54.35% in the FLNpe, and 38.89% in the FLFpe. *Orthography* is important in the SE (22.58%), less important in the FLFpe (11.11%), and insignificant in the FLNpe (2.17%). The subcategory *others* is the major subcategory in the FLFpl (60%). In the FLNpe (8.7%) and in the SE (3.23%), it is far less important.

Examples for grammatical errors are the usage of singular forms instead of plural forms in cases like *she never thinks about me having* ***feeling*** (Krebs: SE); the missing conjugating *-s* in singular 3rd pers. verb forms: *she* ***need*** *correctness* (Krebs: SE) or the missing article in cases where an article would also have been needed in German. All of

these errors would have been errors in the L1 as well, that is, they are not L1–FL node-switches. It is rather believed that the writers in these cases were in an 'unmotivated' state of interlanguage, in that they simply did not activate the respective FL rules. It might also have been that, in their minds, the participants formulated already other parts of the text than the parts which they were executing, and because of this, errors slipped in.

Orthographic errors mainly occurred in words that are not frequently used or which are foreign words in the L1 and in the FL, like in Siebenmorgen's SE *caligraphy* and *hillarious*. The missing double consonant and the superfluous double consonant might have been categorised as typing mistakes. However, when one looks for the incorrect form *caligraphy* in the internet, one finds 3,160,000 examples in 57 seconds [2012-06-18], that is, this orthographic error is quite popular in English writing and in German writing as well: the German incorrect *Kaligraphie* was found 379,000 times in 37 seconds. Because of this, one can presume that Siebenmorgen committed the error because of a lack of knowledge. The misspelled word *hillarious* can also be found very often in the internet (more than 4,000,000 examples in 17 seconds) – and the incorrect form is labelled as being correct in an online dictionary (http://www.linguee.com/ [2012-06-18]). Still, it cannot be excluded that the writers actually knew how to spell these words correctly, because in the academic texts, they often used vocabulary that is used even less frequently in everyday language than these examples. In the FLFpe, the higher rate of orthographic errors in *others* indicates that the writers were less critical with thinking about the orthography of words that they were insecure about spelling, whereas in the FLNpe the longer pausing and the slower writing processes seem to have made the participants more aware of these factors.

In the two academic essays, punctuation is the largest subcategory (FLNpe: 54.35%) or the second largest subcategory (FLFpe: 38.89%) of *miscellaneous*. In most of the cases, the writers overgeneralised English rules. For example, James wrote: *It is impossible to say that logic principles are culture dependent* [morphological node-switch] *and at the same time make use of these principles_ as they are preconditions for any form of arguing which is supposed to be rational.* The missing comma after *principles* was – probably – left out because of the English rule that stipulates that (most of the time) no commas are set in front of a subordinate clause that is introduced with a subjunction, which is a rule that most of the students had to learn explicitly at school because these commas are compulsory in German. The clause that this rule is not universal, but depends on the sentence the subordinate is embedded in, is often not taught at school or is blended

out by the writers in the writing process. Since this modification of the rule depends on the complexity of the sentence – and the sentences in the academic essays had the tendency to be embedded and complex – the missing application of the rule generated these kinds of errors. The error-rate being higher in the FLNpe than in the FLFpe is an indicator of the conscious application of the false rule. In the FLFpe, the more automatic insertion of a comma in the fluent writing process (which would also be initiated by the L1 rules) worked slightly better. It is again an indicator of differences in the focus during the writing process initiated by the planning conditions.

The last subcategory – *others* – appears only in three of the text types. While in the SE and the FLNpe the percentage of these errors is rather low in number, in the FLFpl they make up the majority of errors in *miscellaneous*. Here, they commonly encompass words that the writers started to write down, substituted them with other words (or added another idea) and did not delete the word that they had begun to execute – a procedure which was actually asked for in the condition of freewriting. Also in the SE, the high writing speed and the planning-in-writing explain these kinds of errors. In the FLNpe, however, errors in *others* were not expected, since the processing was too slow to admit a failure of noticing incomplete words. The analysis of the writing protocols show that in some cases these errors were the result of an unintended deletion of too many letters in revision. Yet, in the slow production process, the participants should have noticed errors like this. Here, eyetracking would have helped to see whether the errors were left unnoticed, e.g. because the participants did not look at the monitor, but at other places in the process of idea generation or in consulting the source text (Wengelin *et al.* 2009: 338).

As in the other error categories, the analysis of the subcategories in *miscellaneous* shows that the writing processes and the governing of these processes differ in planning and formulating, and that the planning forms, as well as the demands of the task have a considerable effect on the linguistic factors of text production.

6.4.10 *Content*

Content is a category that is language independent. It describes errors in which the conveyed content is wrong, or in which it is unclear what the writer wanted to say. An example is iPhone's statement in his FLNpe that Aristotle was a Roman, or Owlet's discussion of a *group* in her FLFpe, forgetting to define the group.

	%
SE	0.00
FLN plan	0.00
FLN	2.15
FLF plan	0.00
FLF	0.91

Table 6.12 Proportion of errors in *content*

The incidents of errors in *content* are rather low (Table 6.12) and they only occur in the academic essays. More of the

participants erred with respect to content in the FLNpe (six out of ten) than in the FLFpe. Only Owlet made a content error exclusively in the FLFpe. All the other participants who made a content error in the FLFpe erred in the FLNpe as well.

Many of the errors were probably committed because of a certain amount of carelessness. IPhone's transforming Aristotle into a Latin person or James' giving Aristotle a female personal pronoun were most likely not based in their missing knowledge, since the facts about Aristotle's nationality and about his gender may be regarded as general education and, additionally, both facts were explicitly mentioned in the source text. In iPhone's case, one can therefore presume that he mixed "Greek" and "Latin" because they are semantic neighbours; the Greek and the Latin cultures being regarded as the two cultures that formed the foundation for today's European culture. In James' case, the gender error might have taken place because of an attempt to write in the 'politically correct' form. In German, this is often achieved by using both the female and the male form of nouns and pronouns in a text. In English, some texts solve the problem by using the female form instead of the male form. Because of this, it could be that the academic genre activated the female pronoun in James' phonological structure, and the error slipped in unnoticed.

Still, all in all, the participants did not show problems in terms of providing correct content – whether they provided this content successfully is a different matter.

6.5 Discussion

The error analysis shows that most of the errors that occur in the FL texts, and that the participants did not notice in revision, are the results node-switches and L1 influence. The moment of the influences and the strengths of these influences differ in the text types – in the simple text, in the plans and in the proper essays – as well as after the methods used for planning. That is, the number of errors depends on the cognitive demands of the task. In the SE, the smallest number of errors per word was found; in the FLNpl, where the number of words is rather low and the participants were slow in executing, the number of errors per word is distinctly higher. Here, the usage of the L1 as a productive method of dealing with the cognitive demands of generating ideas and planning an academic text, proved to be an obstacle in terms of FL performance. In all academic texts, the number of errors is higher than in the SE, which shows that the higher demands on content provision and structuring, the adding of the academic register and the simulation of a test situation added a stress factor on the writing processes, which resulted in a higher usage of the L1.

The analysis of the numbers of errors per participant shows that the different planning methods had an individually different effect on the writers. One group of participants benefited from the higher activation of FL through freewriting, whereas the second group performed better in the FLNpe. It might be that the division of the group mirrors the different planning types (Boehm 1993): for the writers who are used to generating text structure during the writing process, planning through freewriting was an effective method, and they could concentrate more thoroughly on linguistic aspects in the essays than the writers who need to have a strict and more concise plan *before* they start to formulate their thoughts elaborately.

The varying distribution of errors in the subcategories of the node-switch categories also proves that the writers employed their cognitive capacities differently in the various task environments. There are always differences between the plans and the final texts, which, *inter alia*, is a result of the lack of revision of the plans, and in the case of the FLFpl, a consequence of the assignment. Still, the proportional differences between planning and final essays prove that in planning, writers concentrate on different elements and aspects of language than in writing the texts to be evaluated. In the more fluent writing processes of freewriting and FLFpe, certain linguistic rules were activated less effectively than was done in the slow and pause-interspersed writing of notes and *vice versa*. The interfaces from the conceptual structure to the FL structures, between the FL and L1 structures and in between the FL structures are not employed in the same way in the different tasks or planning conditions. As a result, some subcategories do not show any L1-influence in some task environments, whereas the L1-influence is large in others.

These differences in the proportional distributions of the errors in the different (sub)categories give evidence for the thesis that linguistic information is stored to a great extent in the form of rules (Jackendoff 2002: 182). Depending on the methods used, the rules are activated differently; for example, the rules for the correct usage of articles work more appropriately after note-taking than after freewriting. This could be the result of (a) differences with respect to how these rules were taught and learned (implicitly or explicitly), (b) differences in the profoundness of the learned rules, or (c) differences in the ways they are stored – whether they are stored more superficially or more deeply. Because of these factors, the writers applied L1 rules in the formulation process in some conditions and did not do so in other conditions, and they were not able to discern the node-switches in the revision processes, respectively (see the following chapter).

In some error categories, one can also see that the academic genre did not have the exclusive effect of posing an extra cognitive demand on the writers, but that the participants also applied L1 genre features on the FL texts. For example, the errors in *sentence construction* and in *punctuation node-switches* are the result of L1 rhetorical structures in the FL texts. In this way, the linguistic L1 influence is encouraged by the influence of the application of – obsolete – L1 genre characteristics. The extra demand of writing in a foreign – that is, academic – language in the foreign language lowered the borders between the L1 and FL structures, and – as will be shown in the following chapter – the monitoring did not perceive this L1 influence. This might have been the effect of a subconscious strategy of using L1 – not only in FL planning but also in FL essay writing – in order to be able to generate a text in a certain amount of time; and it indicates that, for the participants, other elements of the writing process were more central to the monitoring than language accuracy.

7. Revisions

As was shown in Chapters 5 and 6, fluency, productivity and the number as well as the types of errors in the final texts vary distinctly between the simple and the academic texts and between planning and essay writing. In the following, the extent is presented to which the text changes and revisions that were performed by the participants differ in the different conditions. The average number of revisions, the number of characters that were executed without revisions (Chapter 7.1), the types of revisions made (Chapter 7.2), and the types of 'double revisions' (Chapter 7.3) are analysed. The kinds of revisions in the different writing processes – that is in planning, in formulating or in the final revision – are examined in Chapters 7.4–7.6. Finally, it is looked at which revisions were performed in *r*-bursts and how these revisions had an effect on fluency (Chapter 7.7).

It was assumed that, due to the different cognitive demands set by the writing processes and set by the different assignments, the participants would concentrate on different aspects under the different task conditions. It was also assumed that in FL writing, the participants would focus more on linguistic aspects than in L1 writing, because in the latter the formulating process worked more fluently, and it was shown in Chapter 6.1 that the L1N and the L1F still showed a high number of grave language errors. Since the slower performance in FL writing indicates that the participants perceived a certain amount of difficulties that were set in language problems, it was presumed that revisions regarding this aspect would frequently occur.

7.1 Number of revisions

Table 7.1 gives an overview of the numbers of revisions that were made on average in the different assignments.

	SE	L1N	FLN	L1F	FLF
Total number of revisions	88.90	168.50	156.40	192.00	165.90

Table 7.1 Mean number of revisions in the different task conditions

The number of revisions differs distinctly between L1 and FL and between the different task types. The lowest number of revisions is located in the SE, the highest in the L1F. However, if the number of characters that the writers produced during the writing process is taken into account (Table 7.2), the picture changes:

	SE	L1N	FLN	L1F	FLF
Number of characters without revision	32.5	32.51	28.84	34.04	32.50

Table 7.2 Mean number of characters without revision

One sees that the writers produced more text without revision (34.04 characters) in the L1F than in the simple FL text (32.5), in the L1N (32.51), and in the FLF (32.5), which provided basically the same results. In the FLN, the writers felt the highest necessity to revise (28.84). Here, the higher rate of revisions could have been the result of the participants' higher usage of the L1 in the planning process and the missing stimulation of the FL formulation process in planning. This led to more difficulties in formulating and to word finding problems. The higher amounts of pausing (Chapter 5.3.3) and the shorter lengths of bursts (Chapter 5.4.3) in the FLN production process also indicate that the writers concentrated more on the planning of the next text passages, that the articulatory buffer was lower and the processing more controlled. In contrast to this, the activation of fluency was more successful in the L1F condition, and the writers did not encounter problems as massively in formulating their ideas. Because of this, they produced texts with less revising – although it would have been necessary to do more (see Chapter 6.1).

Fig. 7.1 presents the characters-without-revision rate for each participant. As in the analysis of fluency (Chapter 5.1.3) and in the numbers of errors in the final texts (Chapter 6.3), the results differ strikingly between the writers in terms of quantity. Yet, the rate of signs per revision in the different tasks presents an overall similar pattern. For most of the participants, the number of signs produced without revision is lowest in the FLN-condition, and highest in the L1-conditions. Participants like Marissa and Gio were relatively stable in their characters-per-revision rate in all texts, and both of them produced fewer characters without revisions in their L1. It might be that their monitoring was more active in the L1, and because of this they were more critical/insecure in their formulation. This could be the result of their student vita because both are students of natural sciences in their second subject (Gio: biology, and Marissa: mathematics). Since writing academic papers is less frequently demanded at Cologne University in these topics, both are not as used to producing L1 academic essays as they are to producing them in FL. However, since their numbers of characters without revisions in the FLN, the L1F, and the FLF are close, it is impossible to draw any reliable conclusions from the results on their way of processing.

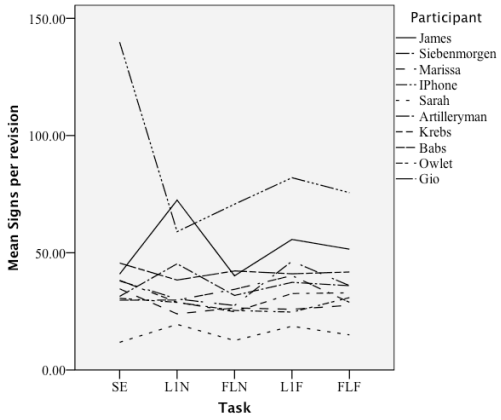

Fig. 7.1 Mean number of characters without revision

Noticeable exceptions were Artilleryman, iPhone and James. iPhone and James made fewer revisions in their L1 writing, but both of them produced more signs without revision in the L1N than in the L1F. Both candidates stated in the questionnaire that they had problems with the concept of freewriting: iPhone generally evaluated planning by freewriting positively in the L1 since the "ideas came directly out of the head" [translated by author]. However, he also noted that freewriting "inhibits itself" in some cases, and that he did not write according to the plan, but developed the argument structure while he was writing the essay. James' motivation for more revisions in the L1F were different: He stated that after freewriting, he encountered difficulties in finding the correct references in the source text directly, which made him write things down, and then check and correct them.

Artilleryman is outstanding in various aspects. For one, his characters-without-revision rate is by far the highest of all participants. Only in the L1N, did one participant (James) revise less. Artilleryman's L1N is also the essay with the lowest characters-without-revision rate for Artilleryman, although the rate of 59 characters without revision is high compared to his fellow participants. Yet, compared to the SE, in which he produced 139.86 characters without revision, the result in his L1N is low. In the other essays (FLN, L1N, and FLF), his pattern fits more or less into the global pattern, in that the FLN-rate and the FLF-rate are lower than the L1F-rate, and that in the L1F writing process he was able to produce more characters without revision than in the other academic essays. In the production of the L1N, many typing mistakes slipped in, which Artilleryman immediately corrected. In the questionnaire, he described this aspect as having had a negative influence on the production process. Why this high amount of typing mistakes occurred cannot be substantiated conclusively. In the questionnaire, Artilleryman stated that in some cases English words came more readily to him than German words because he more often dealt with linguistics in the FL context than in the L1 context. It might be that this higher proficiency in FL had had a negative influence on his L1 executions (see Riehl 2004: ch. 6.2, Schneider 2000: 315/316).

Beside these exceptions, one can note that the distributions of revisions in the writing processes within each writer stays in a predictable frame.

7.2 Types of revisions

Table 7.3 gives an overview of the number of revisions that were made on average in the different categories. There is a general tendency of a probability of revisions in the

different categories, but inside the categories, there are large differences between the tasks in the different languages and in the different planning conditions.

	SE	L1N	FLN	L1F	FLF
Phonological node-switch	1.30	0.60	2.10	0.10	2.80
Orthographic node-switch	4.50	5.00	5.30	5.30	7.00
Punctuation node-switch	1.20	**0.00**	1.80	0.20	1.50
Syntactic node-switch	1.30	**0.00**	1.90	**0.00**	3.30
Semantic node-switch	0.10	0.70	0.60	0.10	0.80
Genre node-switch	0.10	1.60	0.90	0.80	1.20
Code-switch	0.40	0.50	0.10	**0.00**	0.60
Typing mistakes	54.70	96.30	88.50	122.80	95.50
Miscellaneous	8.90	19.70	18.30	25.40	18.20
Content	23.00	55.60	45.10	48.50	44.70

Table 7.3 Mean number of revisions in the different categories

In all conditions, the highest number of revisions is located in *typing mistakes* (Fig. 7.2): in the SE they make 57.28%, in the L1N 53.5%, in the FLN 53.77%, in the L1F 60.43% and in the FLF 54.38%. In the L1F and the SE the proportionate revision of typing mistakes was distinctly higher than in the note-taking conditions or in the FL freewriting condition. This is probably the consequence of the higher speed in which the participants were typing in these conditions (Chapter 5.3), which resulted in the writers' inability to adequately coordinate their motor executions to the higher demands that the speed of formulation made on the executive processes.

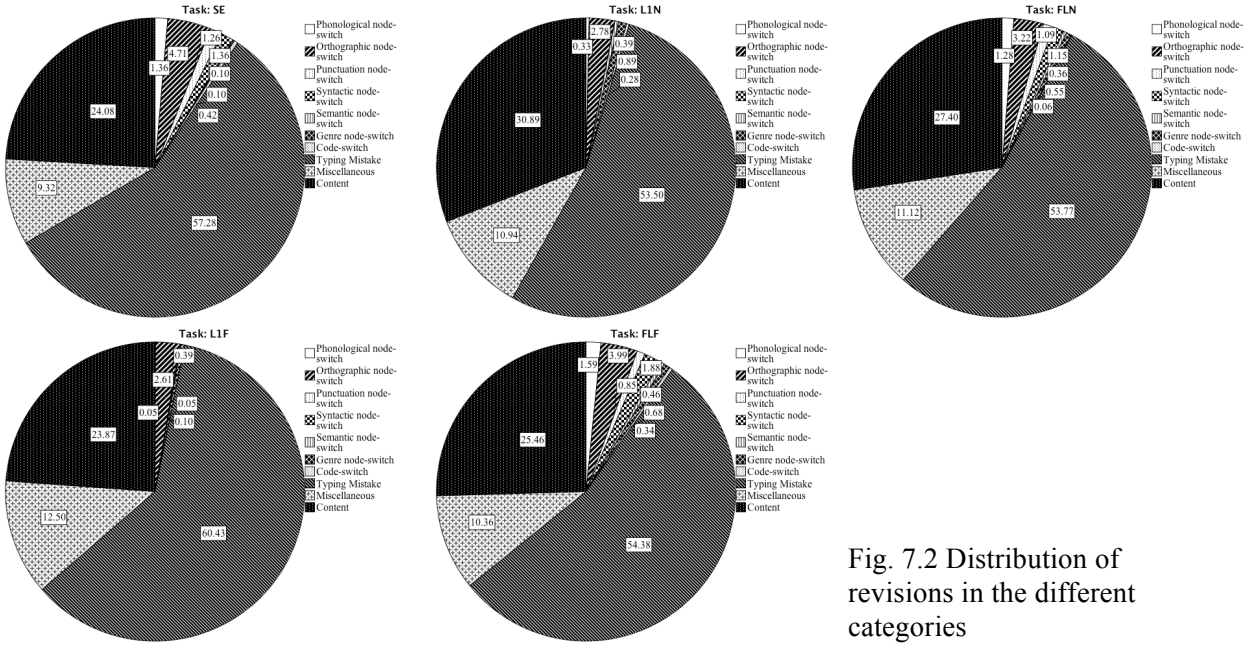

Fig. 7.2 Distribution of revisions in the different categories

The fact that the number and the percentage was highest in the L1F condition indicates that (a) here the formulation was most productive (Chapter 5.4.3) and led to the highest

difficulties with respect to motor executions; and (b) that the monitoring process still was able to spot the mismatches between the mental orthographic representations and the spelling found on screen, which consequently led to a higher amount of r-bursts (Chapter 5.5). Additionally, in L1 academic writing the participants often used words which were not necessarily elements of their everyday vocabulary, since they tended to use more complex and/or foreign words, which corresponds to the L1 academic genre conventions (Siepmann 2006: 133), and the automatised motor executions intermeddled with correct typing (Grabowski 2003: 363).

In the FL there is also a tendency of committing typing mistakes in foreign words (e.g. *rheoric* instead of rhetoric; Babs: FLN), and often the participants were not able to correct these mistakes in the first attempt, but they needed second or third attempts (Chapter 7.3).

Beside word initiated difficulties, the typing mistakes seem to have been rooted in many cases in an execution that was too slow for typing the planned formulation on time. For example, in mistakes like *philopsohy* (iPhone: FLN), the letters that were typed instead of the correct ones anticipate the letters that are coming shortly afterwards. In other cases, the typing mistakes foreshadow a formulation that is already planned and stored in the articulatory buffer. For example, Krebs had to revise: *One the one hand*, to *on the one hand* – when she had anticipated *one* in the intended execution of *on*. As noted above (Chapter 6.4.8), a further analysis of typing mistakes would be worthwhile, especially with respect to whether there are differences in the type of typing mistakes in the L1 and the FL. It might well be that in the L1 the collision of mental formulation and typing might be of more relevance in this error category because formulation works faster and more fluently, and that in the FL more typing mistakes take place in cases when the FL letter combination is less common in the L1. Christensen (2004: 556), for example, discovered that the orthographic-motor integration not only has an influence on the execution alone, but also on creative aspects and on the structure of the texts. In this way, the influence of L1 on FL writing might be a relevant factor also in execution.

Other categories in which revisions were executed to a noteworthy extent were revisions in *content* (between 23.87% in the L1F – lowest rate – and 30.89% in the L1N – highest rate), in *miscellaneous* (between 9.32% in the SE and 12.5% in the L1F) and in *orthographic node-switches* (between 2.61% in the L1F and 4.71% in the SE). The revisions in the subcategories of these categories are analysed in more detail in the following chapters.

In the remaining categories, the number of revisions was lower than two per cent. In some of the categories in specific writing tasks, no revisions were made at all. *Phonological node-switches* were corrected in 1.36% of the revisions in the SE, in 0.33% of the revision in the L1N, in 1.28% of the revisions in the FLN, in 0.05% of the revisions in the L1F and in 1.59% of the revisions in the FLF. *Punctuation node-switch* revisions occurred in 1.26% of the revisions in the SE, in the L1F in 0.1%, in the FLN in 1.09%, and in the FLF in 0.85% of the cases. 1.36% of the revisions were concerned with *syntactic node-switches* in the SE; in the FLN this was the case in 1.15%, and in the FLF in 1.88% of the revisions. *Semantic node-switch* revisions occurred in all text types (but to a very low extent): SE: 0.1%, L1N: 0.39%, FLN: 0.36%, L1F: 0.05%, and FLF: 0.46%. In the SE, there is only one semantic node-switch revision which was executed by Owlet, who wrote *work* and changed it to *paper*, which was a revision of a one-to-one translation from the German *Arbeit* that denotes an academic paper as well as work in general. In the FL, the semantic node-switches that were revised were in part translations and in part semantic node-switches inside the FL network. In the L1, the semantic node-switches were exclusively of the subcategory semantic network, that is, no FL-influences were revised.

The rate of *genre node-switches* was 0.10% in the SE, 0.89% in the L1N, 0.55% in the FLN, 0.39% in the L1F, and 0.68% in the FLF. A genre-node-switch revision taking place in the SE at all is the result of Gio's using the digit *4* in her text, which she deleted after having remembered that in written texts (different from notes), writing a digit for numbers below thirteen is considered as being inappropriate. Beside this error, no revision in this category occurred in the SE, because here no genre was prescribed. Again, in L1-writing, no influence of the FL could be detected, but in FL writing most of the genre node-switches that were revised were L1 induced node-switches.

Code-switches were revised in 0.42% of the total number of revisions in the SE, in 0.28% in the L1N, in 0.06% in the FLN, and in 0.34% in the FLF. Code-switch revisions in the SE and the FLF were expected, since here the participants actively enforced their formulation process and consciously decided on subduing the monitoring. That is, they were more eager to produce text and to convey content than to write texts which were perfect in terms of wording and style from the start. In order to stay in the flux, it was (consciously or subconsciously) decided to rather write down the activated L1 phonological structure than to try to find the adequate FL one. When one looks at the number of code-switches that are still found in the final texts, it is remarkable that although revisions were executed in the FLF and the participants had had more time to perform final

revisions (Chapter 5.3.2), still the highest number of code-switches are found in the FLF (Chapter 6.4). This contradicts the expectation that in the FLF, words would be found more easily because of the activation of the semantic–FL-phonology/FL-orthography interfaces by freewriting. However, as was described in Chapter 6.4.7, some of the code-switches (e.g. talk master) were not even perceived as being code-switches.

It is also noteworthy that the participants had to revise code-switches in their L1. Siebenmorgen had difficulties in finding an L1 expression for *awkward* and *scientific community*, Artilleryman first wanted to translate the term *Scottish Brogue*, but then decided not to do it. Interestingly, he also kept the English *e.g.*, instead of replacing it by the German *z.B.* Krebs first wrote *low level* but changed it into *untere Schicht* after a short pause. These code-switches are especially 'enlightening', when one takes the content of the task into account, in which the participants commented on Wolf Schneider's (2008: ch. 14) claim that the high usage of English in the academic community makes the L1 language poorer. That is, here the L1 terms were not as active as the more frequently used FL words.

The overview of the analysis of revisions shows that beside orthographic node-switch revisions, all of the categories in which a relevant amount of revisions took place are – more or less – language independent. Although typing mistakes might be inspired by the L1 in some cases, their finding and correcting does not concern the L1–FL linguistic interfaces. *Content* in the case of *wording*, *sentence structure* and *text structure* to a certain degree is interrelated with language. For example, the writers might have had difficulties in finding the 'perfect' word in the FL in expressing their thoughts; a revision of sentence structure which was made in order to make the intended meaning clearer would have been possibly unnecessary in German because of the declinations. However, with respect to node-switching, the participants either did not perceive them because of the high cognitive demands and the lowering of the blocking of the L1, or they concentrated more on other aspects (like typing mistakes and content), and because of this were not able to recognise and correct node-switches. A reason for this might be that the methods of revising texts did not differ between the L1 and the FL, and that the participants were not flexible enough in the revising processes for dealing successfully with the different demands of L1 and FL text revision.

7.2.1 Revision of *content*

Most writers judge the revision of *content* to be of highest importance with respect to the

expected evaluation by the readers (Lamb and Simpson 2011: 45). In German schools and at university, teachers/lecturers often explicitly state that they will focus on the judgement of the provided content when they read students' papers: The evaluators assess whether the content is appropriate to the assignment, and whether it is broad (or concrete) enough in presenting the crucial points of the topic. Beside this, it is evaluated whether the language chosen is concrete and semantically unambiguous in transporting the intended meaning, and whether the structure of the text is clear, and presents the information needed for understanding the text in a logical order. Despite these statements, language is often enough the critical criterion that influences assessment (Armstrong 2011: 153).

In the category *content* quite different aspects are subsumed (Chapter 4.3.6), which make use of different cognitive capacities during the writing process. For example, for the evaluation and revision of content, in the sense of *information provided*, the writers have to apply knowledge/conceptual structures that are stored in long-term memory (Baddeley 2007: 150–151, Jackendoff 2011: 689, Kellogg 2001: 43). In a set time frame like the one in this test, writers have to judge in advance whether the content that they have generated so far is central to the topic, because neither time nor place are given for including digressions in the texts if the participants do not want the readers to judge their texts as missing the point. If writers want to convince the readers of their positions, they should also choose the strongest arguments. They must provide the right amount of background information in order to make the reader understand the relevance of the topic. In the ideal case of argumentation, writers additionally find an example/empirical evidence for the ideas provided (Bünting, Bitterlich, and Pospiech 2000: 122–128, Hoppmann 2008: 631, Hyland 2004: 68/69, Kienpointner 2008: 708).

That is, content generation alone is very demanding, and the convincing formulation of ideas puts a further cognitive demand on the writers – even more so in FL writing. As Sarah notes in her L1N about the usage of English by German academics: "Konzepte und Ideen können häufig in der Muttersprache besser, weil klarer und präziser[,] formuliert und umgesetzt werden – semantische Konzepte des Englischen greifen hier häufig nicht." (*In the native language, concepts and ideas can often be better, that is more clearly and more precisely formulated and realised; semantic concepts of the English language often do not fit.* [author's translation]). If one 'translates' this statement into the model presented in chapter 2, Sarah notes that in the FL, the speakers/writers often lack interfaces between semantic and FL phonological, syntactic and/or orthographic structures, which would convey the intended meaning best.

	SE	L1N	FLN	L1F	FLF
Information	13.00	24.30	22.80	23.30	25.50
Wording	6.50	21.30	14.50	18.60	13.50
Sentence structure	3.20	7.20	5.20	6.10	5.70
Text structure	0.30	1.10	0.60	1.00	1.00
Numbering	0.00	2.60	2.30	0.00	0.00

Table 7.4 Mean number of revisions in the subcategories of *content*

When one looks at the revisions in *content*, one sees that the numbers differ exceedingly in their weighting between the subcategories and between the different conditions (Table 7.4). The highest numbers of revisions are located in the subcategory of *information*, in which the participants changed the material provided or in which the participants added material or deleted it. The latter provided the majority of the cases. The subcategory *wording* was approximately as important as *content* in some texts. *Sentence structure* is also relevant all tasks. *Text structure* and *numbering* are nearly irrelevant. Note that revisions of numbering could not take place in every note-taking essay, because in many cases the participants did not work according to the assignment: only Marissa numbered her ideas in the L1Npl and the FLNpl, four participants numbered their ideas exclusively in the FLNpl, one participant only numbered the L1Npl, and four participants did not number their ideas in any of the note-taking essays.

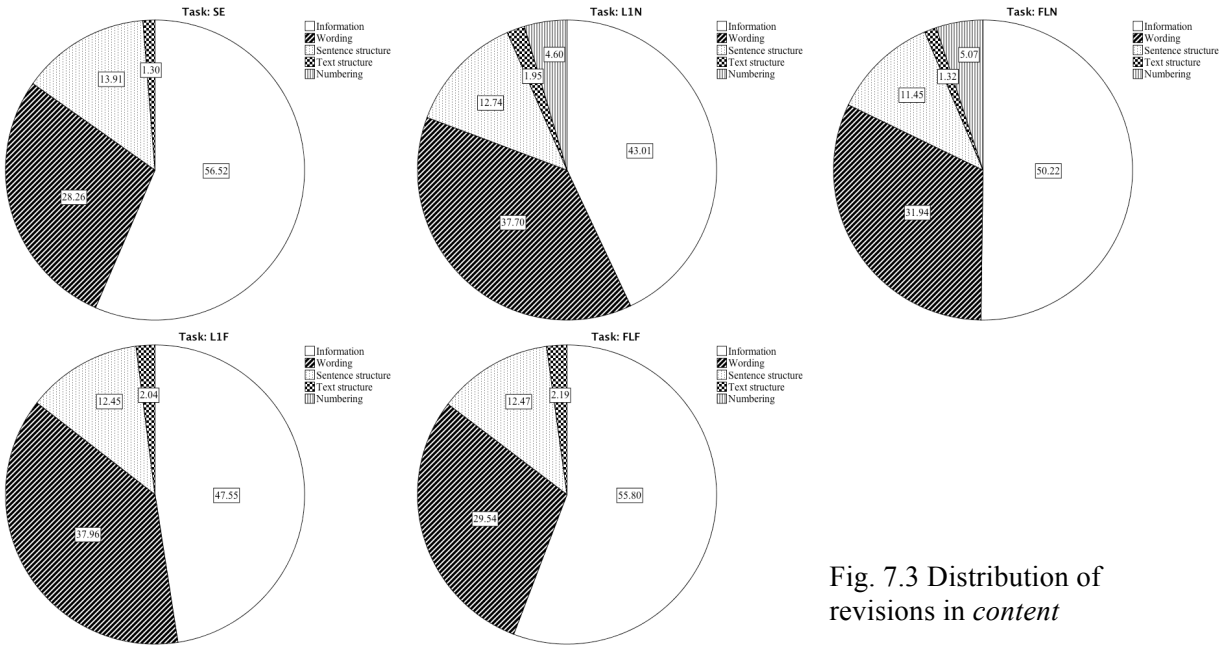

Fig. 7.3 Distribution of revisions in *content*

Fig. 7.3 gives an overview of the distributions of the revisions in the subcategories of *content* in the different tasks. If one excludes *numbering*, which could not take place in the

SE or in freewriting, the overall patterns are the same in all conditions. *Information* is always the most important subcategory, followed by *wording*, *sentence structure* and *text structure*. In the note-taking conditions, revisions of *numbering* are more relevant than revisions of *text structure*.

Although the majority of revisions in *content* were made in the subcategory *information* in all text types, there are distinct differences in the proportions. In the process of FLF writing and in the process of SE writing, revisions of content take more than fifty per cent: 55.80% in the FLF, and 56.62% in the SE. In the FLN, the subcategory *information* makes up 50.22% of the revisions, in the L1N 43.01%, and in the L1F 47.55%. Even if one excludes *numbering* from the analysis because it takes place only in the note-taking condition, the results show that the revision of *information* is higher in the freewriting-condition than in the note-taking condition, and that the percentage of these revisions is distinctly higher in the SE than in the academic essays. In the FL, *information* in both conditions is more dominant than in the L1.

In the SE none of the participants pre-planned the text. Additionally, since they were explicitly asked to write the texts for the sake of fun, they were not too concerned with wording, and they did not focus their attention on it. The free, uninhibited writing process activated idea generation, and the participants added new information in order to make their texts livelier. In some cases, one could also notice that the writers had the feeling that they exhibited too much of their inner lives in the texts, and they revised these passages. In this way, even the rather 'harmless' task of letting a writing tool describe the writers' attitudes towards writing and their behaviour in writing, underlines the psychological opportunities of writing (Sanousi 2004).

In contrast to *information*, the proportions in *wording* are higher in the L1 than in the FL: L1N: 37.7% (39.52% if numbering is excluded), L1F: 37.96%, FLN: 31.94% (33.64% if numbering is excluded), and FLF 29.54%. It was lowest in the SE with 28.26%. The language-internal differences between the planning conditions are low, although if one excludes *numbering*, the difference in FL becomes more distinct. The different distributions of revisions in the subcategories *information* and *wording* in the different tasks show that, with respect to content-generation and revision the participants used their cognitive capacities differently in the L1 and in the FL. They also did this differently in, as well as after the different planning conditions.

The higher activation of thinking in writing during freewriting in the L1Fpl and the FLFpl had an impact on the whole writing process. The revision of *information* was –

consciously or subconsciously – either judged to be more important in these tasks, or the amount of new ideas that were generated during freewriting and afterwards in the formulation process were higher than in note-taking, and the participants moved more inside the text and added phrases and sentences (see Li 2007: 51). The latter was also noted by the participants in the questionnaires. For example, Artilleryman stated that more detailed information "came in the writing process". Still, in the L1 and especially in the L1N the percentage of *information* revisions is below 50%. Instead, the participants put a higher degree of attention on *wording*. They seemed to be more aware of difficulties in formulating as precisely and as academically as possible, and they were better able to cope with these difficulties as well as linguistically better equipped to address these problems.

There are no distinct differences between the revisions of *sentence structure* between the tasks: these revisions make up 13.91% in the SE, 12.74% in the L1N, 11.45% in the FLN, 12.45% in the L1F, and 12.47% in the FLF. In many cases, they were the consequence of added information which had to be syntactically integrated into the text. Many more revisions would have been needed in this respect – in the L1 and the FL – and this becomes obvious in the high number of *syntactic node-switches* and errors in *grammar* in *miscellaneous*, which are the result of added sub-clauses or phrases into the FL and L1 syntax (Chapters 6.1.1 and 6.4.4). The error rate shows that the revisions of sentence structure often did not work accurately and that the number of revisions in this respect was distinctly too low.

Text structure was very rarely revised in the writing process. In the L1, the results are basically the same (L1N: 1.95%, L1F: 2.04%), whereas in the FL, the difference between the planning conditions is bigger: 1.32% in the FLN, and 2.19% in the FLF. In the SE the participants revised roughly as much as in the FLN: 1.30%. Not much text-structure revision took place in the SE, which indicates that – for one – the task was performed as knowledge-telling, and that – for two – the writers were able to plan and structure the simple texts during the formulation process.

In note-taking, not many revisions in *text structure* occurred, which could have been expected, since the participants were asked to decide on the structure of the text in the note-taking conditions before starting to write the essays. However, since the participants did not all number their notes *before* writing (Artilleryman, who numbered his notes in the FL-condition, did this after having written the text, and Marissa changed the numbers during the writing process), it does not seem that the numbering was the decisive moment in pre-structuring the text, which made the writers write the text in a more linear fashion. It

is additionally remarkable that the rate of revising the text structure is also very low in the L1F and the FLF. It was expected that in planning by freewriting, the idea-initiating effect of writing as well as the subduing of the evaluation of the generated ideas (in terms of adequacy or in terms of how to bring these ideas into a structure before starting to write the essay) would lead to structuring the text on-line, which would have more revisions as a consequence.

The small amount of restructuring might indicate that the freewriting process helped the writers to generate the structure while writing down all of their ideas and while interacting with the text in the text production. However, this seems rather far-fetched when one looks at the written texts. First analyses of the rhetorical structure of the introductions already indicate that the text structure in many texts was not so clear that no revision would have been needed. On the contrary, the low revision of text structure in all conditions points at a structuring which resembles the Teutonic academic genre, in which the writers rather present their thinking processes to the reader than that they present the results in a linear (and convincing) fashion (Swales and Feak 1994: 214).

Generally one can say that the participants were better able to focus on different aspects of *content* in the evaluation and revision of their texts in the L1 than they were in the FL, which indicates that the participants were better able to distribute their cognitive capacities in L1 academic writing. Conscious evaluation of content provided and of language in terms of accuracy and genre adequateness could be more successfully executed in parallel. In the FL, this conscious evaluation and revision of language was not executed as elaborately – be it because the cognitive capacities were too tightly strung to idea generation and to putting these ideas into order, or be it because the participants in the FL lacked the awareness of language subtleties, which would make the texts linguistically more acute and more convincing.

7.2.2 Revisions in *miscellaneous*

The error-category *miscellaneous* contains all language errors that are neither simple typing mistakes, nor are they node-switches, in that they are not based on the other language. In this category, revisions are also located, in which the participants typed something, deleted the word(s) or letter(s), and in a next step rewrote exactly the same letter(s) or word(s). For example, in her FLF Owlet wrote the sentence *[far more important] is the parents' (and teachers, and*, [then she deletes *and*, and types it in again, deletes it again and goes on writing] *and friends) relation*. These revisions were rated as being an element of the subcategory *others* in *miscellaneous*.

Table 7.5 gives an overview of the average number of the revisions in the subcategories of *miscellaneous* in the different conditions.

	SE	L1N	FLN	L1F	FLF
Total	8.90	19.70	18.30	25.40	18.20
Grammar	1.10	1.90	2.60	2.40	3.10
Orthography	0.10	1.50	0.30	2.80	1.20
Punctuation	0.90	4.70	2.90	4.30	1.90
Others	6.80	11.70	12.50	15.80	11.80

Table 7.5 Mean number of revisions in the subcategories of *miscellaneous*

The differences of revisions in *miscellaneous* between the different task types is remarkable. In the SE, the average number of revisions was lowest with only 8.9, which was to be expected since here the participants wrote shorter texts (Chapter 5.1); and the writing process worked more fluently and less revisions were made (Chapters 5.4.3 and 7.1). In the academic texts, the numbers are higher: In the L1N 19.7 revisions were made, and in the L1F 25.4. In the FLN and the FLF the rate is nearly identical: 18.3 in the FLN, and 18.2 in the FLF.

The high number of revisions in *miscellaneous* in L1-processing was expected, since it was already seen in the final texts that not many FL to L1 node-switches took place, but that other language errors yielded the majority. Revisions in *grammar*, *orthography* and *punctuation* often had to be made in all texts, because the participants changed the text written thus far – for example by adding new content – and the grammar or the punctuation therefore did not fit the syntactic context anymore. In the L1, the revision of punctuation was of highest relevance, which on the one hand is the result of the added information, but on the other hand, it is also the consequence of the missing automaticity in L1 punctuation (Jahn 2008: 115). As was seen in Chapter 6.1.1, the participants were not totally successful in this revision process. Also in grammar, some participants, e.g. Krebs, Marissa or Owlet, were not effective in revising. That is, in the L1 some of the participants revealed a certain amount of insecurity/missing sensitivity for the application of the correct syntactic and orthographic structures. This indicates that the participants did not put a high amount of their cognitive capacities on the monitoring of deeper language levels. Instead, they concentrated on content and on more superficial linguistic aspects like typing mistakes (Lindgren and Sullivan 2006: 40). However, a higher focus on a grammatically and orthographically correct text production would have been needed – for a good evaluation by the lecturers as well as for a more fluent transmission of information.

In the FL texts, revisions of language errors that were not rooted in the L1 were of marginal importance. In the FLF more revisions with respect to *grammar* were made, in the FLN more revisions with respect to *punctuation*, and in both essays hardly any revisions of orthographic, L1-unrelated errors were revised. The fact that more errors in punctuation had to be revised in the FLN might be rooted in the higher tendency for node-switches in *sentence construction* (Chapter 6.4.4), which indicates that the writers had a higher tendency to produce embedded, L1-influenced sentences in the FLN-essays than in the FLF-essays, which in turn asked for more refined punctuation. The higher number of revisions in grammar in the FLF points in a similar direction: the participants added new content and had to readjust, for example, the verb form from singular to plural. Here, the participants did not spend time on the evaluation of punctuation, which would have asked for the conscious application of rule knowledge – maybe because of the higher productivity.

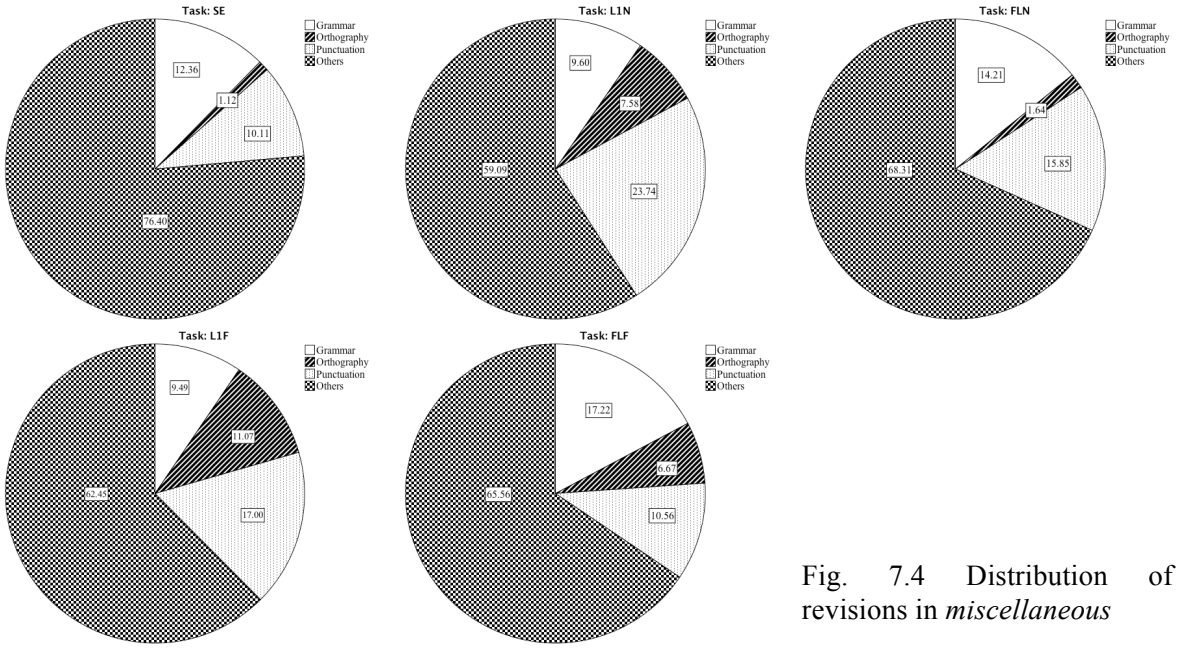

Fig. 7.4 Distribution of revisions in *miscellaneous*

Figure 7.4 demonstrates that for all texts – no matter in which language and in which planning condition they were generated – the majority of revisions in the category *miscellaneous* were made in the subcategory *others*. In the L1N, the proportion is lowest (59.09%). It is highest in the SE (76.4%), which – in combination with the fluent text-production and the missing plan – stresses the writing-like-speaking production process in this task. The writers generated the ideas, structured the texts and produced the formulations in parallel, which sometimes led to a 'thinking jam'.

In all text conditions, these kinds of revisions are a sign of the writers' searching for the right words or for the content they wanted to present next. The participants were

dissatisfied with the text they had in mind, but they 'resigned' to the fact that no better wording or content to be provided for the following passage could come (directly) to mind. This impression is supported by the questionnaires and the interviews in which the participants described word-finding problems or complained that they were dissatisfied with their formulations.

In the L1 academic essays, the proportion of the subcategory *others* is lower in both task-conditions than in the FL academic essays. This suggests that idea generation, word finding and word evaluation work more effectively before execution in the L1 than in the FL. In the L1N the proportion is lowest (59.08%, L1F: 62.45%). The slower execution and the higher numbers of pauses in note-taking were used by the participants to mentally evaluate the ideas/the formulation and immediately find better alternatives for the idea/word with which they were dissatisfied; whereas in the L1F the production process worked less restrictedly (Chapters 5.3.2 and 5.3.3), and because of this the participants used the 'dialogue' with the screen more often to trigger the word-finding process (see Zimmermann and Schneider (1987: 125/126) for the dialogical aspects of word-finding). However, they did not always perceive this using of writing for thinking as being a chance to work with the text/the medium. In the self-evaluations of the participants, some of them stated that they experienced the activation of the language structures by freewriting as being too 'aggressive', and that it did not leave them the time and cognitive capacities to write the academic text in an appropriate, and well thought-through fashion. It seemed to them as if the fluent writing process sometimes overtook their thinking processes.

In contrast to L1, the FLF shows slightly less revisions in the subcategory *others* (65.56%) than the FLN (68.31%). It might be that after freewriting and the enhancing of fluency, the participants were more willing to ignore 'imperfect' wording than in the controlled note-taking condition, which they were not able to do in the L1. In the FLN, no positive effect of the higher pausing and the slower production process could be made out with respect to the writers' not writing things down before the sentence/phrase was completely planned. This is a further indicator for the smaller articulatory buffer under the FLN writing condition, and of a larger use of L1 in idea generation and planning. Yet, the differences between the planning conditions in the number of revisions in the subcategory *others* is not as distinct in FL writing as it is in L1 writing. That is, although the writing processes worked more fluently in the FLF than in the FLN, they were still more slowly executed than in the L1, and because of this – and maybe because of the less dense phonological structure–semantic structure network – there is not such a big difference in

the execution of revisions in *others* in the FLN and FLF as there is between the L1N and L1F.

7.2.3 Revision in *orthographic node-switch*

Orthographic node-switch is the only category in which L1-induced errors in FL texts or FL-induced errors in L1 texts were revised to a remarkable extent. They occupy the fourth place in the 'rank' of revisions. In the SE, 4.71% of the revisions were executed in this category, in the L1N, it was 2.78%, in the FLN 3.22%, in the L1F 2.61%, and in the FLF 3.99%.

It is remarkable that the percentage of orthographic node-switch revisions from the FL to L1 is above 2.5%. These node-switches were almost exclusively located in the subcategory *capital letters* (L1N: 84%; L1F: 82.69%, see Fig. 7.5). The writers had to correct their spelling of nouns from lower case letters to capital letters. As noted above, stating that in these cases 'real' node-switches take place is ambiguous because of the 'fashion' of exclusively using lower-case letters in some genres of current fictional texts, and even more so in writing in the internet or in writing SMS (Schübel 2009: 25). However, since one can presume that writing with lower case letters has been transferred to German via English– rather than via French or Spanish, which are also taught at school, but are by far not as popular as English – the habitual usage of lower-case letters is a rather public orthographic node-switch, which is unwelcome in the L1 academic community. Since the participants were aware of this context, they were eager to correct these node-switches – yet, as was shown in Chapter 6.1.2, they were not completely successful.

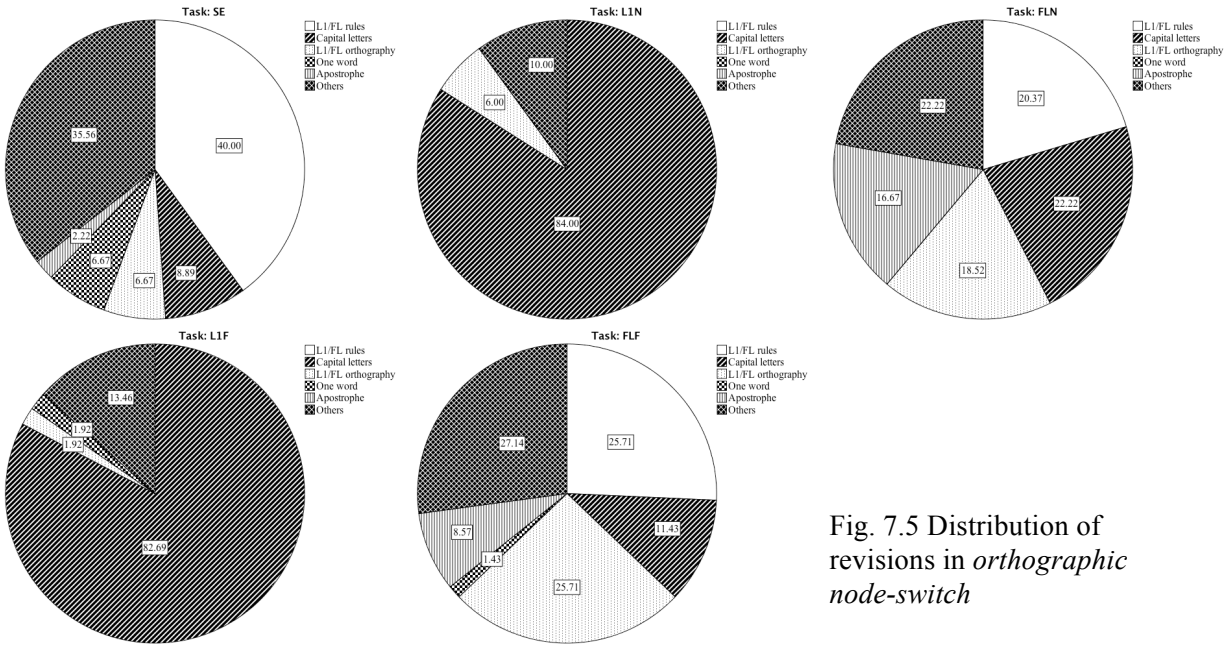

Fig. 7.5 Distribution of revisions in *orthographic node-switch*

Other FL to L1 orthographic node-switches which were revised, were the taking over of the English orthography to a word that exists in English as well as in German, which was higher in the L1N (6.00%) than in the L1F (1.92 %). For example, in his L1N-essay James first started to write the intended German word *exzellent* like the English counterpart *excellent*, but revised the error directly after he had typed 'c'. In the L1F, also a node-switch in the subcategory *one word* took place, when Gio started to write *Bolognaprozess* in two words, like it is done in English (*Bologna Process*) and corrected it later. This term seems to have been problematic for many participants, because a high number wrote *Bologna Prozess* in their essays without correcting it.

Another relevant subcategory in *orthographic node-switch* revisions in L1 was *others*, which was also relevant in the FL texts and will be discussed below.

In the FL texts, the orthographic node-switch revisions took place in the subcategories *L1 rules* (SE: 40%, FLN: 20.37%, FLF: 25.71%), *capital letters* (SE: 8.89%, FLN: 22.22%, FLF: 11.43%), *L1 orthography* (SE: 6.67%, FLN: 18.52%, and FLF: 25.71%), *one word* (SE: 6.67%, FLN: 0%, FLF: 1.43%), *apostrophe* (SE: 2.22%, FLN: 16.67%, FLF: 8.57%) and *others* (SE: 35.56%, FLN: 22.22%, FLF: 27.14%). In the SE, the distribution in the subcategories is distinctly different from the distributions in the academic texts. Here, the two categories *L1 rules* and *others* make more than 75%. *Capital letters*, *L1 orthography* and *apostrophe*, which are relatively important in the academic essays, are only of marginal relevance in the SE.

In all FL texts, the errors which were revised in the subcategory *L1 rules* were mainly errors that were initiated by the underlying intention of the German orthography to adapt the spelling to the (high-standard) pronunciation and to adjust the orthography of words that belong to one family. Many of the orthographic errors were also related to the German phonological structure. Examples for these kinds of node-switches were *wont* instead of *want* (Sarah: SE) or *live* instead of *life* (Sarah: FLF). These errors show that with respect to the sound-spelling correspondences, the activation of the L1 orthographic rules worked faster than the retrieval of the correct orthographic structure from long-term memory (Rastle *et al*. 2011: 1591).

In the FL academic essays *capital letters* is also a subcategory of relevance. In the FLN the proportion of revisions in this subcategory is distinctly higher than in the FLF, being the most important subcategory in revisions beside the revisions in *others*. Yet, when one compares the rate of revisions in the FLN with the results of the errors in *capital letters* in the final essays (Chapter 6.4.2), one sees that 48.48% of the node-switches in

orthography were still set in *capital letters* in the final FLN, whereas it was only 5.71% in the final FLF. This means that, although the monitoring in the FLN was aware of the fact that writing capital letters instead of lower-case letters at the beginning of a noun is incorrect in English in the majority of cases, the writers were still unable to extinguish these node-switches effectively in the note-taking condition. Since writing with lower case letters is unacademic in the L1, one can therefore state that the academic register had an influence on FL orthography in activating L1 rules, as was also perceived in the errors in the final versions of the essays in certain subcategories of *syntax* (Chapter 6.4.4).

Also the taking over of the German way of adding the possessive *s* to the noun without an apostrophe (*Lindas Stuhl* against *Linda's chair*, Chapter 4.3.1) and its revision points into the same direction. As stated above, the usage of an apostrophe in front of the *s* in German denotes that the writer's orthographic capacities are of a low standard, which in academic writing invokes negative evaluations. The higher degree of instances in which the writers applied the German rule and revised it in the FLN-essay shows that on the one hand, the L1 orthography was activated to rather a high degree, and that at the same time the monitoring worked rather successfully in this respect. In the final texts, only 7.69% of the orthographic node-switches belonged to the subcategory of *apostrophe* in the FLN, whereas in the FLF 12.12% of the orthographic node-switches were located in this subcategory (Chapter 6.4.2). Since this rule and the rules of capital letters are applied and monitored differently under the different planning conditions, it seems as if the rules are initiated differently.

A category which is only of marginal importance in the errors in the final essays, but is important in revision is the subcategory of *others*. Most of the revisions in this subcategory (in the L1 as well as in the FL) were of the type that the participants executed phonological or orthographic associations, i.e. they wrote a word that is neither semantically related to a word that would fit the context, nor is it phonetically close to a fitting L1 (FL) counterpart which, in turn, has an orthographic relationship to a word that would semantically fit in the L1 (FL) context. Examples are *I thing* instead of *I think* or *shop* instead of *shoot* (both Sarah: FLF). In these cases, node-switches occurred inside the orthographic structure: not from FL to L1, but between FL orthographic nodes in FL writing and between L1 orthographic nodes in L1 writing. In the L1F, the proportion is 3.36% higher than in the L1N, in the FLF it is 4.92% higher than in the FLN. In the SE, it is even 23.68% higher than in the FLF. This shows that freewriting and the condition of writing a simple text raised the activation of the phonological network and the

orthographic network, but at the same time the higher productivity made the participants execute an incorrectly activated but maybe more automatised orthographic structure more often.

All in all, the different distributions of the revisions in the subcategories of *orthographic node-switch* indicate that the differences in the writing conditions have an impact on the application of the rules, their execution and the monitoring of the orthographic realisation of the planned and formulated texts. The high number of revisions in *capital letter* in the L1-essays also shows that orthographic 'fashions' outside the academic/high standard L1-writing have an impact on the writing processes, which makes the production of a successful text in L1 more demanding for the students. At the same time, the L1 academic genre conventions have the effect that the writers apply L1 orthographic rules more often for high standard writing in the FL texts.

Overall, the distributions of the revisions in the different text types in the error categories and in the subcategories show that the participants worked differently in L1 and FL, in academic and vernacular writing, and after the different planning conditions. They put a focus on different aspects during the writing process. This focus did not change exceedingly with respect to the main categories, but it changed distinctly with respect to the revisions in the subcategories.

That is, the general methods of revision are similar in the different tasks, but the focal points of the revisions vary. With respect to the awareness of L1 influences on the FL text production, however, one can state that the participants did not show a high degree of awareness. Their monitoring was not attuned to doing this.

In the following, the distribution of revisions that needed second or third attempts is described in order to analyse whether certain types of revisions put more cognitive demands on the writers than others.

7.3 Double revisions

Not all of the revisions were successful in the first attempt, but the participants often had to take two or more turns for revising one error (directly after the first attempt). These cases are called 'double revision'. They are of interest, since they have a strong effect on the statistical evaluation of fluency, because the bursts executed after the failure in revising typing mistakes are very short and have an impact on the average burst lengths.

There are no note-worthy differences between the proportions of double revisions in the total number of revisions between the tasks: in the L1N, they take 7.72%, in the FLN

7.61%, in the L1F 7.81%, and in the FLF 7.72%. The highest proportion of double revisions is located in the SE with 8.77 %. The participants did not make use of planning or the alternating strategy of pausing and executing (Olive and Kellogg 2002: 594) in this task, but planned the whole text during the writing process. They also did not make any elaborate pausing in order to plan the texts during the pauses. The higher rate of double revisions is thus probably the result of the parallel writing processes and the need to write down the ideas as quickly as possible in order not to forget them, and the inability to perform the typing processes accurately at the high speed that they were performed in.

The proportion is lowest in the FLN, which might have been the effect of the lowest writing speed (see Chapter 5.3). In the L1F, it is highest in the academic condition, which points at the disadvantage of the high typing speed in the freewriting conditions, i.e. the participants' missing ability to type quickly enough to adhere to the speed of thinking. As Alves *et al.* (2007: 56), Bereiter and Scardamalia (1987: 6), or Cooper and Matsuahashi (1983: 34/35) have shown, missing proficiency in motor execution leads to cognitive costs. If not skilled in typing, attention is needed for the execution, and "trace-offs are likely to occur and performance deteriorates" (Alves *et al*. 2007: 56). Since most of the writers usually either take more time for typing in writing academic texts or are – for example in emails – rather lax with correcting errors or mistakes in high-speed written communication, they are not used to high speed executing in academic contexts. Additionally, the participants' mental formulation was already ahead, and because of this the writers did not revise efficiently (Fayol 1999: 20).

	SE	L1N	FLN	L1F	FLF
Total	7.80	13.00	11.90	15.00	12.80
Phonological node-switch	0.00	0.00	0.00	0.00	0.00
Orthographic node-switch	0.00	0.00	0.00	0.00	0.20
Punctuation node-switch	0.10	0.00	0.00	0.00	0.00
Syntactic node-switch	0.00	0.00	0.00	0.00	0.00
Semantic node-switch	0.00	0.00	0.00	0.00	0.00
Genre node-switch	0.00	0.00	0.00	0.00	0.00
Code-switch	0.00	0.10	0.00	0.00	0.00
Typing mistake	7.10	10.50	10.80	13.30	11.70
Miscellaneous	0.30	0.40	0.40	1.30	0.60
Content	0.30	2.00	0.70	0.40	0.30

Table 7.6 Mean number of double revisions in the different categories

Table 7.6 shows the distribution of the type of revisions that were not successful in the first attempt. The highest proportion of double revisions is found in the category *typing-*

mistakes: 91.03% in the SE, 80.77% in the L1N, 90.76% in the FLN, 88.67% in the L1F, and 91.41% in the FLF. Here, the double revisions were lower in both L1-conditions than in the FL, and they were lowest in the L1N-condition. Many double-/triple revisions of typing mistakes in L1-writing took place with foreign words. This signifies that the letter strings are more easily accessed in the L1 than in the FL (and in foreign words), especially if the FL-orthography works according to different principles than the L1-orthography, as is the case in German and English (Coulmas 2003: 169). In both languages, the participants were more successful in revising typing mistakes straight away in the slower note-taking condition than in the freewriting condition.

Other double revisions were found in the categories *others* and *content*. However, in both categories the results are rather low. Only in the L1-texts did noticeable deviations take place. In the L1N, there are distinctly more double revisions in the category *content*: 15.38%, and only 3.8% in the SE, 5.38% in the FLN, 2.67% in the L1F, and 2.34% in the FLF, which is probably the result of a higher monitoring in this condition and of the attempt to make the text as good as possible from the beginning. In the L1N, the subcategories that are revised in *content* are *information* (27.27%), *wording* (40.91%) and *sentence structure* (31.82%), that is, *wording* takes the majority. In all other text types, only two of the five subcategories in *content* are involved: in the SE and the L1F *wording* (66.67%/25%) and *sentence structure* (33.33%/75%), and in the FLN and the FLF *information* (85.71%/33.33%) and *wording* (14.29%/66.67%). Numbering and text structure were never objects of double revisions. There are such distinct differences in the subcategories of *content* that they could be the result of a different distribution of the cognitive capacities in monitoring. However, since the numbers are so small, it would be impudent to draw any general conclusions.

In the L1F, more double revisions were made in *miscellaneous* than in the other texts. Most of these revisions were of the category *others*, i.e. one can see an active usage of the written text for the thinking process. Rather than to pause, when no alternative was found to an expression that did not convince the writers, they rather rewrote it until a better variant was found or until the writers compromised with the word.

Again, the numbers of double revisions in *miscellaneous/others* are low, and no overall conclusion should be drawn.

7.4 Revisions in planning

Planning by note-taking and planning by freewriting make different use of language in respect to the quality as well as to the quantity of the text produced. In note-taking, the

plans are shorter (apart from Sarah's case, who produced more text in note-taking than in freewriting; see Bereiter and Scardamalia 1987: ch. 8), and usually the wording is more precise and already more attuned to the register of academic writing. In freewriting, the writers' text production was less organised, the participants wrote down ideas that are irrelevant to the topic, and so on. Additionally, in some freewritten plans, one can find reflections on the writers' knowledge about the topic, their word-finding or formulating problems, the slipping of ideas, or their attitudes towards the planning method which was uncommon to them. The following example is Siebenmorgen's plan for her FLF about censorship of computer games and films as a method of preventing school shootings.

> okay, let's start the media and violence mh... i don't know... so there is some sort of link but it seems that many dstudies ndon't hstop to think if tit is the other way around: so that maybe aggressive people also watch more violence and prefer it to nonviolent media than people who aren't aggressive in the first place instead of the media making people aggresseive. Furthermore, I don't knowhow... ham aähm ehm what am I going to write. it's a difficult topic there are pobviopulsy many, many different concluision... probably it's something in the middle: so that rthere is something like ehm what was I going to write something in the line of: some vion no s lots of violence in the media will actually make you more aggressive especially children as their havbits are still forming, but that's less so with gropwn ups so maybe censoring it with an age limit would be c gouog... w ´ fand then there is: the following point that there are ltos of other factors: for wexample socuiialisation: if the kids have a good, caring loving family they won't get violent: as the last study says of somebodey: dit's the EINSTELLUNG of the parent'ss toward violence that influences kids... so if parents don't like violence on TV they will teach that to their kids and they will also dislike violence... I have to stop correcting myself there must be oanother point there must be something else... m some studies don't see any connection beteen w there's a w missing n

Siebenmorgen had difficulties with this form of planning in different respects: first, it is noticeable that her typing skills were not able to cope with the high speed of executing the outcomes of mental formulation. One also sees that she struggled with finding a position to the topic, and that this missing position made it difficult for her to come up with ideas that fit the assignment. These difficulties were also mirrored in word finding problems, in that she used a code-switch for expressing *attitude* or *position* ("EINSTELLUNGEN"), which is interesting since the German word *Position* is semantically related to the word *Einstellungen*. With respect to revision, the sentence: *I have to stop correcting myself...* is crucial. It reveals that for her (and for other participants), the freewriting feature of ignoring errors and mistakes, and the demand to keep on formulating did not work successfully in making the writing process easier, but, on the contrary, that their idea generation was inhibited by the extra-demand of *not* monitoring the written text.

Because of the differences in the planning strategies, it was expected that the participants' foci in the writing of the plans would differ distinctly, which should be

mirrored in their revisions. It was expected that more revisions in *content* were made in note-taking, in which a plan as precise and as concise as possible would be the goal, whereas in freewriting this aspect should not be of interest since here the participants were asked to not revise the content.

7.4.1 Number of revisions in the plans

The total number of revisions made in the different planning processes (Table 7.7) shows that none of the participants worked according to the freewriting assignment with respect to not correcting themselves, but that most of them executed a high number of revisions in this process. Since no planning was made in the SE, this task is not included in the table.

	L1Npl	FLNpl	L1Fpl	FLFpl
Total number of revisions	25.00	25.50	29.30	26.50

Table 7.7 Mean number of revisions in the plans

The total number of revisions in the plans is close in the L1Npl, FLNpl and FLFpl. Only in the L1Fpl is the number distinctly higher than in the other planning processes. When one looks at the number of characters produced in the planning processes, the picture changes, however. In the L1Npl, revisions took place every 31.46 characters, in the FLN, this was the case every 25.67 characters, in the L1Fpl every 52.54 characters, and in the FLF every 49.21 characters. This means that in the FLNpl, the revision rate was highest, and it was lowest in the L1Fpl. In the freewriting conditions, the rates are now closer in both languages, although the revision rate is lower in the L1Fpl than in the FLFpl. This shows that formulation and execution in the FLNpl were least equipped for comfortably generating an adequate plan. Additionally, the fact that the participants worked more task-appropriately with respect to not revising in the L1Fpl points toward a higher concentration on idea generation in L1 than in FL.

James's L1Npl is unique with respect to the content that he generated in planning by notes. Basically, he wrote down the rhetorical meta-structure that is expected from an academic essay:

> Introduction: outline of the problem, thesis, (enlightened monolinguality, outline)
> Body: extreme 1, extreme 2, proposal of a compromise, consequences
> Conclusion: result, summary
> (James, L1Npl, translated by author)

He did not need to write down more elaborate notes, for example what extreme 1 or extreme 2 would be; nor which result he intended to present. Still, he was very goal-oriented in the writing process, his final text is comparatively well structured and his

arguments are strong. For him, writing down the labels of elements of the rhetorical structure in the L1 sufficed to make him comply to the assignment, and no extra help for lightening the demands on the working memory were needed, by writing down ideas in order to be able to relocate the cognitive capacities on structuring and formulating (Baddeley 2009b: 37 and 2009c: 59, Baddeley, Papagno and Vallar 1988: 587). In this respect, his essay seems to have rather been knowledge-telling than knowledge-transforming (Bereiter and Scardamalia 1987: 8/12).

In contrast to this, Sarah was more elaborate in her notes than in her freewritten plan. She wrote down all the arguments she was going to present, together with the examples that she wanted to add in order to underline her argumentation. In doing this, she performed 91 revisions, whereas James executed only one (but overlooked two orthographic errors, whereas in Sarah's distinctly longer plan only three errors were found in the final plan).

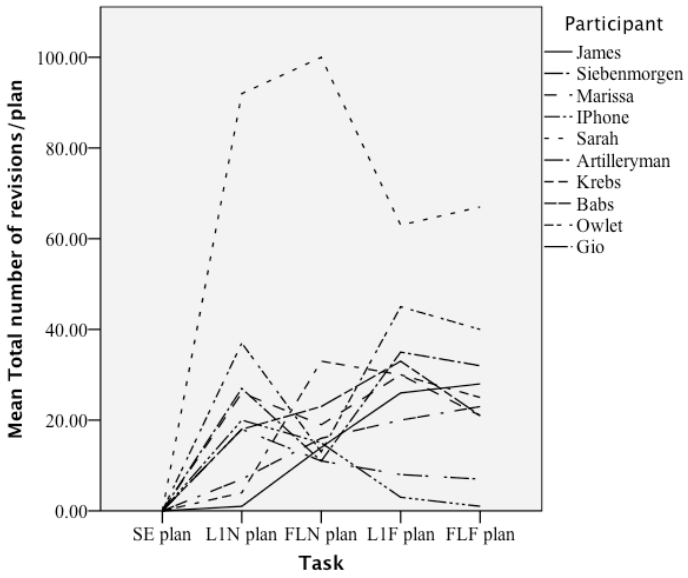

Fig. 7.6 Mean number of revisions in plan per participant

This means that in the production processes of the plans, one can notice extreme differences between single writers. Fig. 7.6 gives an overview of the total number of revisions in planning per participant. It shows that there is still a tendency to an overall pattern of making more revisions in the L1 plans than in the FL plans, and that most of the participants made more revisions in freewriting than in note-taking. The only participants who were really successful in blocking the compulsion for revising in freewriting were Artilleryman and Siebenmorgen, who were both more successful in doing so in the FL than in the L1. Krebs and James were also exceptional, in that they hardly revised the L1-notes which, in both cases, was (a) rooted in the shortness of the notes, and in Krebs' case in what seems to be a total neglect of orthography, in that she wrote all nouns with lower case letters, resulting in nine orthographic node-switches in the final plan. This neglect of spelling might have been her strategy of reducing the cognitive demands of the planning process.

The lower numbers of revisions in the FLNpl indicates that the participants here used the pausing for planning, not so much for revising, and that they hardly made any use of the writing-for-thinking method. Only Sarah, who made a very detailed plan, seems to have used this method in L1 and in FL, which resulted in a higher number of revisions.

7.4.2 Distribution of the revisions in planning

Fig. 7.7 shows the proportional distribution of the types of revisions that were made during the planning processes.

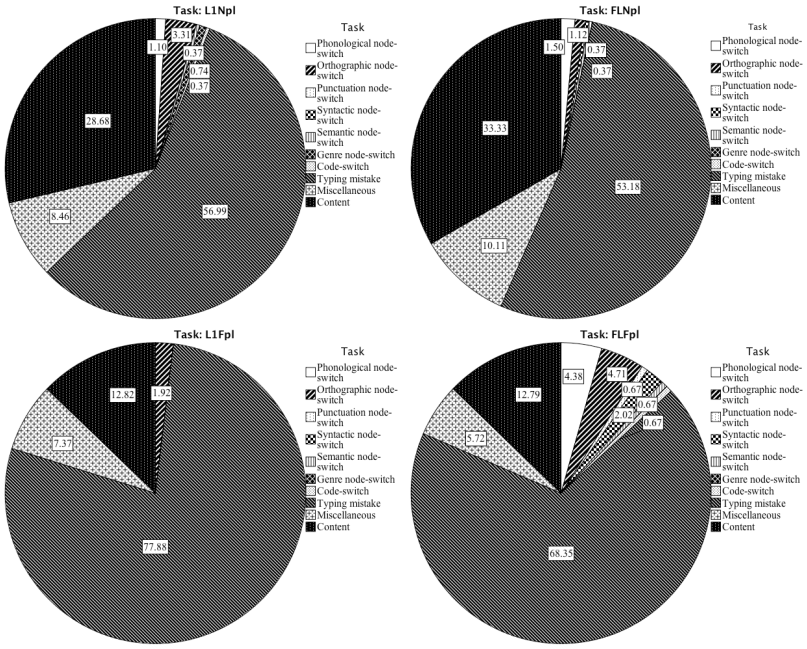

Fig. 7.7 Distribution of revisions in planning

In all text types, three categories were relevant in revision: *typing mistakes* (L1Npl: 56.99%, FLNpl: 53.18%, L1Fpl: 77.88%, FLFpl: 68.35%), *content* (L1Npl: 28.68%, FLNpl: 33.33%, L1Fpl: 12.82%, FLFpl: 12.79%) and *miscellaneous* (L1Npl: 8.46%, FLNpl: 10.11%, L1Fpl: 7.37%, FLFpl: 5.72%). The revisions in these categories will be analysed in more detail in Chapters 7.4.3 to 7.4.5.

In single conditions, other categories were relevant as well. For example, in the FLFpl, the revision of orthographic node-switches lies at 4.71%. It is also noticeable in the L1Npl with 3.31%. In this plan, the revisions of FL orthography were located for 66.66% in the subcategory *capital letter*s, for 22.22 % in FL orthography and for 11.11% in *others*. In the L1Fpl, fewer revisions were performed here, which resulted in a high number of orthographic node-switches in the final plans (see Chapter 6.1). That is, the academic register played a role in note-taking already in that the participants were more keen on writing correctly than they were in freewriting.

Orthographic node-switches were corrected in the FLFpl, which was not expected. 42.86% of these revisions were located in *L1 rules*, 28.58% in *L1 orthography*, and

28.58% in *miscellaneous*. Here, again it becomes obvious that because of the higher speed in typing, the execution process was in some cases faster than the time the working memory needed to retrieve the FL orthographic representation from long-term memory.

In this respect, the overall proportions of the revisions of node-switches and of code-switches in the FL plans are of interest. In the FLNpl, 5.89% of the revisions were related to these aspects, whereas in the FLFpl, it was 13.12%. Although the number of corrections of L1 influence in the FLFpl is still relatively low, the percentage is higher than the rate of node-switch revisions for the whole writing process, in which the revisions of node-switches have a percentage of 8.20% in the FLF. This means that in the freewriting condition the awareness of the intrusion of L1 into the FL writing was detected more successfully than in writing the proper essay or in the final revisions in which hardly any revisions of node-switches were made (see Chapters 7.5 and 7.6). This implies that for FL writing the switching-off of the monitoring is – at least to a certain extent – better equipped in making the writers sensitive to L1 influences. The subconscious activation of FL structures in freewriting activates the appropriate rules more effectively than the note-taking condition. Because of this, a higher subconscious awareness of the use of L1 came up, which helped the writers to cope more successfully with noticing and revising L1 influences. That is, not only making students consciously aware of the L1 influences in FL writing (Sersen 2011: 344) mitigates these influences, but also the subconscious activation of the FL linguistic structures does so. However, as was shown in Chapter 6, the activation of the FL structures is not completely successful in subduing L1 influences.

7.4.3 Revisions of *typing mistakes* in planning

As was expected, there are differences in the proportions of revisions of typing mistakes between the planning conditions, but there are also differences between the languages: In the notes, the results are quite close in L1 and FL: 56.99% in the L1Npl and 53.18% in the FLNpl. In freewriting, the difference is larger: in the L1Fpl 77.88% of the revisions were concerned with typing mistakes, in the FLFpl only 68.35%. That is, the writers corrected proportionally less typing mistakes in the FL than they did in the L1. Yet, if one takes the amount of typing mistakes in the final plans into account, one sees that this higher proportion of corrections in the L1 did not result in a lower number of typing mistakes in the L1Fpl. On the contrary, the average number of typing mistakes in the final plans was 18.8 compared to an average number of typing mistakes of 12.8 in the FLFpl (chapter 6.4).

Although the average L1Fpl is longer, this does not explain the higher proportion of typing mistakes despite the more in revising, since in the final freewritten plans, the

proportion was one typing mistake per 81.88 characters in the L1Fpl, and one typing mistake per 101.88 characters in the FLFpl. Although the letter strings in the L1 are more frequently used and the execution of German orthography should be more automatised, the high speed of production made the participants commit more typing mistakes, and at the same time, the higher speed of idea generation made them concentrate less on the correct orthographic representations of the generated ideas. This corresponds to the findings of Takagaki (2003: 33), who discovered that writers concentrate more on the revision of spelling in FL writing than in L1 writing – that is, FL writers focus on the more superficial aspects than they do in their L1 (see also Whalen and Ménard 1995: 410).

In the L1Npl, the participants committed less typing mistakes than in the FLNpl, and they were also more effective in correcting these mistakes. Here the rate of characters produced without revision of a typing mistake lies at 15.5 characters in the L1Npl and 14.2 in the FLNpl. A slightly higher number of revisions in the category of typing mistakes was made in the L1, and if one looks at the significantly higher productivity in L1 note-taking (786.6 characters in the L1Npl vs. 654.5 characters in the FLNpl), one can see that in the L1Npl in comparison to the L1Fpl, the lower production rate and the higher rate of pausing enabled the writers to commit less typing mistakes and to better perceive them. In the FLNpl, for which the participants took more time than for the L1Npl (Chapter 5.3.2), they were less successful in detecting and correcting typing mistakes: in the final L1Npl the rate of characters without typing mistakes lies at 50.75, whereas in the FLNpl it is 46.09.

With respect to typing mistakes, one can therefore conclude that although the revisions of typing mistakes were proportionately more important in freewriting than in note-taking, they were evaluated as being less important in the L1 than they were in the FL, whereas in note-taking the participants' monitoring worked more efficiently in this respect in L1 than in FL. This underlines the fact that the participants used writing for idea generation differently in L1 than they did in FL, and at the same time that the participants were better able to monitor different aspects of the writing processes in note-taking in their L1 than they were in the FL.

7.4.4 Revisions of *content* in planning

The rates of revision in the category *content* differ primarily between the planning conditions. Whereas in note-taking, the revision rate in this category is 28.68% in the L1Npl, and 33.33% in the FLNpl, in the freewriting condition the rate is 12.82% in the L1Fpl, and 12.79% in the FLFpl. This difference is the result of the demand that the participants should not revise the text written thus far in freewriting, and as a consequence

even those ideas which the writers evaluated as being worthless and which were deleted in notes (or not written down at all), were not deleted, but were commented on (e.g.: *not related to the topic* iPhone: FLFpl) or the participants simply changed the topic and brought in a new idea.

Table 7.8 shows that in the plans, the ranking of revisions in the subcategories of *content* differs from the distributions of *content*-revisions in total. The majority of revisions are located in *information* in all plans (L1Npl: 41.03%, FLNpl: 50.55%, L1Fpl: 48.72%, FLFpl: 66.67%), and *wording* takes the second rank in all texts but the FLNpl (L1Npl: 25.64%, FLNpl: 18.68%, L1Fpl: 38.46%, FLFpl: 23.33%). In the note-taking essays, the proportion of *numbering* is identical in both languages (23.08%), and it either takes the third rank (L1Npl) or the second rank (FLNpl). *Sentence structure* is of comparatively low importance (L1Npl: 10.26%, FLNpl: 6.59%, L1Fpl: 12.82%, FLFpl: 10.00%). A revision of text structure took place exclusively in the FLNpl: 1.1%.

	L1Npl	FLNpl	L1Fpl	FLFpl
Information	41.03	50.55	48.72	66.67
Wording	25.64	18.68	38.46	23.33
Sentence structure	10.26	6.59	12.82	10.00
Text structure	0.00	1.10	0.00	0.00
Numbering	23.08	23.08	0.00	0.00

Table 7.8 Distribution of revisions in the subcategories of *content* in planning

The proportions of revisions in *information* were distinctly lower in note-taking than in freewriting, and in both planning conditions, the proportions of revisions in *information* were higher in the FL. The former is the result of the goals of planning by note-taking, in contrast to those of planning by freewriting. In the notes, only the relevant ideas were to be fixed on paper/on screen. Since the writers made more and longer pauses, it can be presumed that in these pauses they evaluated the ideas, and more often mentally deleted irrelevant ideas and substituted them with more appropriate ones before they wrote them down. Still, one could see that the participants moved inside the notes, and added thoughts to ideas that were generated before. These movements imply that during the pauses the writers read the source texts and consciously searched for ideas. In this way, one can say that generating ideas in note-taking works less linearly than in freewriting, in which the writers usually 'discussed' one idea to a certain depth and then went on to another idea which was often triggered by the one dealt with before.

The fact that the subcategory *information* was more in focus of revision in the FL than in the L1 might be the consequence of the less dense network between the semantic

and FL-phonological/orthographic structures: the activation of the phonological and orthographic structures activates more phonological/orthographic and semantic instances via the interfaces in the L1 than in the FL, and more new ideas are generated (see Hino, Lupker and Taylor 2012: 1267, Schneider 2000: 320). In this process, related nodes are triggered more automatically and faster in the L1, and not as much 'jumping' between the ideas is required. This indicates that writers need less cognitive resources in the planning process in their L1 than in the FL, which enables them to evaluate the generated ideas before writing them down. Consequently, less revision of *information* was needed.

In contrast to this, all ideas in freewriting that came to the writers' minds are pinned down in order to activate the semantic network. This has the advantage of stopping ideas that are not goal-oriented from 'lingering' in the mind with the help of writing them down. Because of this, the revision of *information* in the freewriting process was in many cases the deletion of words in order to add more content to an idea just written down. When one looks at the revisions that were performed in *information* in the FLFpl, it seems that the triggering of ideas by writing worked a little more delayed than in the L1Fpl, and that because of this, the participants more often felt the urge to set new, but related generated content in, although they were already in the process of formulating another idea.

In the subcategory *wording*, a slightly higher proportion of revisions was performed in the L1Npl than in the FLNpl or L1Fpl. The lowest percentage of revisions in *wording* took place in the FLFpl. In the L1Npl, the participants were eager to find words that contained as much information as possible. Additionally, wording was revised with respect to 'genre-adequateness', and the participants changed German words to foreign words. That is, the participants were keen on using genre-adequate words already in the plans, which should in turn make the formulating of the essays easier. In doing this, the participants could influence the quality of the final text, since they could decide on a different text structure or on another focus when they were not able to formulate their ideas adequately in planning. In freewriting, this refinement of wording in planning did not take place, and in the FLFpl, one can see that the participants had difficulties in finding the right words, but since they were asked not to pause, they more often solved this problem by either code-switching or by adding "...", instead of providing alternative words.

Revision of *sentence structure* in planning was less relevant. It was highest in the L1Npl and lowest in the FLFpl. In note-taking, revision of sentence structure was higher in both languages. It was most often used in order to put the keywords at the beginning of the notes, which is more feasible in German than in English, since the word order is less

restricted because of the declinations. In the freewritten plans, the participants often broke sentences off instead of restructuring them when a new idea came up (*okay, let's start the media and violence mh… i don't know… so there is some sort of link but it seems that many studies don't stop to think…* – Siebenmorgen: FLFpl).

Revisions in *text structure* could only take place in the notes because no movements inside the texts were allowed in freewriting. All in all, there was only one revision in *text structure* (Babs' FLNpl). The revision was a rather superficial one: A point in the list which was marked by a dash as a subargument of another argument, was raised to a higher level of argumentation by deleting this dash, thus making it an argument rather than a subargument.

The 'real' restructuring in the plans happened in numbering the notes. The revision of *numbering* was higher in the FLNpl than in the L1Npl which could be the effect of the higher cognitive demands of FL writing, which made the participants generate ideas and write them down in a better ordered way in the L1 than in the FL (which was also seen in the lesser proportion of revisions of *information*). However, the proportions in *numbering* are misguiding, since (a) only five of the participants revised numbering in the FLNpl, and in the L1Npl it was only two out of ten. Thus, for those who executed revisions in *numbering*, it was done more elaborately in L1 than in FL. Siebenmorgen and Owlet, who renumbered the L1 notes, revised the order more extensively in the L1 than the participants who revised *numbering* in the FL. This could be an indicator of these writers' belonging to the writing type of *Mozartians*, who cannot start to write a text before the whole structure is clearly laid out. Both did not number their ideas in the FL which might be the result of a different writing approach in FL writing. In Owlet's FL case, for example, the notes were open questions. Here, the impression arises that she started to write the FLN without a clear plan. Both also generated a distinctly lower number of ideas in the FLNpl than in the L1Npl, which led to a higher need for pre-structuring in the L1 than in the FL.

In summary, in *content* revision the participants needed to revise *information* less in the L1 than in the FL in planning because of the greater cognitive demands of writing in the foreign language and the less densely structured cognitive-phonological network in the FL. In the L1, the writers were better able to generate related ideas, which made the generation of a coherent text easier; and they were better able to evaluate the ideas before writing them down. The participants additionally had a higher tendency in the L1Npl to try to express the generated ideas as precisely as possible already in the note-taking condition. This was helpful for the formulation process of the essays to be written because, as a

consequence, the writers already had some appropriate terms at hand, which relieved the working memory in formulation. In the FL, the writers met more problems in executing these processes in parallel.

In the freewriting condition, the differences between the L1 and the FL are not as distinct as in the note-taking condition. Here, the writers conformed more to the demands of the freewriting assignment with respect to revision. However, one can notice the writers' tendency to pay less attention to the quality of the wording in the FLFpl than in the L1Fpl, which indicates that the writers had a higher aspiration to write genre-adequately in the L1-plans even during freewriting, whereas in the FLFpl, the parallel generation of ideas and their formulation required too many cognitive capacities to give the writers the facilities to use the planning process as a preparation stage for accurate formulating.

7.4.5 Revisions in *miscellaneous* in planning

In the category *miscellaneous*, the main part of revisions was executed in the subcategory *others* (L1Npl: 1.3, FLNpl: 2.3, L1Fpl: 1.5, FLFpl: 1.00, Table 7.9), i.e. they were the results of writing words, judging the words as being inappropriate or not fitting the intended meaning, deleting them, being unable to find a more appropriate formulation/idea, and to set in the same word again. In the other subcategories the number of revisions are very low (*grammar*: L1N: 0.1, FLN: 0.1, L1F: 0.1, FLF: 0.4, *orthography*: L1F: 0.3, FLF: 0.1). Only in punctuation, is there a slightly higher number of revisions in the L1Npl (0.9); in the FLNpl it is on average 0.3, in the L1Fpl it is 0.4, and in the FLFpl it is 0.1.

	L1N plan	FLN plan	L1F plan	FLF plan
Grammar	0.10	0.10	0.10	0.40
Orthography	0.00	0.00	0.30	0.10
Punctuation	0.90	0.30	0.40	0.10
Others	1.30	2.30	1.50	1.00

Table 7.9 Distribution of revisions in *miscellaneous* in planning

One can, therefore, conclude that in planning, the linguistic revisions that were made in the FL, which were not typing mistakes or the result of the influence of the L1, but were rooted in other factors (e.g. the adaptation of punctuation to an altered sentence structure) are negligible. The higher rate of revisions in the subcategory *others* shows that the participants used the written form in some cases for evaluating their ideas or formulations or for word-finding. If one takes into account that less words were executed in the notes, it becomes obvious that the formulation in the FLNpl was more strenuous than in the other conditions, which is the result of the less highly activated FL structures in note-taking and

the more highly activated L1 structures. As opposed to the L1Npl, the writers were less often able to find alternatives directly, but had to content themselves with the words that were evaluated as being inappropriate. In the FLFpl, the writers were less keen on the ideal formulation for the intended meaning, but concentrated more exclusively on the generation of ideas, which supported the fluency of the production process (Chapter 5.4.3). This positive effect of freewriting on fluency was taken over to the formulation of the body.

In the analysis of the revisions in planning, it becomes obvious that the writers performed the planning process differently in the L1 and in the FL, and that they set different foci in the different languages and under the different planning conditions. This hints at an interdependence of language and thinking which becomes enforced under the condition of freewriting that explicitly uses language for the thinking process. This interdependence does not necessarily have an influence on the qualitative aspects of the thinking process (with respect to more linear thinking in more linear languages), but has an influence on the efficiency of thinking. The FL inhibits the thinking process through the extra demand of mentally formulating the ideas with the help of a less densely built linguistic network, in which not as many associations and linguistically induced knowledge is triggered as is done in the L1.

7.5 Revisions in the process of writing the proper essays

In the writing of the academic texts, the participants had to concentrate on performing the task in a genre-adequate structure and on using a language style that is appropriate. Because of this, it was expected that the participants would concentrate more on linguistic aspects in this production process than they did in planning. Since they activated the FL interfaces more strongly in the FLFpl, it was also expected that less difficulties would occur for example with respect to wording in writing the FLFpe, but that, because of the higher productivity, again more typing mistakes would have to be revised.

As opposed to the revisions in total and the revisions in planning, there is no regular pattern between the number of revisions in the different languages and in the different planning conditions of the academic texts. More revisions were performed in the L1, and less in the FL. In the L1 the revision rate is higher in the writing of the L1Fpe than in the L1Npe, which is the reverse in the FL essay production (Table 7.10).

	SEpe	L1Npe	FLNpe	L1Fpe	FLFpe
Total number of revisions	84.10	135.90	127.00	150.70	123.30
Phonological node-switch	1.30	0.30	1.70	0.10	1.40
Orthographic node-switch	4.20	4.10	5.00	4.60	5.20
Punctuation node-switch	1.20	0.00	1.60	0.20	1.30
Syntactic node-switch	1.20	0.00	1.80	0.00	2.40
Semantic node-switch	0.10	0.60	0.50	0.10	0.50
Genre node-switch	0.10	1.40	0.90	0.70	1.10
Code-switch	0.40	0.30	0.10	0.00	0.30
Typing Mistake	52.60	78.60	72.90	95.40	70.50
Miscellaneous	7.90	16.20	15.20	20.70	14.40
Content	21.40	43.60	34.30	37.70	32.80

Table 7.10 Mean number of revisions in the different categories in proper-essay writing

However, when one takes the numbers of characters produced into account, there is again a relationship between the languages and between the planning conditions: In the SEpe, the participants produced 28.04 characters without revisions. In the L1Npe, they executed 35.02 characters without revision, in the FLNpe 29.74, in the L1Fpe 37.51 and in the FLFpe 36.47. That is, in the note-taking condition the characters-per-revision rate was lower than in the freewriting conditions, and in the L1 less revisions were made than in the FL (see also Stevenson, Schoonen, and de Glopper 2006: 223), although the difference between the L1Fpe and the FLFpe is low. It is interesting to see that the characters-per-revision rate is lower in planning with the help of notes than in the formulating of the essay: 28.78 characters without revisions (plan) to 34.24 (proper essay) in the L1N, and 23.17 characters without revisions (plan) to 29.99 (proper essay) in the FLN. In the L1F and FLF, the rate of characters per revision is the reverse: 49.12 (plan) to 32.27 (proper essay) in the L1F, and 42.78 (plan) to 32.68 (proper essay) in the FLF.

Expectedly, the number of revisions of *typing mistakes* was the major revision type in all essay production processes (SEpe: 58.19%, L1Npe: 54.17%, FLNpe: 54.4%, L1Fpe: 59.81%, FLFpe: 54.27%, Fig. 7.8). As in the planning process, other relevant categories for revision were *content* (SEpe: 23.67%, L1Npe: 30.05%, FLNpe: 25.60%, L1Fpe: 23.64%, FLFpe: 25.25%) and *miscellaneous* (SEpe: 8.74%, L1Npe: 11.16%, FLNpe: 11.34%, L1Fpe: 12.98%, FLFpe: 11.09%). Additionally, *orthographic node-switches* were revised to a noticeable extent (SEpe: 4.65%, L1Npe: 2.83%, FLNpe: 3.73%, L1Fpe: 2.88%, FLFpe: 4.00%). The distribution of the revisions in the subcategories of *orthographic node-switches* corresponds to the ones in total.

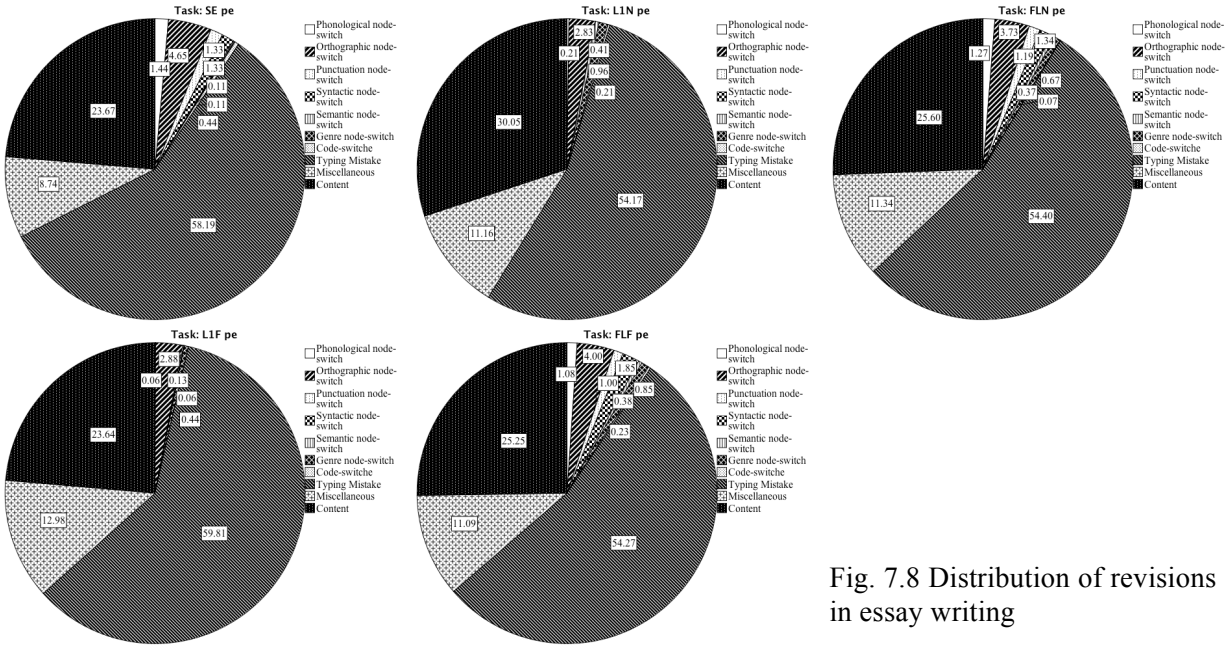

Fig. 7.8 Distribution of revisions in essay writing

Genre revisions also took place in all of the academic texts, however only at a low level (SEpe: 0.11%, L1Npe: 0.96%, FLNpe: 0.67%, L1Fpe: 0.44%, FLFpe: 0.85%). In the L1, these revisions were located exclusively in the *language independent* revision of node-switches (e.g. the participants replaced a vernacular German word with a foreign word), whereas in the FL conditions, the influence of the Teutonic academic genre was more often the incentive for revisions than the language independent genre node-switches: in the FLNpe 66.67% and in the FLFpe 73.73%. For example, Siebenmorgen decided to hedge a statement in her FLF with the help of *may*, whereas the sentence in the English academic genre would have been written as an indicative sentence (*However, even with this unclear conclusion from the study, it* ***may be*** *better to "play safe"*, instead of her first version *...it* ***is*** *always better to play safe*.).

Overall in FLN writing, more node-switching was revised than in the FLNpl: 8.64% in the FLNpe in contrast to only 3.36% in the FLNpl, whereas the participants in the FLF revised less node-switches in formulating the essay than in its planning (9.39% in the FLFpe vs. 13.12 % in the FLFpl). The rate is still higher than in the FLN. That is, in the process of writing the academic essay, the higher cognitive demands of writing reduced the L1 awareness in the FLF, whereas in note-taking, the higher fluency in essay writing compared to the fluency in planning enlarged it (see Chapter 5.4.3).

The whole proportional distributions of revisions in the different categories vary distinctly between the texts produced after note-taking and after freewriting in the L1, but they hardly differ between the planning conditions in the FL. This indicates that the different planning conditions could be used for a more flexible monitoring in the L1,

whereas the monitoring stayed rather consistent in FL writing. Thus, one can conclude that although fluency was enhanced in FL by the activation of the linguistic structures with the help of freewriting, the participants stuck to their FL writing strategy, which – when one looks into revisions in detail – was not so much a sticking to the L1-writing strategy as was found by van Weijen (2008: 163) and van Weijen *et al.* (2008: 218), but rather a sticking to the individual FL writing strategies.

In the following, the distribution of revisions in *typing mistakes*, *content* and *miscellaneous* in the different tasks will be scrutinized in more detail, in order to examine whether this consistency could also be detected in finer grades.

7.5.1 Revisions of *typing mistakes* in writing the proper essay

The proportions of revisions in *typing mistakes* are similar in the L1Npe (54.12%), the FLNpe (54.4%), and the FLFpe (54.27%). In the L1Fpe, the proportion is distinctly higher at 59.81%. In note-taking, the slower writing processes made the writers commit less typing mistakes in both languages, and less revisions were needed, although typing mistakes still form the largest group of revision types.

In contrast to this, when looking at the number of typing mistakes in the final texts (Chapters 6.1 and 6.4), one sees that the extended revisions of typing mistakes in the L1Fpe did not lead to a higher level of correctness (average number of errors: 7.6) than the revision of typing mistakes in the FLFpe (average number of errors: 5). The higher number of typing mistakes in the L1, in which the finger movements should be more highly automatised than in the FL shows that the acceleration of typing, which was initiated by the freewriting process, led to less accurate executions in the L1. Since none of the participants took much time to read and revise the freewritten plan, but basically continued their writing processes directly after having finished freewriting, it can be presumed that the writers planned and structured the freewriting essays online. The higher productivity and fluency in the L1Fpe also points toward a still active process of idea generation that was induced by freewriting (Galbraith 2009: 117, Menary 2007: 624/625), and because of this, further cognitive capacities were captured by these processes. Due to the high speed and the high cognitive demands, the monitor was not able to detect all typing mistakes, although it made an attempt to do so. It might also be that the writers in the L1 automatically rearranged mixed letters mentally because they are more used to quick reading in their L1, in which the letter combination as a whole is deciphered more efficiently (Dehaene 2009: ch. 2).

In the FLFpe, on the other hand, the slightly slower execution improved the

coordination of the finger movements, and the concentration on more superficial elements in FL writing (Stevenson, Schoonen and de Glopper 2006: 225) also made the participants more aware of FL typing mistakes. This explanation is supported by similar results in the SEpe in which 58.9% of the revisions were located in the category of typing mistakes. Here, the writers produced the highest number of bursts per minute (see Chapter 5.4.1), but they did not plan the texts before writing, and because of the combination of these two factors and the less automatised execution processes in FL typing, more typing mistakes occurred.

7.5.2 Revision of *content* in writing the proper essay

When one looks at the total number of revisions in *content*, the majority of revisions were performed in L1Npe (43.60), followed by L1Fpe (37.70), FLNpe (34.30), FLFpe (32.80), and SEpe (21.40). The L1Npe has the highest percentage of revisions in *content* (30.05%), but the L1Fpe has the lowest percentage of revisions in *content* (23.64%). This is the consequence of the exceedingly high number of revisions of typing mistakes in L1F text production. If one excluded these revisions, the ranking would change again: L1Npe: 45.99%, SEpe: 42.86%, L1Fpe: 41.98%, FLF: 40.74%, and FLNpe: 39.64%. One can, therefore, state that the highest focus of cognitive capacities on *content* is taken in the L1Npe, a task type in which the students felt most at home, followed by the simple task, and then the L1Fpe. It is lowest in both FL conditions.

	SEpe	L1Npe	FLNpe	L1Fpe	FLFpe
Information	12.30	19.50	17.60	19.10	18.30
Wording	6.00	17.80	12.00	13.30	9.90
Sentence structure	2.90	6.10	4.20	4.90	4.50
Text structure	0.20	0.70	0.50	0.80	0.60
Numbering	0.00	0.20	0.20	0.00	0.00

Table 7.11 Mean number of revisions in *content* in writing the proper essay

Table 7.11 presents the average number of content revisions in the different subcategories. The ranking of the subcategories is the same in all assignments, however the proportions differ distinctly (Fig. 7.9).

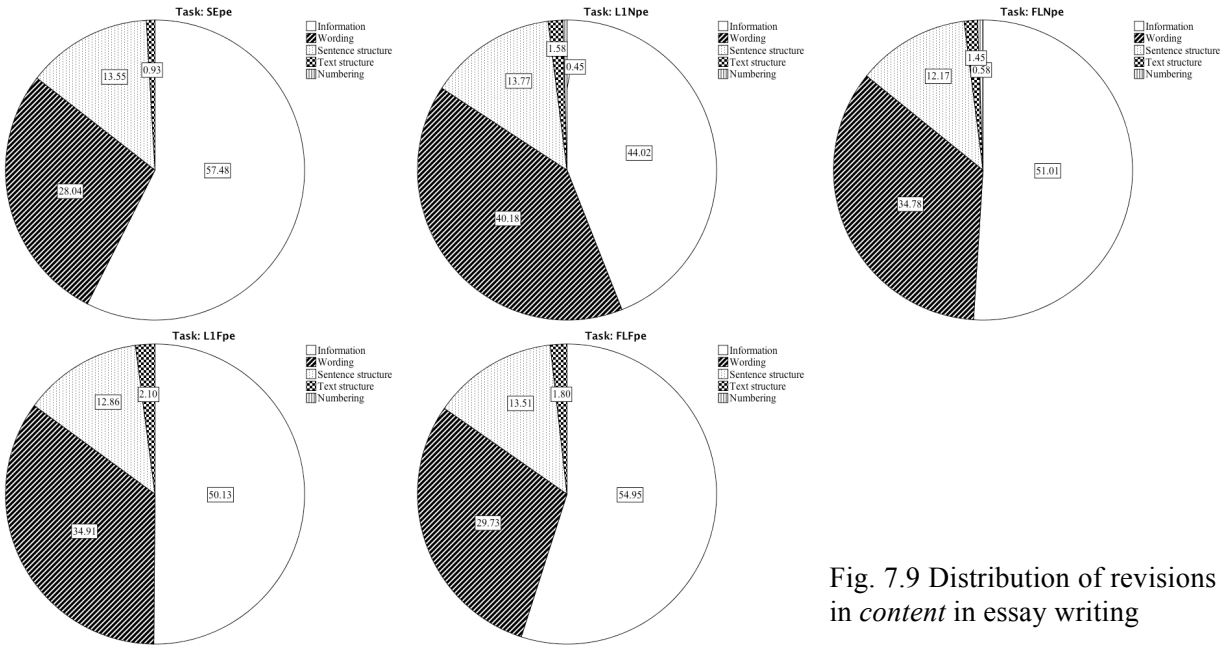

Fig. 7.9 Distribution of revisions in *content* in essay writing

In the L1Npe, the revision of *information* only takes 44.02% of content revisions, whereas more than 50% of the revisions were executed in this subcategory in all other conditions (SEpe: 57.48%, FLNpe: 51.01%, L1Fpe: 50.13%, FLFpe: 54.95%). In each language, the focus on *wording* was higher in the note-taking conditions (L1Npe: 40.18%, FLNpe: 34.78%) than in the freewriting conditions (L1Fpe: 34.91%, FLFpe: 29.73%), or in the SEpe (28.04%). That is, there is a symmetric effect of the planning conditions on the content revision processes in both languages.

In the subcategory *sentence structure*, the effects of the planning methods on essay production differ between the L1 and FL. In the L1, slightly more revisions were made in the note-taking conditions (L1Npe: 13.77%, L1Fpe: 12.86%), and in the FL slightly more revisions were made in the freewriting conditions (FLNpe: 12.17%, FLFpe: 13.51%). In the SEpe, *sentence structure* makes 13.55% of revisions in *content*. Hardly any revisions concern *text structure* (SEpe: 0.93%, L1Npe: 1.58%, FLNpe: 1.45%, L1Fpe: 2.10%, FLFpe: 1.8%). Interestingly, there are revisions in *numbering* in the formulation of the essays: 0.45% in the L1Npe, and 0.58% in the FLNpe.

In all texts but in the FLFpe, proportionately more revisions were made in the subcategory *information* than were executed in planning. In note-taking, this is the result of the rather short plans of some of the participants. Beside Sarah, they often only scribbled down the central topics of their texts. That is, during the formulation of the essays, the participants had to decide on the arguments they would give, or on evidence for their positions. In many cases, changes in *information* were elaborations of the points they had just written down.

The results in the FLFpe are exceptional, since the revision of *information* was 11.72% lower than during the planning process. In the L1Fpe, the focus on *information* was slightly higher in the essay writing than in the process of planning. When one looks at the revisions that were made in the L1Fpe, it seems that they are the consequence of the higher employment of monitoring which evaluated the information written down in terms of their task appropriateness. In the FLFpl, on the other hand, the revision of *information* was remarkably high, which might have been the result of a slightly delayed activation of content generation by FL writing (Chapter 7.4.4). In the formulation of the academic essay, the participants slowed their writing process down, and because of this, they were better able to evaluate whether there were still arguments they wanted to add to the text, than they were in the less monitored freewriting process.

Still more revisions in *information* were made in the FL than in the L1, which is probably the result of the different cognitive demands that FL writing puts on the writers. In the L1, the participants were better able to pre-plan larger text parts, and because of this, they were better able to evaluate which content should be provided, and whether the amount and the type of information given would be text adequate. The fact that more revisions of *information* were needed after freewriting than after note-taking might be an indicator that thinking through writing was still in process during the formulation process, and that the participants more often used the written text to evaluate the content and its appropriateness than in note-taking, in which the participants paused more often in order to decide on the information to be provided next.

In the academic essays, *wording* became more important in essay writing compared to planning. Only in the L1Fpe were less revisions of *wording* made in the process of essay writing. This shows that the different planning conditions had an impact on the formulation processes, and that this impact differed in the L1 and in the FL. The structured planning and the small amount of formulation during planning with the help of note-taking made the participants focus more on the precise formulation of the keywords, but left them with the problem of elaborating these ideas in essay writing. In the FL, the participants still made distinctly less revisions in *wording* than in *information* in comparison to L1-writing. Because the participants in the L1 were better able to evaluate the content provided with respect to sufficiency and appropriateness before writing it down, they evaluated the written text more in terms of linguistic appropriateness. At the same time, the unstructured way of planning and the higher activation of formulating in freewriting in both languages made the participants work more fluently in the formulation of the texts, but left them with

deciding on the appropriateness of the *information* that they wanted to provide. This effect is even higher in the FL, in which parallel processing is more demanding than in the L1 (see also Ong and Zhang 2010: 229/230).

Still, in all academic texts it is obvious that the participants recognised style as being important in both languages. More revisions in *wording* were made than in the SE. Since no pre-planning was conducted in the SE and the linguistic style was not evaluated as being of high importance, the writers focused their cognitive capacities distinctly more on *information* in their revisions than on *wording*. As with speaking, they added information when it came to their minds, or they deleted it because of the feeling that it was too intimate.

In the subcategory *sentence structure*, the variations between the tasks are slight, and one must be careful with generalising the findings. It is note-worthy that *sentence structure* was revised most in L1Npe, and least in FLNpe. In the L1Npe, the result conforms to the higher revisions of wording, which indicates that the writers were more concerned with style and semantically accurate linguistic representations of their intended meaning. In the SEpe and the FLFpe, the higher number of revisions of sentence structure might be the result of still having to order their ideas during the writing process, because the writers did not explicitly plan the structure of the texts to be produced. The slightly lower number of revisions of sentence structure in the L1Fpe proves that because of the strong activation of the linguistic structures with the help of freewriting, the participants were better able to master the coordination of the parallel writing processes in their L1. If one compares the results of grammatical errors in the L1 in the final texts (average number L1Npe: 3, L1Fpe: 2.2), one sees that the participants were indeed better able to perform correct syntax in the L1Fpe, whereas in the L1Npe the proportionately higher revision of *sentence structure* and the higher number of rewording resulted in a grammatically less accurate text. Thus, one can evaluate the higher number of revisions in these aspects as being rather contra-productive to language quality.

In the FLFpe, the revisions in *sentence structure* had a similar effect as in L1Npe, in that the number of syntactic node-switches in the final texts is higher than in the FLN-texts (29.16% to 25.30%, see Chapter 6.4), which shows that the higher number of revisions in syntactic structure did not have a positive effect on the syntax. It seems that, because of the demands of structuring the paper in the FLF during the writing process, the participants were more eager to add information into the sentence using L1 syntactic rules, which in the case of German syntax are more suitable for an embedded presentation of

content. That is, in the most distinct task conditions, similar processing could be made out.

Despite the expectation that *text structure* revisions would be more dominant in the essay writing process than in planning, and that they would be very important after freewriting, the revision of *text structure* is rather irrelevant. Although the participants performed more revisions of *text structure* in freewriting condition than in the note-taking condition, and the revision-rates were higher in the L1 than in the FL, the number of revisions was low overall. In addition, if one looks at the rates of the individual writers, one sees that no reliable conclusions can be drawn from the overall results: the generation of structure is performed differently by the individual writers. Whereas James did not revise the text structure once, Siebenmorgen revised it in all texts, but in the FLFpe. Six of the participants revised the text structure in the L1Fpe, whereas in the L1Npe only five did so (three of whom also revised the text structure in L1Fpe). In FLFpe, only two participants revised the text structure. The higher proportion of text structure revisions in this context was purely the result of Gio's 'elaborated' text-structure revision of four instances, while in the other contexts the participants revised the text structure only up to two times. The scope of the revisions in *text structure* also differs extensively. Some of the participants simply divided one paragraph into two, and with this restructured the text visually, whereas others added up to three paragraphs into the text written thus far, and with this, changed the argument completely.

Interesting are Siebenmorgen and iPhone, in that they changed *numbering* in the plan while writing the L1Npe (Siebenmorgen) and the FLNpe (iPhone) in order to make the plan fit the text (and not *vice versa*). In contrast to the other participants who also did not necessarily work according to the plan, both decided to stop the essay writing process and to rather revise the plan than to focus on the production of the text to be evaluated.

In summary, one can say that in the two major subcategories of *content* – *information* and *wording* – the different planning conditions had similar effects in the L1 and in the FL academic texts, whereas the differences between the revisions after note-taking and freewriting are higher in the L1 than in the FL. This supports the theory that writers are more effective in using flexible methods in L1 than in FL writing (van Weijen *et al.* 2008: 218).

7.5.3 Revision of *miscellaneous* in writing the proper essay

The average number of revisions in the category *miscellaneous* differs distinctly between the SEpe (lowest), the L1Npe, the FLNpe, and the FLFpe (middle) and the L1Fpe (highest; Table 7.12).

	SE	L1N	FLN	L1F	FLF
Total	7.90	16.20	15.20	20.70	14.40
Grammar	0.90	1.50	2.50	2.00	1.90
Orthography	0.10	1.10	0.30	1.60	1.00
Punctuation	0.80	3.50	2.30	3.00	1.40
Others	6.10	10.10	10.10	14.10	10.00

Table 7.12 Mean number of revisions in *miscellaneous* in essay writing

This impression does not change if one looks at the proportional distribution of the revisions: SEpe: 8.74%, L1Npe: 11.16%, FLNpe: 11.34%, L1Fpe: 12.98%, and FLFpe: 11.09%, although the difference between L1Fpe and the results in the other academic essays becomes less prominent.

The proportion of revisions in the subcategory *others* was highest in all conditions. In the SEpe, they made up 77.22%, in the L1Npe 62.35%, in the FLNpe 66.45%, in the L1Fpe 68.12%, and in the FLFpe 69.93% (Fig. 7.10). The proportional ranking of the other subcategories differs. In the SEpe and in the FL texts, *grammar* was the second most important category (SEpe: 11.39%, FLNpe: 16.45%, FLFpe: 13.29%), whereas *grammar* takes the third place in the L1 (L1Npe: 9.26%, L1Fpe: 9.66%). Revisions in *punctuation* are more dominant in the L1 (L1Npe: 21.60%, L1Fpe: 14.49%), making up 10.13% in the SEpe, in the FLNpe 15.13%, and in the FLFpe: 9.79%. Hardly any revisions in *orthography* were made in the SEpe (1.27%) and in the FLNpe (1.97%), whereas in the L1Npe 6.79%, in the L1Fpe 7.73% and in the FLFpe 6.99% of the revisions are located in *orthography*.

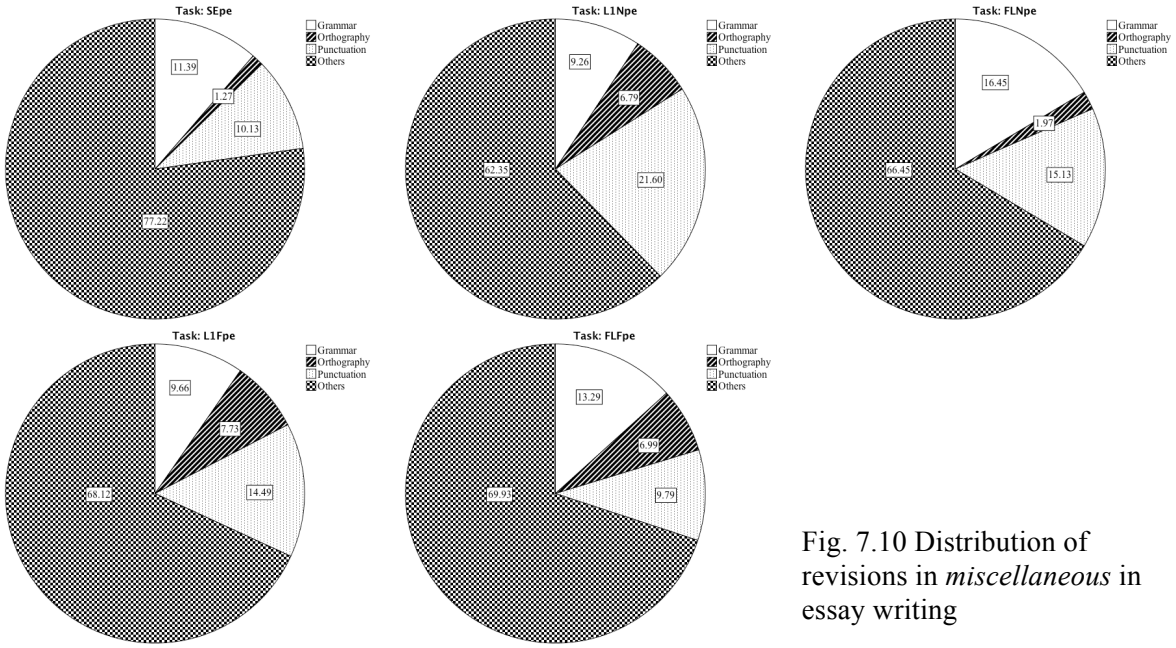

Fig. 7.10 Distribution of revisions in *miscellaneous* in essay writing

In the SEpe and in the freewriting essays, the proportion of *others* is stronger than in the note-taking essays, and it is more relevant in the FL essays than in the L1 essays. In the SEpe, this was predictable, since the participants planned what they were going to write when writing it. Furthermore, the high rate in *others* resembles the search for words in the production of speech (Myachykov, Tomlin, and Posner 2005: 358). In the L1Fpe and the FLFpe, the proportions of *others* are distinctly lower than in the SEpe (with only a slight difference between L1 and FL), but they are still distinctly higher than in the note-taking conditions. In some cases, the participants needed more than one revision in this subcategory, before either finding better formulations or before resigning themselves to the words that they had written down. In other cases, they wrote down ideas that came to mind, and only in doing so did they start to evaluate whether these ideas were text adequate or not. That is, they showed a higher keenness for using writing for thinking after freewriting.

In the note-taking condition, the slower processing made the participants slightly more adept to evaluate the text mentally and to find a better formulation or better fitting content without 'communicating' with it on the screen. Since the participants made more pauses in the note-taking condition, it can be presumed that the planning and mental evaluation took place in these pauses, whereas the participants made more use of working with the external factor of the written text in freewriting. In the L1Npe, this impression is supported by comparing the revisions of *miscellaneous* and *content*, in which one sees that the participants made proportionally more revisions in *content* than in *miscellaneous*, which points at a different use of the interaction between written and mental texts in note-taking and in freewriting.

In the L1, the proportion of revisions in *punctuation* differs distinctly between the planning conditions, since the participants executed more revisions in *sentence structure* in the L1Npe than in the L1Fpe, which often had an impact on punctuation. However, what is remarkable, is that the higher frequency of revision of sentence structure did not result in a higher number of revisions of grammar. This was to be expected in German, since because of declinations, changing the noun into a dative or accusative object has a consequence on the phonological and the orthographic representation. The cacophony between revisions resulted in a relatively high number of grammatical errors in the L1N final essays (see Chapter 6.1), whereas in the L1F-essays the participants were more successful in adjusting the grammar to the requirements that revisions of content (*information* and *sentence structure*) posed on the texts.

As was shown in Chapter 6.4, only a low number of linguistic errors occurred in the FL final essays that were not rooted in the L1, but that were the result of other factors, which put the writers in a state of interlanguage. Looking at the numbers of errors in the subcategories of *miscellaneous* (Chapter 6.4.9), one notes in *grammar*, that the higher number of revisions in the FLNpe resulted in a lower number of grammatical errors that were not rooted in the L1 in comparison to the FLFpe. In contrast to this, the higher number of revisions in *punctuation* in the FLN-essay writing did not result in less errors in punctuation in the final texts, but here the number of errors in the proper essays was distinctly higher in the FLN than in the FLF. This result is even more astounding when one takes into account that there were (slightly) less revisions of *sentence structure* in the FLNpe. A probable explanation for this phenomenon is a low L1 competency in punctuation (Ickler 2005: 399), and that the punctuation errors in the FL were the result of the (warped) influence of L1, in that the participants missed these competencies and worked according to their 'individual rules' of punctuation.

Generally, the results of the analysis of the revisions that the participants executed during the writing process of the proper essays show that the writers worked differently in the L1 and the FL, and also after the different planning conditions. In all text types, the categories that were monitored most closely are the same: *typing mistake*, *content* and *miscellaneous*. However, the distribution in the subcategories varies between the planning conditions, and it often varies more between the L1 and the FL, which indicates that the participants were better able to use their cognitive capacities flexibly in the L1 and that the planning concepts had a stronger effect on their methods for dealing with the writing processes in L1 than in FL.

7.6 Revisions in the final revision

Findings in tests on text quality (e.g. Becker 2006: 40−44) show that revisions are of high importance in order to achieve a good assessment. In FL writing, this effect is better if the writers revise *after* text production than *during* text production (Chenoweth and Hayes 2001: 94). Because of this, the analysis of the final revisions is of special interest, since it shows in which areas the writers were keen on enhancing the texts, and whether the participants focused their cognitive capacities more on surface level, or on revising content and structure in order to improve the texts in deeper than the cosmetic aspects (Chanquoy 2001: 21, Faigley and Witte 1981: 402 ff.).

As noted in Chapter 5.3.2, not all participants were able to revise their texts after the production process due to a lack of time: in the SE, three participants made revisions, in the note-taking essays seven participants did so, and eight did so in the freewriting essays. The participants who made revisions differ in the tasks. The only one who did not have time for a final revision in any condition was Gio. The time the individual participants had left for the revising processes also differed distinctly – individually and between the different tasks. Therefore, it would be false to conclude that the fact that there were more final revisions in the FLF than in the L1F, and less in the FLN than in the L1N is a result of the different need for revisions in the texts or of the different methods that were used, since the comparability of the results is not given. Because of this, only a short overview of the results will be given in the following.

One general conclusion can be drawn, however: under the stressful condition of having to cope with the cognitively demanding tasks of writing an academic essay in a strict time frame – be they L1 or be they FL – the participants acted more like novice writers in nearly all of the essays, in that they spent most of their time on planning and on formulating, which means that they were not as efficient in their time management of text production as professional writers would be, who put more effort into revision (Manchón and Roca de Larios 2007: 580, Rijlaarsdam, Couzijn and van den Bergh 2004: 192). The participants were more eager in this aspect in the FLF than in the FLN, the L1N and the L1F. With respect to time-management, one can therefore conclude that the higher productivity in the L1F had the negative effect that, although the participants produced more text in less time, they seem to have lost the consciousness for the requirement of revisions, and rather handed the essay in as is, than enhance it, whereas in the FLF, the participants were more keen on revising.

	SEr	L1Nr	FLNr	L1Fr	FLFr
Total number of revisions	11.75	10.86	7.80	15.00	18.00
Phonological Node-switch	0.00	0.00	0.00	0.00	0.11
Orthographic node-switch	0.75	0.00	0.00	0.13	0.44
Punctuation node-switch	0.00	0.00	0.40	0.00	0.00
Syntactic node-switch	0.25	0.00	0.00	0.00	0.33
Semantic node-switch	0.00	0.00	0.00	0.00	0.11
Genre node-switch	0.00	0.00	0.00	0.13	0.11
Code-switch	0.00	0.14	0.00	0.00	0.11
Typing Mistakes	5.25	3.14	2.80	3.88	5.22
Miscellaneous	2.50	1.71	0.80	3.00	2.33
Content	4.00	6.00	3.80	8.50	9.78

Table 7.13 Mean number of incidents of final revisions in the different categories

Table 7.13 gives an overview of the number of revisions in the different categories. Only the results of the participants that actually made revisions after the production process were included, in order to generate a more adequate picture of the relations of revisions between the writing tasks.

The writers' focuses differed considerably in the different tasks. For one, the total number of revisions varies distinctly between the different planning conditions, as well as between the academic texts and the SE, in which – in relation to the length of the texts – the highest number of revisions was performed (however, only by three participants). This is probably due to the fast production process in the SE and because of this, much enhancement was needed. More revisions were made in the academic texts after freewriting, which is a result of the differing time frames for revision, since more time was left for revisions due to the fast production in this condition than in the slower note-taking condition.

Additionally, there is a variance in the variety of revisions. Revisions were made in all text types in *content*, *typing mistakes*, and *miscellaneous*. In the L1Nr, a revision of *code-switching* was also executed (Siebenmorgen's *Wissenschaftliche Gemeinschaft* → *scientific community*). In the L1Fr, a genre node-switch and an orthographic node-switch were corrected. In the FLNr, corrections in *punctuation* were performed. A wider variety of revisions was performed only in the FLFr and in the SEr: all of the categories beside *punctuation node-switch* were revised, although the revisions of node-switches are still very low. Yet, the fact that more revisions of the L1 induced errors were made in the FLFr suggests that the FL activation effect of freewriting caused an – at least – slightly higher awareness of node-switching. Although this effect did not become visible in the writing of the proper essays, it is (faintly) noticeable again in the revising process. These different results are therefore an indicator for marginally different revision strategies in the FLNr and the FLFr. The participants in the FLFr showed a slightly higher flexibility than in the FLNr in using their cognitive capacities in revising. This higher flexibility can also be seen in the SEr in which a few syntactic node-switches and some orthographic node-switches were revised.

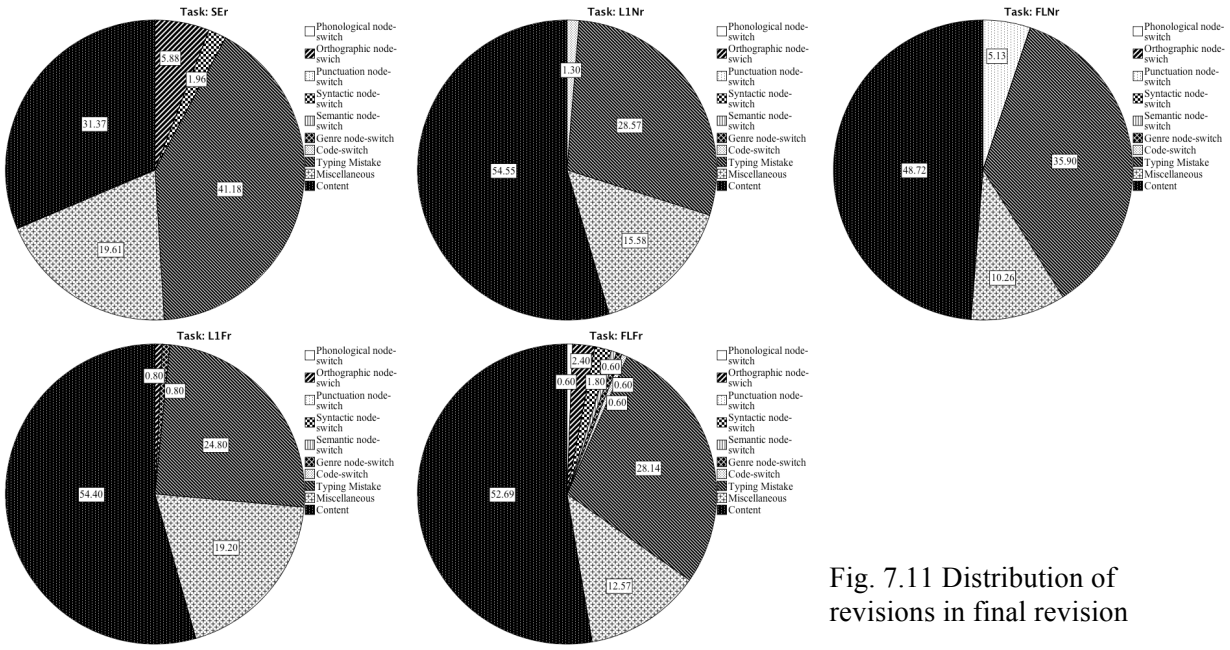

Fig. 7.11 Distribution of revisions in final revision

A difference to the revisions in planning and in writing the proper essays is that the main revision category in the final revisions of the academic essays was not *typing mistakes* (L1Nr: 28.57%, FLNr: 35.90%, L1Fr: 24.80%, FLFr: 28.14%, Fig. 7.11), but the revision of *content*. That is, the participants concentrated on a higher level on the scale of revisions than pure proofreading in all academic texts (see Chapter 3.1.4). Whereas in both L1-essays and in the FLF-essay, the participants executed final revisions of *content* for over 50%, in the FLN-essays, it was 48.72%. In the SE it was only 31.37%. In the SEr, this indicates that the participants were generally quite content with the text produced, and they felt that a deeper revision was unnecessary. It is not clear whether this positive attitude towards the texts in the FLNr also dominated the decision of concentrating the cognitive capacities more on the "cosmetic level" (Bereiter and Scardamalia 1987: 22) than in the other academic texts, or whether this occurred because the participants encountered higher demands on their cognitive capacities in the note-taking essays – which is indicated by the slower processing and the larger amounts of pauses – and because of this were not able to concentrate on the deeper levels more extensively (Hayes 2008: 34). It is also possible that the participants decided more or less consciously on cosmetic revisions because they had too little time to make more relevant changes and to adjust the rest of the text accordingly.

The proportion of revisions of typing mistakes stays high in all conditions, followed by revisions of *miscellaneous* in all text types (SEr: 19.61%, L1Nr: 15.58%, FLNr: 10.26%, L1Fr: 19.20%, FLFr: 12.57%).

In other words: the participants commonly focused on the same aspects in their revisions in L1 and FL and in both planning conditions on category level.

The distribution of the revisions in *content* in the different subcategories (Fig. 7.12) shows that the participants worked differently in this aspect in the different tasks. For one, there is a more general difference between the note-taking essays and the freewriting essays, as well as between the final revisions in the academic essays and the SEr. There is also a note-worthy difference between the L1Fr and the FLFr.

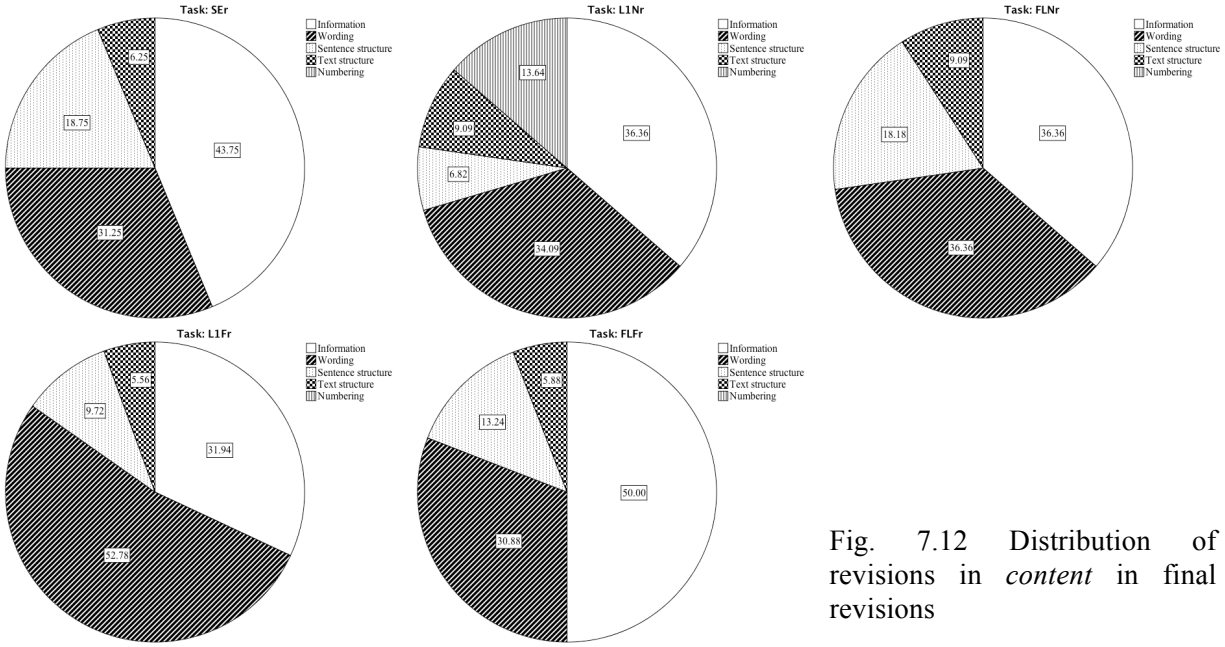

Fig. 7.12 Distribution of revisions in *content* in final revisions

In the SEr, the participants were most concerned with the revision of *information* (43.75%), followed by the revision of *wording* (31.35%), *sentence structure* (18.75%), and *text structure* (6.25%). The revision of *information* mainly had the form of adding some details, which in turn had an influence on the sentence structure. It was expected that the focus on *wording* was lower in the SEr, since the participants were explicitly told that no evaluation of the language standards would be made. Additionally, for those participants that had spent a longer time abroad in English speaking countries, it can be presumed that they felt comfortable and secure in writing in the vernacular language. The participants' eagerness to revise the SE was generally very low (three out of ten), so that one can conclude that the revisions made were not done in a strategic manner, but rather in a superficial attitude of changing what 'struck' one's eyes.

In the note-taking essays, there are no distinct differences between the revisions in the subcategories of *content* in the L1 and in the FL. In *information*, the proportions were exactly the same (36.36%), in wording they were close (L1Nr: 34.09% and FLNr: 36.36%), and in text structure, they were again identical (L1Nr: 9.09% and FLNr: 9.09 %).

That is, the participants concentrated on the same aspects of *content* in the note-taking condition in both languages. There is a difference in the revision of sentence structure, which was proportionately higher in the FLN-condition (L1Nr: 6.82% and FLNr: 18.18%). Since the participants in the L1 had a higher tendency to revise the sentence structure during the text production process, they did not perceive a high need for revision here. Nonetheless, the number of final revisions in the note-taking conditions is too small to draw general conclusions.

Interesting is Marissa's numbering of her ideas in the plan during the final revision in the L1N. It is not clear whether she did this because she had read the assignment after the text production again and had realised that she had forgotten to number the ideas in the notes, or whether she had planned to do so from the beginning, in order to make sure that the numbering of the notes matched the order of the text. Whatever the reason, it is remarkable that she valued this task as being more important than a closer revision of the text she had produced. This indicates that – at least for her – final revision was indeed rather "punitive" (Becker 2006: 25) than rewarding.

The freewriting essays fall out of the parameters of *content* revision in two aspects: for one, the subcategory in which most revisions were made differs distinctly between the L1 and the FL. Whereas the majority of revisions were made in *wording* (52.78%) in the L1Fr, the majority of revisions were made in *information* (50%) in the FLFr. This corresponds to the proportional distribution of revisions in writing the proper essays, in which the participants had already raised their focus on *wording* in the L1 (Chapter 7.5.2). In the final L1F revision, linguistic accuracy became the most important goal for the writers. In the FLF, on the other hand, the participants in the final revision had a greater tendency to realise which content they had missed to include in the texts (which was often the title), and it might be that the offset activation of content generation with the help of freewriting was still going on and thus not as easily imposed in the FL as it was in the L1. Because the participants added content, they also needed a higher revision of sentence structure in order to align it to the content inserted into the text (FLFr: 13.24%, L1Fr: 9.72%).

The final revision of text structure in freewriting was basically the same in both conditions (L1Fr: 5.56 %, FLFr: 5.88 %), and in most cases, revision was just the pressing of the return key in order to visualise the argument structure.

One can therefore conclude that, in the short time frame for final revisions in the note-taking conditions, the writers decided to use the same strategy in the L1 and in the FL,

whereas in the longer time window after freewriting, different strategies were used in the L1 and the FL final revision – in linguistic as well as in content-related revision processes.

7.7 Revisions in p-bursts and r-bursts

In Chapter 5.5.1, it was shown that in the SE and in the FLN more p-bursts than r-bursts occurred, and that the proportion of r-bursts rose in the freewriting condition in the L1 as well as in the FL. Furthermore, one could see that most of the pauses were not used for reading, evaluating and revising the text, but that the pauses were essentially used for planning the sentence/content to come, or were the result of a cognitive overload, which was dealt with by slowing the writing process down. In the following, the distribution of revisions in the different categories which were made after pausing will be analysed (Table 7.14), and the distribution of revisions after which the participants paused will be outlined in the different categories (Table 7.15). It was expected that the errors in the more superficial categories (e.g. *typing mistakes*) would be detected sooner, and that because of this, they were more often corrected directly, whereas the participants would need more time to evaluate *content*. L1 and FL processing would differ with respect to time because the cognitive demands are lower in the L1, and more parallel processing can be proposed.

	%	SE	L1N	FLN	L1F	FLF
Phonological node- switch		0.00	0.00	9.52	100.00	7.14
Orthographic node-switch		8.89	16.00	16.98	7.55	12.86
Punctuation node-switch		25.00	-	33.33	50.00	40.00
Syntactic node-switch		38.46	-	47.37	-	42.42
Semantic node-switch		0.00	14.29	50.00	0.00	37.50
Genre node-switch		0.00	43.75	77.78	37.50	33.33
Code-switch		0.00	40.00	100.00	-	33.33
Typing mistakes		8.23	10.80	11.30	8.31	8.90
Miscellaneous		29.21	38.07	35.52	23.62	28.02
Content		40.87	46.76	54.99	39.18	46.53

Table 7.14 Proportion of revisions after pauses to revisions in total

Table 7.14 illustrates that the minority of error corrections and revisions in most of the categories were executed after p-bursts, which indicates that the participants revised the text produced during the execution process. The proportion of revisions after pausing was lowest in the category of *typing mistakes*, in *orthographic node-switch*, and in *phonological node-switch* (in the L1F only one phonological node-switch revision occurred, which makes the 100% misleading). That is, the more localized errors were – in most cases – detected and corrected immediately. In the L1, this process worked slightly

more efficiently than in the FL (although the results are quite close), and in the freewriting condition the immediate revision of these types of errors worked distinctly better than in the note-taking condition.

Revisions in other categories more often needed time before they were executed or before the errors or weaknesses were detected. In the FLN, the writers paused before revising in more than fifty per cent in some categories. As was expected, revisions in *content* are the ones that were most demanding in all conditions. This indicates that content revision is for one the revising process that demands a high amount of cognitive capacities, and for two that the participants more often consciously evaluated the content provided with respect to task appropriateness. The participants weighed this aspect as being the one of highest relevance for a successful academic paper in the L1 as well as in the FL. The parallel evaluation of content worked far better in the freewriting condition than in the note-taking condition. The participants were more adept to generate and evaluate content after freewriting, which is probably the result of the higher fluency (Baaijen, Galbraith, and de Glopper 2010: 1779, Galbraith, Ford, Walker, and Ford 2005: 138).

Genre node-switch revision and *code-switch* revision were most demanding in the FLN as well. In both categories, the participants needed pausing before revising in over 50% of the cases. This again indicates that the low activation of the FL in note-taking and the higher use of the L1 in planning put a higher demand on the cognitive capacities of the writers than L1 or FL writing that was activated by freewriting. The writing process is by far more laborious in the FLN than in the other conditions, which was not explicitly mentioned by the participants in the questionnaires, however. It seems that they were not aware of being on a "fulltime cognitive overload" (Flower and Hayes 1980: 33).

The participants were more efficient in the FL freewriting condition in directly revising *genre node-switches*, *semantic node-switches*, *syntactic node-switches* and *miscellaneous* than in the FLN. The result in *genre node-switches* was not expected, since it was presumed that the participants would encounter more difficulties in this respect in the freewriting condition, because the academic genre is a further foreign language and it was assumed that in freewriting more vernacular language would be used. As was presented in Chapter 6.4.6, the number of *genre node-switches* was also lower in the final freewriting essays, that is, the participants were better able to cope with the demands of academic writing in the freewriting condition and they were better able to block the Teutonic influences.

The writers were also slightly more efficient in detecting node-switches between L1

and FL syntactic structures after planning by freewriting. Still, although even if the awareness for node-switches was higher in these categories than in the note-taking condition, the participants were not sufficiently successful in detecting and revising linguistic node-switches in the FL condition (Chapter 6.4).

In the L1 academic essays, most linguistic errors were categorized as *miscellaneous*. As in the FL, the revision linguistic errors without former pausing was higher in the L1F, but the error rate of the final texts is also higher. This might indicate that the participants' awareness for errors varied in the text production process: it could be that there were text passages in which the monitoring was less capable of coping with formulation, execution and revision at the same time (for example when generating an argument), whereas at other passages, the monitor was better able to focus on the text produced at the moment – for example, when the writer had already structured the next passage, knew which content to provide, etc. (Kellogg 1987: 256, McCutchen 2000: 19, Olive and Kellogg 2002: 594). Here, an analysis of the independencies of rhetorical structure and revisions is promising.

The only error category that was less efficiently detected in the freewriting condition in both languages is *punctuation node-switch.* Here, the writers needed pausing more often before revision than in the note-taking condition. This could be the result of the students' general difficulties with punctuation. Since even the L1 punctuation system is not inherent for many Germans in the sense that they apply the rules competently and without effort, freewriting and higher fluency had a negative influence on the detection of these errors.

All in all, the majority of revisions were performed in r-bursts, and in most of the cases p-bursts took place because the writers slowed down the writing processes or had to plan the following text passages.

Table 7.15 shows that the need for revisions was not only detected very quickly, but that the revisions also did not seem to be very obstructive for the writing processes. Only in the minority of cases did the participants make pauses *after* revising. They were able to keep the train of thought or the plan for the following passage in mind in most cases, while they were completing the revising processes. In some categories, only in one language or in one condition did pauses occur after revision: There were cases of pausing after the revision of *semantic node-switches* in the L1N, which might have been the result of evaluating the alternative word for its appropriateness. The same might have been the reason for the case in *genre node-switch* revision in the FLF, and the revision of *code-*

switches. Revisions of *orthographic*, *punctuation*, and *syntactic node-switches*, which were followed by pauses, occurred exclusively in the FL. These revisions were of a higher cognitive demand in the FL which, in turn, points at an effort in subduing the L1-influence. As a result, revising has a stronger influence on fluency in the FL than in the L1 (see also Stevenson, Schoonen and de Glopper 2006: 222).

%	SE	L1N	FLN	L1F	FLF
Phonological node-switch	0.00	0.00	0.00	0.00	0.00
Orthographic node-switch	0.00	0.00	1.89	0.00	1.43
Punctuation node-switch	8.33	0.00	11.11	0.00	6.67
Syntactic node-switch	7.69	0.00	5.26	0.00	3.03
Semantic node-switch	0.00	14.29	0.00	0.00	0.00
Genre node-switch	0.00	0.00	0.00	0.00	8.33
Code-switches	0.00	0.00	0.00	0.00	16.67
Typing Mistakes	1.28	2.18	2.94	2.20	3.04
Miscellaneous	14.61	11.17	14.21	6.30	15.38
Content	4.35	5.40	5.76	3.09	5.15

Table 7.15 Proportion of pausing after revisions to revisions in total

Between the planning conditions, there is no fixed pattern between the languages for pausing after revising: In *content* in both languages, less pauses took place after revision in freewriting, which suggests that the activation of content generation had a positive effect in L1 as well as in FL writing. In typing mistakes, more pausing after revisions occurred in the FL. The proportion of pauses after revision in *miscellaneous* is higher in the L1N than in the L1F, whereas in the FL, it is higher in the FLF. As was shown above, in both languages and in both planning conditions, many revisions that were made in *miscellaneous* were of the subcategory *others* which denotes insecurity with respect to the word or the content to be executed. Pauses after revisions in this subcategory signify that the participants consciously searched for an alternative to the word(s) that they had just deleted and typed again, and that they gave up the method of writing for word finding. In the L1F, the higher fluency had the positive effect of making this process more successful for the participants and pauses were needed less often. In the FLF, the participants also wrote down words fluently, but when they were dissatisfied with them, the method of writing the same word again in order to activate the semantic and the phonological network did not work as efficiently as it did in the L1. In the FLN less pausing was needed after revising *miscellaneous* due to the slower production and the more controlled processing.

All in all, one can note that certain types of revisions were cognitively more

demanding for the writers than revisions in other categories, and that the participants more often lost their train of thought after these revisions. However, the revisions do not seem to have impeded the writers' production processes in a direct way.

7.8 Discussion

The analysis of the revisions shows that there are differences between L1 and FL revising processes and that there are differences in these processes in and after planning by note-taking and by freewriting. For one, revising in L1 took place less frequently than it did in FL, and revising in freewriting took place less frequently than in note-taking. This demonstrates that the effect of fluency enhancement through freewriting was achieved best in the L1F, indicating that the writers were more confident in their writing processes in freewriting, and that this was fostered more in the L1 than in the FL. However, as was demonstrated in Chapter 6.1, this confidence was not justified in many aspects, and the higher speed in the production process would have asked for a more intense revising process during and after writing. The higher amount of revisions in the note-taking conditions, however, did not necessarily lead to more accurate texts either (see Stevenson, Schoonen and de Glopper 2006: ch. 3.4 for similar results).

In the distribution of revisions in the different categories, one sees that the highest proportion of revision took place in all languages and in all planning conditions in *typing mistakes*, followed by revisions of *content* and of *miscellaneous*. Thus, on the categorical level, the focus of the revisions is similar in all conditions, which means that the participants on this level were not flexible in their focusing, or they did not feel the need to alter their monitoring in the different conditions.

The distribution also shows that the highest number of revisions in the FL was performed in error categories that were not influenced by the L1. Hardly any revisions of node-switches were conducted. The participants did not seem to have had much awareness of their usage of the L1 in the FL writing process, although, as was shown in Chapter 6, these kinds of errors formed by far the majority. This focusing on *content* and on *typing mistakes* is rather dangerous with respect to reader evaluation, because if the readers do not possess knowledge of the writers' L1, they will not be able to comprehend the texts completely in many cases or they will at least encounter difficulties in trying to do it.

The concentration on *content* revision might have been the consequence of the teaching of text production in German schools, in which the main stress is laid on content, whereas orthography or punctuation do not seem to be regarded as being as relevant in

teaching in secondary school or at university (Peyer 2003: 633), despite their importance for understanding the texts and for the impression that it makes on the readers. This neglect of a more thorough evaluation of language aspects in the writing processes leads to linguistically weak texts – not only in the FL but also in the L1. When one looks at the linguistic results of the essays in the L1 and in the FL (Chapter 6), one sees that teaching students the focus on content is neither appropriate nor enough for academic writing, since the essays are not adequate to the high linguistic standards of academic texts.

In contrast to the distribution of revisions in the main categories, in the subcategories of the relevant categories, there are differences in the L1 and the FL and in/after note-taking and in/after freewriting. Here, the differences are set in language-related aspects. For example, in the category *content*, the revising of *wording* was more important in the L1 than in the FL. The urge to find a better way of expressing one's thoughts is more highly developed and works more actively in the L1 than in the FL, which is the result of the better and the more broadly developed linguistic structures and networks in the L1, and also of the underlying differences in the monitoring of the writing processes in the L1 and the FL. Because of this, one can say that the participants showed flexibility in their revising processes in the different languages to a certain degree, and focused their cognitive resources on different aspects. However, it does not seem to have been a conscious decision to do so, but rather the effect of the higher cognitive demands in FL writing, and the less well developed linguistic structures in the FL.

The planning methods also had an effect on revision: the different activation of the linguistic structures had an impact on the focus of the monitoring in the writing processes, but this effect was less strong in the FL than in the L1. The participants were better able to distribute their cognitive capacities more flexibly to the task conditions in the L1, whereas they rather stuck to their familiar monitoring methods in the FL.

These differences can be found in all writing phases – from planning, through essay writing to revision. The participants changed their focus of attention on the different subcategories during the text-production in the different stages; and they changed them differently in the L1 and the FL and in note-taking and freewriting. This is also reflected in the analysis of the revisions that took place after pauses or the revisions that were followed by pauses. In the L1, the participants executed more revisions without former pausing, and they needed less pauses in order to get back onto their train of thought after revisions. Because of this, one can say that the cognitive demands of monitoring and revising were lower in the L1 than in the FL, and that the participants were better able to perform the

writing processes in parallel. The demands were also higher in the note-taking conditions than in the freewriting condition.

Another – slightly self-contradictory – outcome of the analysis of the revising processes is that a deliberate **reduction** of typing speed after freewriting would have had a positive effect on the fluency of the writing processes, since the high number of revisions of typing mistakes had a negative impact on the burst lengths. They also absorbed cognitive resources; and the focus on other (and more relevant) aspects of text-writer interaction – like content generation and -selection, structuring, planning, linguistically adequate formulating etc. – suffers or becomes less central. In this way, the analysis supports the old saying: “The slow horse reaches the mill”.

8. Conclusion

The aim of this study has been to analyse the differences in the writing processes in L1 and FL academic writing and to examine the influences of the L1 on FL linguistic processes. Different planning strategies were employed by the participants in an original study designed to examine whether such variations in approach have an effect on the writing processes and on the linguistic quality of the texts produced (see also Manchón and Roca de Larios 2007: 553). Additionally, the study was intended to reveal whether there are interrelations between fluency/productivity, error types and revisions. To this end, ten L1 German students of English philology were asked to write two L1 and two FL academic essays each, one after planning by note-taking and one after planning by freewriting in each language.

The following subchapters present a summary of the results of the study (Chapter 8.1), as well as a discussion of its weaknesses (Chapter 8.2) and a set of suggestions for possible future projects that can be developed using the data and the insights collected here (Chapter 8.3).

8.1 Results

The results in the different areas (productivity, errors, revisions) are presented separately and are correlated in a concluding section.

Productivity and fluency

The analysis of productivity in the writing processes has shown that both language and planning method have an effect on the different quantitative aspects of the production process. The activation of the linguistic structures triggered by freewriting had a positive effect on productivity in both the L1 and the FL for all participants, and the texts produced were longer. The writers were more productive after freewriting in the FL than in the L1 with respect to the number of words, but they were more productive in their L1 with respect to the number of characters – a result which is grounded in the different orthographic systems of German and English. This difference calls attention to the fact that the analysis of text length in terms of word count (or in logographic writing systems in terms of symbol count) can be problematic – all the more so when comparing English or German with languages like Finnish or Turkish, which realise complex syntactic relationships in single words.

It was not only the lengths of the final texts which was greater in the freewriting

condition: the rate at which individual characters were produced, evaluated and in some cases deleted also rose distinctly under the freewriting condition in both languages. The writer-text interaction was enhanced. Freewriting had the effect of encouraging the participants to communicate with their written texts and to actively use this external source for idea generation during the writing process. Significantly, this effect was more pronounced in the L1 than in the FL.

In addition, the freewriting condition saw the participants produce their longer texts in a more efficient way with respect to time. Again, the effect was stronger in the L1: in the note-taking condition, 60% of the writers were able to better manage their time in the L1 than in the FL, and in the L1F this proportion rose to 90%. That the effect was more pronounced in the L1 than in the FL proves that FL writing places higher demands on the cognitive capacities. Additionally, it suggests that the success of conscious thinking processes depends on the language in which they are performed – an observation which, in the model proposed here, is explained by the denser networks of interfaces inside the L1 phonological structure and between the L1 phonological structure and the conceptual structure. Thanks to these denser networks, ideas are generated more quickly in the L1, and the difficulty of transforming them into language is less than in the FL.

The distribution of time among planning, formulating and final revision also differed between the different task conditions. Whereas in the simple essays the participants wrote much as they would speak – that is, they typed their texts without spending time on pre-planning or revisions of more than a superficial nature (Seyfeddinipur, Kita, and Indefrey 2008: 841) – in the academic texts they spent time on preparing and planning the tasks, as well as on revising them if time was left. The differences among the individual writers were significant on this measure, a result which serves to remind that in writing, many other internal factors are at play that are independent of the language used or the way in which the linguistic structures are activated by the different planning strategies. The individual writers used and responded to these strategies differently, and in many cases they responded differently in the L1 as compared to the FL. This points to the presence of different attitudes among the writers toward L1 and FL writing, which in turn has an effect on the writing strategies in the two languages (Grosjean 2010: 119, Spolsky 1989: ch. 7, see also: Madigan, Linton and Johnson 1996: 307). At the same time, those students who did have enough time left after finishing their essays to revise the texts thoroughly chose not to do so, but rather spent only a small amount of time revising and preferred to finish the writing process than to enhance it. In

this connection, no differences among the various task conditions could be made out, suggesting that here is evidence of a general weakness in students' writing performance (see Becker 2006: 30).

Another interesting result with respect to time is the distribution of phases of execution and phases of pausing. In both planning conditions, more pauses were made in the FL than in the L1, indicating that processing was more difficult for the participants in the FL because more working memory capacity was needed (Bergsleithner 2010: 12). Again, activation via freewriting made the phases of execution more dominant in both languages, which suggests that in freewriting the participants used execution itself to support the thinking process. The higher rate of execution in the L1 as compared to the FL, and during and after freewriting in both languages, is mirrored in the lengths of the writing bursts. These were longer in the L1 and after freewriting; they were also fewer in number and resulted in longer texts in these conditions. In the L1F task, these results were restricted to the formulation process of the essay and were not found in planning or revising, which again indicates that the participants used different writing strategies in the L1 and the FL.

Looking at the ends of the bursts, it is possible to observe another indicator of the activating effect of freewriting on the entire writing process: in this condition, more bursts were ended by revisions than by pausing, underlining the higher on-line interaction between the writer and text produced and the higher amount of parallel processing. After planning by freewriting, the participants did not find it necessary to slow down their writing processes to a complete standstill as often. This effect was again greater in the L1 than in the FL, likely because of the better-developed L1 linguistic/semantic network and the lower demands on working memory in L1 writing.

Overall, the results of the analysis of productivity and fluency demonstrate that the cognitive demands of writing FL academic texts are higher than the demands of writing simple FL texts or L1 academic texts. In the FL the writers were forced to slow down their processing and they were less adept at using writing to support thinking than they were in their L1. Still, in both languages, the method of freewriting had an enhancing effect on productivity and on fluency – an insight which could be used to good purpose in writing pedagogy.

Errors in the final texts

The final texts were analysed with respect to the quantity of errors that were left

uncorrected and in particular with respect to their quality. The latter was judged with the help of a cluster of error categories and error subcategories that were based on the bilingual version of Jackendoff's monolingual *Tripartite Architecture* (2002: 125). It was expected that there would be differences in the quantity of errors between the simple text and the academic texts, and it was also assumed that the distribution of errors among the different categories would differ between the two planning conditions. Since in planning by freewriting the phonological, syntactic and orthographic structures were explicitly activated, it was presumed that here, the FL text would include fewer L1-induced errors.

Although the primary focus of this investigation is the influence of L1 on FL writing, an analysis of the errors made in the L1 texts was conducted as well. The results illustrate the oft-bemoaned deficiencies in the writing of German students (e.g. Martenstein 2012: 6), especially with respect to the high number of errors that remained undetected and were consequently left uncorrected. The language weaknesses consisted mainly in *typing mistakes*, but there were also grammatical errors and errors in punctuation the frequency and seriousness of which in some cases made understanding the texts difficult. The error rates in the L1N and L1F tasks did not differ strikingly, a result which shows that the activation of the linguistic structures via freewriting did not have a positive effect on the quality of language in the L1 essays.

In the simple FL text, proportionately fewer errors were left uncorrected than in the L1 academic texts. Thus it can be said that the cognitive demands of academic writing are high enough that they can also affect language quality in the L1: for most of the writers, the academic genre indeed has the quality of a 'foreign language', even in their L1. At the same time, the results indicate that the participants' attention in academic writing was focused on other issues than language, and that there was no (or insufficient) awareness of linguistic quality during the writing process. It was therefore assumed that the error rate would rise in the FL academic texts.

Indeed, the number of uncorrected errors and mistakes in the final FL academic essays and in the final versions of the plans was distinctly higher than it was in the L1 and the simple FL texts. The majority of these errors can be explained by the influence of L1 linguistic structures on FL writing. The strength of this influence varies between the texts written in the different planning conditions, and between the plans and the final texts. For example, in the rather short plans which were created in the note-taking condition, the ratio of words to errors is distinctly higher than in the much longer freewriting plans, although in the latter, revisions were not done as extensively as they were in the notes (see below).

In the FL notes one could see a greater use of the L1, which could not be subdued effectively in the formulation of these plans. This method – consciously or subconsciously chosen – of relieving the cognitive capacities by using the L1 in planning had a negative impact on the quality of the written plans.

However, this negative impact of planning by note-taking in the FL was not necessarily carried over into the formulation of the essays. Some of the participants performed better with respect to the linguistic correctness of their final texts after planning by freewriting, while others performed worse. It can therefore be stated that the planning methods had an effect on the linguistic quality of the texts, but that this effect was individually different. This is likely due to the different ways in which individuals cope with writing, and in particular the different ways in which they deal with planning a writing task. For so-called *Mozartians* (Boehm 1993), note-taking is the planning method that is most appropriate to their needs, in that it does not require them to write down a fluent text before they have (mentally) planned it in detail. After this detailed planning process, they feel more confident in the formulation process, and their internal monitors can better evaluate the linguistic quality of the text. In contrast, *Beethovians* (Boehm 1993) are not well equipped to generate plans by thinking without writing; for them, planning by note-taking means that the task of generating ideas and of planning the text must be accomplished during the formulation process, which absorbs a high amount of cognitive capacity that should be dedicated to monitoring.

It is worth noting that some writers seem to fall into the category of Mozartians in one language (the L1 or the FL) and into the category of Beethovians in the other; that is, they were better able to generate linguistically correct texts in their L1 under one condition, and in their FL under the other condition. Here, further tests would be of interest to see whether the different results with respect to linguistic quality in the L1 and the FL were indeed the result of a change in planning preference between the two languages, or whether other factors, for example knowledge about the topic, were of greater relevance (see Grabe 2001: 42).

Although there were individual differences in the numbers of errors made by the participants in their essay, the distribution of these errors among the different categories in the different conditions again shows an overall pattern. In all of the essays, the majority of errors – besides typing mistakes in planning – were node-switches. Most relevant were syntactic node-switches and orthographic node-switches. The former frequently had their origins in a (mis)application of the complex L1 syntactic structures. These complex

structures were stimulated first of all by the Teutonic academic genre, which encourages complicated and embedded sentence structures. Thus it can be said that the syntactic node-switches were induced not only by the cognitive overload, but also by the switch from FL to (old-fashioned) L1 genre standards. Second of all, since syntactic node-switches were more strongly stimulated in the freewriting condition and in the simple essay where structuring was performed during the writing process, it could also be that these node-switches were the result of the participants' spontaneous inclusion of content in subclauses of subclauses, which in German (high-standard) syntax is possible.

The distribution of the errors among the subcategories of the node-switch categories shows that the different planning methods activated the linguistic structures differently. Certain kinds of node-switches were more frequent in the freewriting condition, while others were more frequent in the note-taking condition. This supports the view that the bilingual *Tripartite Architecture* is valid for explaining FL language processes, and that in the linguistic structures, the information is mainly stored in form of rules (Jackendoff 2002: 126). Some rules were applied more successfully after the activation of the linguistic structures via freewriting, while in other cases compliance with the rules was better pursued in the more controlled note-taking condition. This means that the interfaces between the conceptual structure and the phonological, orthographic and syntactic structures are stimulated differently by the different planning methods. This might be the result of the differing ways in which the rules were learned by the participants and taught at school – for example, whether they were acquired more implicitly or more explicitly – or it might be the result of the profoundness of the rules, and/or of the way in which these rules are stored (Ellis 2002: 167, Mulligan 2003: 1114, Schacter 2001: 395).

The evidence of an interdependency between the type of planning strategy employed and the rate at which certain types of errors occurred in the text, as well as between the quantity of errors left undetected and the combination of type of writer and type of planning, could be useful in developing training programmes or in teaching writing. On the other hand, the high number of L1-induced errors shows that under the cognitively demanding situation of FL academic writing, writers have a higher tendency to use their L1 interfaces more extensively to reduce cognitive demands, and their awareness of this interference is rather low. This in turn suggests that in order to enhance the blocking of the L1, FL writers must learn how to distribute their cognitive capacities such that they support the monitoring of their writing processes and the detection and revision of L1 interventions.

Revision

Like the errors, the revisions were analysed with respect to their quantity as well as their quality. It was expected that there would be differences in the revision processes between the L1 and the FL and between the different planning conditions. In the L1, fewer revisions were expected because it was assumed that there would be fewer problems with parallel processing, word finding, and typing competencies. Since in freewriting the writers' fluency was higher, fewer revisions were expected here as well. Additionally, it was assumed that more typing mistakes would need correcting during and after freewriting as a consequence of the high productivity occasioned by this planning strategy, and that because of the less structured plans, more revisions in text structure would be necessary, depending on the writer type.

Some of these expectations and assumptions were confirmed. The quantitative analysis of the revisions showed that the ratio of revisions to typed characters was lower in the freewriting conditions and in the L1. The latter result conforms to findings of Stevenson, Schoonen, and Glopper (2006: 222), who also found that there is a higher tendency among FL writers to revise their texts (although often only superficially).

With respect to the categories of errors that were revised, it emerged that the vast majority of the revisions done in all of the different texts were concerned with typing mistakes and other (language-independent) revisions. *Content* and *miscellaneous* were the most significant categories beside *typing mistakes*; and in *miscellaneous* the majority of revisions were located in the subcategory *others*. In the FL writing tasks, the participants detected and corrected very few node-switches, and the parallel activity of L1 structures in the writing process overwhelmed any awareness they may have had of their tendency to apply L1 rules in FL writing. However, in the planning-by-freewriting process itself, the awareness of L1 influence was distinctly higher than it was in the writing of the essays. This means that in FL writing – and even more so in FL academic writing – monitoring had a rather negative impact on the perception of node-switches. This could be the result of (a) the higher cognitive demands in writing academic texts, and (b) the Teutonic academic structures, which are better realised in the L1 with respect to syntactic structure.

As was the case with respect to fluency and errors, with respect to the distribution of revisions there were also differences between the L1 and the FL and between note-taking and freewriting. These differences were higher in the subcategories than in the categories. Generally, it was evident that the participants were more apt to revise language-related aspects in the L1, while in the FL conditions they concentrated more on revising

information. The writers were better able to plan their texts in the L1, or at least to plan the next passage with respect to the content they wanted to provide in order to reach the rhetorical goals of their essays. The result of this better planning performance was that they were able to concentrate more on linguistic aspects that would help them to reach their audience effectively, for example better and more precise formulations (Butcher and Kintsch 2001: 284). This might have been the effect not only of the lower cognitive demands of L1 writing, but also of the better-developed L1 phonological structure network in which more elements are activated by the cognitive structure, which in turn gives the monitor the opportunity to select the best formulation to convey the intended meaning. This view is supported by the higher number of revisions in the subcategory *others* in *miscellaneous* in FL writing, where the participants typed words, deleted them, and then typed the identical words again because they were not able to find a good alternative.

The kinds of revisions also vary among the different writing processes of *planning*, *formulating*, and *final revision*. In planning, apart from typing mistakes, the revision of *content* was judged to be the most important aspect, and here most revisions were made in *information*. Already in the plans, however, it was evident that the generation of ideas for the essays was more efficient in the L1 than in the FL, in that the participants needed fewer revisions in *information* and already made more revisions in *wording*. They perceived the accuracy of the formulation as important in the L1 and were able to perform tasks that would simplify the formulation of the essay.

The revision of *content* was also highly important in the writing of the essays, and here again, the participants were better able to concentrate on *wording*, *sentence structure* and *text structure* in the L1 than in the FL. They were better able to focus their cognitive capacities on the goals of the texts, rather than on searching for more information to provide or on evaluating this information. Still, in essay writing in both languages and both conditions, the participants faced the problem of not being able to find the most appropriate words/arguments on the first attempt, but often typed, deleted, and retyped the same words. That is, when it came to content, the high cognitive demands of academic writing had an impeding effect in both languages and under both planning conditions.

Contrary to expectations, the participants did not spend a significant amount of time or cognitive capacity on the revision of text structure, but made only marginal revisions in this respect, if they made any at all. Thus is seems that one of the crucial aspects of academic texts, namely the strategic positioning of information, was not judged to be important, even though many of the essays would have benefited from some restructuring.

In this regard the participants can be said to have performed at a novice level rather than at a high-standard level. This is also reflected in the fact that the participants did not include final revision in their time schedule for the writing process. Since in FL writing, it has been found that revision *after* the production process is more effective than the revision *during* the production process (Chenoweth and Hayes 2001: 94), it is possible that more L1 influences would have been found and revised if the participants had separated the production and the revision processes more distinctly.

The results in revision show that making students read academic texts is not an effective way of promoting the acquisition of writing competencies — indeed, it is rather counter-productive. A more active approach to the teaching of academic writing is needed and greater support in this should be given to students in this area – be it in form of classes, coaching in writing centres, teaching with the help of observational learning (Braaksma *et al.* 2004: 2, Kietlinska 2006: 63, Rijlaarsdam *et al.* 2006: 203, 2008: 54) or using a "Learners as researchers" approach (Schneider 2007: 186). In teaching writing, one of the main tasks should be to teach students to adapt their approaches and especially their revising strategies to the tasks and to the differences between the L1 and the FL. For example, in FL writing it seems to be important to revise a text in multiple steps after producing it, in order to focus the cognitive capacities on different aspects separately: aspects such as content, structure, style and typing errors, as well as 'real' linguistic aspects which are related to L1 influences. It also seems clear that FL writers need to include more time for revision when managing their writing processes.

Interdependencies of fluency, errors and revision

The results of this study confirm that writing works differently in the L1 and the FL and that the planning methods of note-taking and freewriting have different effects in the two languages. The analysis of fluency and productivity showed that in both languages, freewriting had an enhancing effect, and that the language faculty – and with it the cognitive faculty and its interfaces to the language-external faculties of the long-term memory – was positively activated in this planning process That the enhancement effect was stronger in the L1 than in the FL shows that the cognitive faculty is not as language-independent as Jackendoff (2003: 662/663), for example, proposes. This result points to a stronger ability to think via writing in the L1 or in the more active language – for example, in the case of people who have been living in an FL environment for a long period of time or who read, speak and write more in the FL in a specific field or topic (De Bot, Lowie and Verspoor 2005: 48–49). This stronger ability is the result of the denser network of

phonological and orthographic structures in the L1 (or the more active language) which in turn activate other related phonological and orthographic elements that are themselves related to other elements in the cognitive structure.

Additionally, it was apparent that the enhancement of the writers' productivity did not necessarily have a positive effect on the linguistic outcomes of the production processes: the texts did not contain fewer errors, nor was revision more effective with respect to detecting and correcting L1 influences. Still, the higher productivity achieved had the effect of better activating different linguistic rules (syntactic or orthographic) in the more-productive writing processes than in the less-productive writing processes. That is, one form of planning was better suited to certain aspects of the linguistic structures than the other, and vice-versa.

The number of revisions of typing mistakes that had to be carried out – and that were not carried out to a sufficient extent, as was shown above – was increased by the high typing speed in freewriting. Still, in most cases the participants were able to continue their writing processes fluently after correcting these typing mistakes without requiring extra time to get 'back on track'. This ability was greater in the L1 than in the FL, which shows that even in the more superficial aspects of writing, the higher cognitive demands of writing in a foreign language have an impact on the production process (see also Stevenson, Schoonen, and de Glopper 2006: 225). If burst-lengths have an impact on the creative aspects of writing, such as idea generation and knowledge constitution, it could be that the intended enhancement of the writing process with the help of freewriting was not as effective in the FL as in the L1 because of the higher amount of cognitive capacity that was needed to monitor the typing processes and because of the demands of keeping the content in the articulatory buffer in mind, which at the same time inhibited the activation of the semantic structures (see Chapter 8.3).

The individual differences in the production processes, error rates and revision processing additionally show once again that writing is a very individual act (van Weijen 2008: 102). Writers have different methods of dealing with cognitive demands, for example by reducing the typing speed and pausing more often, or by reducing the intensity of the monitoring process. Generally, however, it can be said that in FL academic writing, there is a high tendency to rely on the more highly activated and densely structured L1 in order to reduce cognitive demands and make it possible to transform ideas as fluently as possible into academic texts.

The results also underline that because of individual differences in conducting the

writing processes, it is important to teach not just one writing strategy, but several different strategies from which students can choose the ones that fit them best (see also Lavelle 2007: 227, Polio 2003: 35). It would be worthwhile to try and use the advantages offered by the different planning methods to tackle particular writing problems. For example, since planning by freewriting generally resulted in less L1 influence on FL writing and a higher awareness of this influence than did planning by taking notes, freewriting could be used to activate the linguistic structures before starting the production process of the essay itself and then again before starting final revisions to enhance L1 awareness (see below).

8.2 Limitations of the study

Like most academic studies of its kind, this one includes some structural weaknesses. Perhaps the most serious of these is the fact that the experiment was conducted in the form of a case-study. Although it was possible to extract probable outcomes with respect to the high influence of the L1 on the FL in the writing processes and in the final texts, the number of participants in the study was too low to make a statistically more reliable analysis in the form of significance statistics. In addition, it seems likely that the participants' motivation differed from that of the average student writer since they were drawn from a group that was actively interested in learning how to improve their writing performance. The average student, in contrast, often perceives writing tasks less as a chance to transmit ideas and knowledge to an interested audience than as a test situation in which they are being evaluated by a reader (the teacher) who is superior in terms of knowledge and competencies (Burgess 2002, Leki, Cumming, and Silva 2008: ch. 4).

This issue of audience awareness, with its possible importance in shaping writing outcomes, was not accounted for in the design of the study. The fact that the participants could not receive bad marks for their work meant that the stress factor, which is otherwise so typical of the student writing experience, did not play a role in the analysis. That is, in 'real-life' essay-writing, students act under much different conditions. This is also true of the laboratory setting, which is not the typical one in which essays are written in the university context. The conditions which were chosen to generate a positive atmosphere and to make the experience as uniform as possible for the participants thus also made the test less realistic (van der Geest 1996).

Furthermore, although the group was homogeneous with respect to their L1 and their background as students of FL English at the university level, there were respects in which they differed that may have had an impact on their individual writing performances. For example, since the topics they were given to write about were not taken from their

classes but from other areas in which a certain basic knowledge could be assumed, there were individual differences in the level of interest in the topics and in the extent of their background knowledge about them, both of which could affect the development of the argument (Dansac and Alamargot 1999: 84). For example, Artilleryman had attended a class on Aristotle and as a result was keen to write the essay about the determining effect of culture and language on the development of Aristotelian logic. James had studied philosophy and thus also felt at home with this topic, whereas other participants complained of a lack of ideas and a generally lower level of interest in the topic. Yet for the purposes of the study it was essential that all participants write about the same topics in order to allow a direct comparison of academic structure and argumentation. This was not entirely unrealistic, since even in classes on a specific topic, different levels of background knowledge and interest among the participants can be expected. Still, a follow-up study should be done in which the participants are drawn from a class where they were provided with the same amount of topic knowledge; moreover, they should all receive the same test and write it at the same time in the same room.

Another weakness of the study was that the L1 and FL writing backgrounds of the participants differed. The students whose minor subject was science or sports had distinctly less experience in writing academic essays in their L1 than did those whose minor was philosophy or history. Some of the participants had also spent a significant amount of time in an English-speaking context and at English-language high schools or universities. This may have had an influence on their performance in the FL writing tasks, if only because these participants felt more secure in FL writing than did those who had not had this experience.

However, since the findings show general tendencies in the writing processes of all of the participants and in all of the texts, it can be concluded that these factors did not have a determining effect with regard to the reliability of the study. The individual differences in the outcomes were in many cases quantitative in nature (such as burst-lengths or number of errors), but the qualitative aspects were stable.

8.3 Possibilities for future research

The analysis of fluency and of linguistic errors produced in this study is revealing with regard to different aspects of writing in a foreign language; as noted above, however, this analysis needs to be verified in a larger study involving more participants under more realistic conditions. Additionally, the data that was collected in this project has by no means been fully exploited, and further aspects of writing in a foreign language remain

unexplored. Thus the study opens the potential for a range of new projects.

Rhetorical analysis

As was noted in Chapter 2.4.2, the academic genre in Germany has been in the past – and in many ways still is today – quite different from the academic genre in English-speaking contexts. A recent survey conducted at Cologne University (Breuer 2011) has shown that many students do not have a clear picture of the academic genre and that they are in a state of 'intra-genre'. On the one hand, they feel that the authors of published academic texts do not have their readers in mind when they are writing and do not necessarily wish to be understood quickly and easily; on the other hand, the respondents in the survey found the structure of academic texts to be generally very clear. The majority agreed with the statement that long and complicated sentences are a defining characteristic of German academic texts.

Since the study found a widespread and deep-seated influence of the L1 on FL writing, it is likely that the outdated Teutonic model of academic writing was applied not only in the writing of the L1 essays, but also in the writing of the FL essays. An initial analysis of the titles the participants gave to their essays, for example, showed that there are distinct Teutonic elements in this area. With respect to topic-appropriateness, which is basic to the Saxonic model of academic writing in the L1, 60% of the titles were weak in that they created expectations that were not fulfilled by the texts themselves. In the FL, up to 100% of the titles were inappropriate in terms of accurately shaping reader expectations: some gave the impression that a whole new school of thought was going to be introduced, rather than a simple one-page discussion of a set and very concrete topic. Examples include Artilleryman's title *Bologna-Enigma* or James' *Enlightened Monolinguality – A way out of a heated debate*.

It would therefore be promising to analyse the rhetorical structures of the papers more closely, looking at what kinds of Teutonic features were applied in the L1 as well as the FL tasks. This analysis could eventually be expanded to include all elements of genre-based grammar. The overall structure could be examined to determine whether the lack of revisions to *text structure* was the result of the writers' having produced an adequately-structured text on the first attempt, or perhaps reflects a more Teutonic way of academic writing, in which the reader is 'invited' to participate in the writer's thinking process. Similar examinations of the rhetorical elements, sentence structure and wording are also promising. It is suggested here that in all of these areas, influences of the (outdated) L1 German genre will be found.

Using the activation potential of freewriting for writing pedagogy

As was shown in Chapters 4 through 6, freewriting had an activating effect on the writers in different areas of the FL tasks. The number of node-switches in the freewritten plans was comparatively low, and the revisions made to the plans during the formulation process tackled more of these node-switches than did revisions performed during note-taking. Because of this, one can conclude that in the FL context, freewriting has a positive effect with respect to processing. However, this effect in the planning phase did carry over into the writing process of the academic essays themselves, and had only a marginally positive effect on the final revision processes. Since the persistent L1 influence is probably the result of the high cognitive demands that FL academic writing makes on the mental capacities, to which writers respond by (mis)using the L1 in their FL writing, it might be constructive to use well-directed freewriting to enhance the linguistic quality of the papers.

Generally, it is proposed that when writing in a foreign language, pulling the writing processes apart and dividing them into smaller, less tightly packed units can enhance text production. For example, Lee (2006: 324) and Chenoweth and Hayes (2001: 94) have shown that in FL writing, final revisions and revisions done during the writing of second drafts are more productive than revisions that are done during the writing process – this stands in contrast to L1 writing, where revisions done during text production are more fruitful. Still, in this study, the participants committed a high number of linguistic errors that were qualitatively more significant than simple typing mistakes or spelling errors, even in their L1. The writers who made many errors in L1 grammar and semantics probably encountered difficulties in parallel processing. In some cases they forgot how they started a sentence, or they were too involved in the generation of content and structure to notice when they used a phonological structure that was perhaps related to an appropriate word in the semantic network but did not fit the intended meaning, or even contradicted it. Many of these errors were likely the result of cognitive overload and the participants' inability to focus their monitoring on linguistically deeper matters. They seem to have overlooked grave errors in grammar and semantics because they were too concentrated on content and wording (Lindgren and Sullivan 2006: 41).

All of this shows that it is important for writers to learn how to revise their texts properly and to choose the appropriate steps to take. A very useful analysis would be one that examines whether writers are better able to localise node-switches and other errors in their texts after the passage of a certain amount of time, when the text and the intended meaning are no longer present in the working memory and automatic mental corrections no

longer take place quite as easily. Since the rate of node-switching was lower during freewriting, and at the same time the awareness of node-switches was higher, the activation of the linguistic faculty with the help of this method before beginning a round of revisions made after an interval of time might result in significant improvements in the linguistic quality of the final text.

To test this, a study could be conducted in which the participants write two texts, then after an interval of time revise one text without first actively stimulating the linguistic faculty through freewriting, and the other text after such active stimulation. A comparison of the number of errors remaining in the two final texts as well as the types of errors and the revisions that the participants conducted would show whether an overall enhancement of the revision processes and the final quality of the texts is indeed triggered by freewriting, as well as whether this enhancement is associated with any particular types/subtypes of text features and node-switches. The results would potentially support the proposition made in Chapter 6 of this study, which suggests that the rules in the linguistic structures are indeed activated differently by freewriting versus note-taking.

Furthermore, the outcomes of such a test could be used to broaden the range of constructive strategies available to writers in producing and revising their texts.

Analysis of idea generation

As was outlined in Chapter 3, different researchers have demonstrated that the process of writing itself can contribute to idea generation and to the constitution of new knowledge (e.g. Elbow 1973: 50/51, Galbraith 1999: 144, 2009: 18, Hayes 2008: 32 ff.). At the same time, there are writers who propose that thinking – and thus also the generation of ideas – is independent of the language in which the thinking process takes place (e.g. Jackendoff 2002: 123). However, the results of the current study suggest that when language is used for the generation of ideas (as is the case in freewriting), then the productivity of idea generation as well as the suitability of the ideas depends on the language used – i.e. whether it is the L1 or an FL.

As was seen in Chapters 5 through 7, in certain aspects of productivity and fluency as well as in the outcomes of linguistic processes and in revision, writers were more productive in their L1, and also made use of the L1 in their FL writing. Because of this, it is proposed that idea generation is less productive in the FL than in the L1, since FL writers are working under greater cognitive constraints. Additionally, in the bilingual language model proposed in Chapter 2, a denser network of phonological structures and conceptual structure is assumed in the L1, since here speakers/writers tend to possess a

larger number of phonological elements that are interrelated with each other and with the cognitive structure via the interfaces than in the FL. Because of this, more associations and language-induced idea generation should take place in the L1.

Not only the quantity of generated ideas would be of interest in future studies, but also the quality of their handling. For example, an essay consisting of a list of ideas that are not elaborated and not related to each other except in terms of the overall topic would be qualitatively weaker than an essay in which the ideas are interrelated and form a concise whole. An essay of the former kind would be located on Level 2 in van Wijk's model of text production (1999: 41; see Chapter 3.1.2), while the latter would achieve Level 3 or 4. A list-type essay can be produced by a conscious search for ideas in long-term memory, a form of idea generation that is basically language-independent. In contrast to this, essays at Levels 3 and 4 of text production point to the use of strategic planning, as well as the use of rhetorical style to reach the goal. Since it is only at this level that knowledge transformation is achieved, a higher level of language proficiency is needed, and again L1 writing might be better adapted to realising this target.

A test that uses different planning strategies – one strategy that is basically language-independent and one that makes explicit use of language – could shed light on these processes. In the conscious search for ideas that is characteristic of planning by note-taking, the significance of language might be smaller than it is in the freewriting condition. In FL freewriting, on the other hand, the lack of vocabulary to express the intended meaning, as well as the less-developed network and the higher cognitive costs of formulation, could inhibit the interaction of text and writer and thus also the text-induced generation of ideas. This would support the thesis that thinking is to a certain extent independent of the language it is performed in, but also the idea that language has an influence on thinking in that it can support or impede it when it is consciously used for thinking.

In conclusion, the future promises to see more exciting 'battles' between the L1 and FL, since – to paraphrase Muhammad Ali on the topic of his first wife – *the FL writer's toughest fight is with his first language*.

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Appendix

A – Abbreviations

The abbreviations used in the text are listed in the table. They are not alphabetically ordered but follow topical aspects: First, the abbreviations used in foreign language literature are introduced, then abbreviations which are used in connection with the language model developed in this paper. Finally, the abbreviations that are used in the analysis are presented.

Abbreviation	**Term/Explanation**
L1	First language/mother tongue
L2	*Second language*, in the sense of the language that is not the speaker's native language, but that is spoken in their context (e.g. an English child being brought up in Germany). *L2* is often used in the sense of *foreign language* in the literature.
FL	*Foreign language*: a language that is indigenous in another country than the speaker is born in or is brought up in.
EFL	English as a foreign language
NP	Noun phrase
PP	Prepositional phrase
PS	Phonological Structure
SS	Syntactic Structure
CS	Conceptual Structure
UG	Universal Grammar
SE	Simple essay: Text which is written in vernacular language, with no academic context
L1N	Essay written in the first language after planning by note-taking
FLN	Essay written in the foreign language after planning by note-taking
L1F	Essay written in the first language after planning by freewriting
FLF	Essay written in the foreign language after planning by freewriting
pl	If *pl* is added to the essay type (e.g. FLNpl), the plan of this essay is analysed/described exclusively.
pe	If *pe* is added to the essay type (e.g. FLNpe), incidents in the proper essay or in the writing of the proper essay is analysed/described exclusively.
r	If *r* is added to the essay type (e.g. FLNr), the final revision of this essay is analysed/described exclusively.

B – Overview of participants

The participants' answers in the introductory questionnaire (Appendix C) are summarised in the table.

Code name	*Gender*	*Age*	*Semester*	*Intended degree*	*Subjects*	*Time abroad (English speaking country)*	*Planning type*
James	M	24	9	Teacher-Training	English Philology/Philosophy/Theology	5 mths	Writing process
Siebenmorgen	F	22	6	Teacher-Training	English Philology and Philosophy	11 mths	Numbered notes
Marissa	F	25	10	Teacher-Training	English Philology and Mathematics	5 mths	Note taking/ writing process
IPhone	M	21	3	Teacher-Training	English Philology and Sports	No	Note taking
Sarah	F	26	14	Teacher-Training	English Philology and Pedagogy	1 y	Note taking/outline
Artilleryman	M	26	10	Teacher-Training	English Philology and History	1 y	Note taking/outline
Krebs	F	24	3	Teacher-Training	English and Sport Science	2 y, 9 mths	Note taking/outline
Babs	F	23	7	BA	English Philology and History	No	Note taking; structuring
Owlet	F	26	7	BA	English and Scandinavian Philology	No	Freewriting
Gio	F	26	7	Teacher-training	English Philology and Biology	10 mths	Note taking

C – Introductory questionnaire

The participants had to fill in a questionnaire with questions about their student-biography and their attitudes towards writing. The questions were posed in German. In the following, an English version is presented. The filled-in questionnaires can be found in the electronic appendix in the folder /*Questionnaire1*/

Questionnaire 1:

„Code name“: _____ Gender: _____

Age: _____ Native language: _____

Semester: _____

Area of study: _____

Planned degree: _____

Academic Papers:

1. Language: _____ Type of paper: _____ Mark: _____

2. Language: _____ Type of paper: _____ Mark: _____

3. Language: _____ Type of paper: _____ Mark: _____

4. Language: _____ Type of paper: _____ Mark: _____

What have been the main reasons for the marks (positive and negative factors, e.g. structure, content, language)?

_____

_____

When did you start to learn English: Year_____ Class:

_____

How did you learn English (chalk and talk/conversation at home)?

_____

Have you ever lived in an English speaking country? Yes/no

If yes: When? _____ For how long? _____

If yes: What did you do in the country?

_____

Please state: What is the intention of academic writing (e.g. provision of content, communication between colleagues)?

_____

Are there differences between German and English academic texts in terms of

- structure: yes/no (if yes: in what)

  _____

- choice of words: yes/no (if yes: in what)

  _____

- sentence structure: yes/no (if yes: in what)

  _____

- conveying of content: yes/no (if yes: in what)

  _____

Do you prefer the English or the German type of academic writing?
Why?

_____

What is the most important aspect in writing for you (e.g. Credit points, learning, …)

_____

What are the aspects that you find most demanding in writing?

_____

When you are writing academic texts: Which processes do you have to conduct (e.g. formulating, planning, reading the task, correcting,…)?

_____

_____

_____

Which of the processes is most
demanding?_____
Which do you enjoy most?

_____

Which do you enjoy least?

_____

What are your difficulties in writing German texts?

_____

Which are your difficulties in writing English texts?

_____

Do you start to write the paper a) when it is 'finished' in your head or b) do you start to write directly? a)/b)
In English writing: Do you use the same writing strategies/methods as in German? Yes/no

If no: What are the differences?

_____

Have you attended classes on academic writing? Yes/no

If yes: which and in which language?

_____

Could you use the knowledge provided in your papers? In what and in what not?

_____

Who is your target audience in writing (e.g. your professor, your friends, your parents)?

_____

How do you usually plan your essays (e.g. notes, mind-map, freewriting, during writing)?

_____

If you have 45 minutes time for an essay: How much time do you spend on:

planning: _____ min.

writing: _____ min.

revising: _____ min.

Have you ever used different methods for planning? Yes/no

Which:

_____

Do you have enough time for revising when you are writing an essay under test conditions?? Yes/no

What is the structure of a German essay?

_____

What are the contents of the different parts of the essay?

_____

_____

What is the structure of an English essay?

_____

What are the contents of the different parts of the essay?

_____

_____

When you are reading academic texts, in which language do you do this?

German: _____ % English: _____ % other languages: _____ %

When you are reading for entertainment, in which language do you do this?

German: _____ % English: _____ % other languages: _____ %

Do you use a dictionary when you are writing in a foreign language (yes/no)

What type of text do you write most frequently (please make a ranking by numbering)

_ academic

_ literary

_ business letters

_ e-mails to friends

_ forum

_ SMS

_ chat

_ diary

_ letters/postcards

_ others:

_____

Do you like to write? Yes/no

Why?

_____

Are you a good writer? Yes/no

Why?

_____

D – Tasks

In the following, the assignments that the participants received for each essay are presented in the order in which the participants had to fulfil them. The texts that the writers produced are stored in the electronic appendix /*2_Essays*/. The keylog protocols can be found in the folder /*3_Keylog_protocols*/.

Task 1: Simple essay

Please take on the position of your writing instrument (your computer, your pencil or your workbook). Let it describe you and your writing processes from its very special point of view.

u are a participant in an essay writing class. At the end of the term, you have to write an essay
45 min. on the topic of the different cultures of academic writing throughout the world. You
nt to get a good mark, because the essay can be seen as a test for your bachelor exam which
u'll have to pass in about three months.

Task 2: FLN

signment:

s Peirce said, if Aristotle had been Mexican, his logic would have been different; and perhaps,
the same token, the whole of our philosophy and our science would have been different."
ufrenne 1963: p. 35)

ase take a position to the quotation above using the information you gained in Kaplan's text.
you agree with the view(s) presented in the text/the quotation? If available, make use of your
owledge from other academic fields for your argumentation.

ur writing/the essay should meet the following requirements:

1. It has to be finished in **45 min**.
2. Your position has to become obvious.
3. Give good and convincing reasons for your opinion.
4. The text should have the „classic" essay form: introduction, main part, conclusion.
5. The paragraphs are well structured.
6. Take care of spelling and language use.
7. The reference paper should be used to underline your argumentation.

ase do not forget to give your paper **a title**.
r planning the essay, **please use the note method** (writing down notes, then indicating at
ich place in the text you will use this idea/argument).

od luck!

Task 3: L1N

Aufgabenumgebung:

Sie nehmen an einem deutschen Essaykurs teil. Am Ende des Semesters müssen Sie einen Essay in 45 Min. zu dem Thema "Der Gebrauch der englischen Sprache im deutschen akademischen Kontext" schreiben. Sie möchten gern eine gute Note haben, da Sie bald Ihre Bachelorprüfung ablegen und Sie dieses Essay als Test dafür nutzen möchten.

Aufgabe:
In der Wissenschaft hat die englische Sprache die dominante Rolle übernommen. Dies wird zum einen positiv gesehen, da so der internationale Austausch erleichtert wird, andererseits sehen Kritiker aber auch Gefahren in der Abkehr von der Muttersprache.

Lesen Sie bitte den Auszug aus Wolf Schneiders „Speak German" und beziehen Sie Stellung zu der vom Autor vertretenen Meinung. Beziehen Sie dabei auch Ihr Wissen aus Kursen ein, die Sie hier an der Universität besucht haben (z.B. Sprachwissenschaften oder SchreibArt).

Ihr Schreiben/Ihr Text sollte folgenden Voraussetzungen entsprechen:

1. Sie müssen innerhalb von 45 Min. das Schreiben beenden.
2. Ihre Stellung zur Frage muss deutlich werden.
3. Geben Sie gute und überzeugende Argumente für Ihre Position.
4. Der Text sollte die ‚klassische' Essayform haben: Einleitung, Hauptteil, Schluss.
5. Die Absätze haben eine gute Struktur.
6. Sie beachten Rechtschreibung und Sprachstil.
7. Sie benutzen die Texte, um Ihre Argumentation zu unterstützen.

Bitte denken Sie daran, Ihrem Essay einen **Titel** zu geben.

Benutzen Sie für das Schreiben die **Stichwortmethode** (Schreiben alle Ideen/Argumente als Stichwörter auf. Nummerieren Sie diese dann in der Reihenfolge, in der Sie sie im Text verwenden möchten).

Ich wünsche Ihnen viel Spaß!

Task 4: L1F

Aufgabenumgebung:

Sie nehmen an einem deutschen Essaykurs teil. Am Ende des Semesters müssen Sie einen Essay in 45 Min. zu dem Thema "Bolognaprozess: Ziele und Umsetzung" schreiben. Sie möchten gern eine gute Note haben, da Sie bald Ihre Bachelor-Prüfung ablegen und Sie dieses Essay als Test dafür nutzen möchten.

Aufgabe:
"Der einheitliche europäische Hochschulraum bis 2010 ist das Ziel des Bolognaprozesses, an dem sich 47 europäische Länder beteiligen.
Durch den Bolognaprozess wächst Europa im Hochschulbereich stärker zusammen und ermöglicht so eine bessere Nutzung der vorhandenen Wissenspotentiale. Kernelement des geplanten gemeinsamen europäischen Hochschulraums ist die Einführung eines gestuften Studiensystems aus Bachelor, als erstem berufsbefähigendem Abschluss, Master und der Promotion als europaweit vergleichbare Abschlüsse. Auch die Verbesserung der Anerkennung durch das European Credit Transfer and Accumulation System (ECTS) sowie der Aus- bzw. Aufbau von Qualitätssicherungssystemen ist von Bedeutung. Ebenso ist die Entwicklung und Anwendung europäischer und nationaler Qualifikationsrahmen zur Beschreibung der unterschiedlichen Bildungsabschlüsse und der damit verbundenen Lernergebnisse und Kompetenzen wichtig."
(http://eu.daad.de/eu/bologna/bologna/06950.html)

Die Studiengänge haben sich in Deutschland aufgrund des Bolognaprozesses stark verändert. Bitte nehmen Sie Stellung dazu, inwieweit die Ziele des Prozesses sinnvoll sind und wie sie verwirklicht wurden. Nehmen Sie dabei auch Bezug auf die Umfrage unter Studierenden und auf Ihre persönlichen Erfahrungen.

Ihr Schreiben/Ihr Text sollte folgenden Voraussetzungen entsprechen:

1. Sie müssen innerhalb von 45 Min. das Schreiben beenden.
2. Ihre Stellung zur Frage muss deutlich werden.
3. Geben Sie gute und überzeugende Argumente für Ihre Position.
4. Der Text sollte die "klassische" Essayform haben: Einleitung, Hauptteil, Schluss.
5. Die Absätze haben eine gute Struktur.
6. Sie beachten Rechtschreibung und Sprachstil.
7. Sie benutzen die Texte, um Ihre Argumentation zu unterstützen.

Bitte denken Sie daran, Ihrem Essay einen **Titel** zu geben.

Benutzen Sie für das Schreiben die **Freewriting-Methode** (Schreiben Sie fünf Minuten lang alles auf, was Ihnen zu diesem Thema in den Kopf kommt. Unterbrechen Sie das Schreiben nicht, sondern schreiben Sie zurnot "mir fällt nichts ein, mir fällt nichts ein", bis Sie eine neue Idee haben).

Ich wünsche Ihnen viel Spaß!

Task 5: FLF

Task environment:

You are a participant in an essay writing class. At the end of the term, you have to write an essay in 45 min. on the topic of censorship in television and computer games. You want to get a good mark because the essay can be seen as a test for your bachelor exam, which you'll have to pass in about three months.

Assignment:

After incidents like the school shooting in Winnenden, public has once again turned against television and computer games as being responsible for the tragic events. Many feel that the media influences people's perception of and attitude towards violence. The 'Aktionsbündnis Amoklauf Winnenden", for example, has called on people to dispose of their killer games in a trash can that they have set up in front of the State Opera in Stuttgart.
Please take a position: would keeping these influences away from children and young people, e.g. via censorship, be a good method of protecting society or would it be too big a violation of freedom of the press/the media?

Your writing/the essay should meet the following requirements:

1. It has to be finished in **45 min**.
2. Your position on the question has to be clear.
3. You must give good and convincing reasons for your opinion.
4. The text should have the „classic" essay form: introduction, main part, conclusion.
5. The paragraphs must be well structured.
6. You must pay attention to correct spelling and language use.
7. You should use the reference text to support your argumentation.

Please do not forget to give your paper **a title**.
When planning the essay, **please use the free-writing method** (write down everything that you can think of regarding to the topic in five minutes. Do not stop writing but write down "I don't have any idea" or something along that line until new ideas come up).

Good luck!

E – Questionnaires on the essays

The participant filled in questionnaires after each essay writing session. The questionnaires were filled in in the language that the text was written in. In the following you find the English and the German versions. The filled-in questionnaires are stored in the electronic appendix in the folder /*4_Questionnaires*/.

E1: English questionnaire

Name: _____ Essay:

_____

Date: _____

Was the topic of interest to you?

Why?

_____

Planning:

Did you like the way of planning? yes/no

Why? _____

Will you use this kind of planning again? yes/no

Why? _____

Did you have word finding difficulties? yes/no

Where? _____

Was this of influence in you planning? yes/no

In which respect? _____

Could you solve/get around the problem? yes/no

How? _____

Did you have a German word in the head at some cases during planning? yes/no

When/why? _____

Have you been in a flow in respect to idea generation? yes/no

Did you have ideas that you did not write down in the planning process? yes/no

Why? _____

Do you think that the language influenced your idea finding process/your planning? yes/no

Why? _____

Writing:

Are you content with your writing process? yes/no

Why?

_____

Did you have enough/too little/too much time for writing? yes/no

Have you taken a position to the topic? yes/no

Which one? _____

Do you think that your text is convincing? yes/no

Why? _____

Did you write according to the plan? yes/no

Why? _____

Could you use all the ideas of your planning phase? yes/no

Why? _____

Did new ideas come up during the writing process? yes/no

Which ones?

_____

Could you use them in the essay? yes/no

Why?

_____

Did you write fluently? yes/no

Did you have word-finding problems? yes/no

Where?

_____

What did you do in order to solve them?

_____

Did you have other language-related problems (e.g. spelling, puncutaion) yes/no

Which?_____

_____

What did you do in order to solve them? _____

_____

Were there moments when the German instead of the English word came to your mind? yes/no

When? _____

Which parts were easy to write? _____

Why? _____

Which parts were difficult to write?

_____

Why? _____

Was the planning of help to your writing? yes/no

Why?: _____

If you could write the essay again, what would make differently?

_____

Did you have a reader in your mind? yes/no

Who? _____

Did you appeal to him? yes/no

Is the essay structured in a clear way? (introduction, main part, conclusion) yes/no

Why?

_____

Is the main idea of the main part visible in introduction and conclusion? yes/no

_____

Did you use paragraphing in order to underline the structure? yes/no

Have you “left” the topic? yes/no

Where?

_____

Is the structure of the main part logical? yes/no

_____

Are the paragraphs connected with each other in a logic manner? yes/no

Do you think that your position is obvious? yes/no

Is your language “academic”? yes/no

Why?

_____

Please give yourselves marks for (5 = excellent/1 = very bad):

- language:

- Why?

_____

- content:

- Why?

_____

- structure:
- Why?

_____

- style:
- Why?

_____

Revision:

When did you revise the text: in the writing process or after the writing process?

How many times did you read the text after finishing? _____ time(s)

Which aspects have been of central interest in your revision?

- spelling
- grammar
- structure
- content)
- others:

  _____

E2: German questionnaire

Name: _____ Essay:

_____

Datum: _____

War das Thema für Sie interessant? ja/nein

Warum?

_____

Planung:

War die verwendete Art der Textplanung für Sie gut? ja/nein

Warum?

_____

Werden Sie die Planungsvariante in der Zukunft noch einmal verwenden? ja/nein

Warum?

_____

Hatten Sie Schwierigkeiten damit, Wörter zu finden? ja/nein

Welche?

_____

Hatte das einen Einfluss auf Ihre Planung? ja/nein

Welchen?

_____

Konnten Sie das Problem umgehen? ja/nein

Wie?

_____

Kam Ihnen manchmal eher ein englisches als ein deutsches Wort in den Sinn? ja/nein

Wann/wieso?

_____

Kamen die Ideen flüssig? ja/nein

Gab es Ideen, die Sie nicht aufgeschrieben haben? ja/nein

Warum?

_____

Glauben Sie, dass die Sprache einen Einfluss auf Ihre Ideenfindung/Ihre Planung hatte? ja/nein

Warum?_____

Schreiben:

Sind Sie zufrieden damit, wie Sie geschrieben haben (mit dem Prozess)? ja/nein

Warum?

_____

Hatten Sie genug/zu viel/zu wenig Zeit für das Schreiben? ja/nein

Haben Sie eine klare Position zur Frage eingenommen? ja/nein

Welche?

_____

Halten Sie Ihren Text für überzeugend? ja/nein

Warum?

_____

Haben Sie „nach Plan“ gearbeitet? ja/nein

Warum?

_____

Haben Sie alle Ideen aus der Planungsphase verarbeiten können? ja/nein

Warum?

_____

Kamen Ihnen beim Schreiben neue Ideen? ja/nein

Welche?

_____

Konnten Sie diese in Ihr Essay integrieren? ja/nein

Warum?

_____

Hatten Sie das Gefühl, dass das Schreiben „floss“? ja/nein

Hatten Sie Wortfindungsschwierigkeiten? ja/nein

Wo? _____

Wie sind Sie diese angegangen? _____

Hatten Sie andere Sprachschwierigkeiten (z.B. Rechtschreibung, Zeichensetzung) ja/nein

Welche?

_____

_____

Wie sind Sie diese angegangen? _____

_____

Gab es Momente, in denen Ihnen eher das englische als das deutsche Wort einfiel? ja/nein
Welche waren das?

_____

Welche Teile fielen Ihnen besonders leicht zu schreiben?

_____

Warum?

_____

Welche Teile fielen Ihnen schwer?

_____

Warum?

_____

Hat Ihnen die Planung für das Schreiben geholfen? ja/nein
Kommentar:

_____

Wenn Sie das Essay noch einmal schreiben könnten: Was würden Sie anders machen?

_____

Hatten Sie einen Leser beim Schreiben im Kopf? ja/nein
Welchen?

_____

Haben Sie ihn angesprochen? ja/nein
Ist das Essay klar gegliedert? (Einleitung, Hauptteil, Schluss) ja/nein
Warum?

_____

Steht die Hauptidee sowohl in der Einleitung als auch im Hauptteil als auch im Schluss? ja/nein

_____

Machen die Paragraphen die Struktur klar? ja/nein
Sind Sie einmal vom Thema abgekommen? ja/nein
Wo?_____
Ist der Aufbau des Hauptteils logisch? ja/nein

_____

Sind die Paragraphen sinnvoll miteinander verbunden? ja/nein

_____

Kommt Ihre These klar heraus? ja/nein

Ist Ihre Sprache „akademisch“ genug? ja/nein

Welche Noten würden Sie sich geben für (1 = sehr gut, 5 = sehr schlecht):

- Sprache:
- Warum?

_____

- Inhalt:
- Warum?

_____

- Struktur:
- Warum?

_____

- Stil:
- Warum?

_____

Überarbeitung:

Wie haben Sie den Text überarbeitet: während des Schreibens/nach dem Schreiben?

Wie oft haben Sie ihn nach Fertigstellung gelesen? _____ Mal

Worauf haben Sie bei der Überarbeitung (während und nach dem Schreiben) besonders geachtet?

- Rechtschreibung
- Grammatik
- Struktur
- Inhalt
- anderes:

  _____

F – Contents of the electronic appendix

The following lists the folders on the CD-ROM and gives an overview of their contents:

1_Participants

In this folder, the filled-in introductory questionnaires of the participants the results of the language test are stored.

2_Essays

Here, you find the essays that the participants wrote in the test. Each task (e.g. L1N, FLN) has got its own folder.

3_Keylog_protocols

Like in *2_Essays* the keylog protocols of the participants text production processes are stored in separate task folders.

4_Questionnaires

The participants had to fill in questionnaires about their writing experiences in each task. They are stored in separate task folders.

5_Tables

The results of the analysis were stored in tables which were used for the statistical analysis with SPSS. In this folder, the Excel spreadsheets which form the basis for the analysis of fluency (chapter 5), errors (chapter 6), and revision processes (chapter 7) are stored.

Fluency: Table with the results of the analysis of productivity

L1_errors: Table with the errors per participant in the different types of L1 text and in the different error categories.

FL_errors: Table with the errors per participant in the different types of FL text and in the different error categories.

Revisions_Total: Table with the results of the analysis of the revision processes in total

Revisions_Plan: Table with the results of the analysis of the revision processes in planning

Revisions_Formulation: Table with the results of the analysis of the revision processes in writing the proper essays

Revisions_Final_Revisions: Table with the results of the analysis of the revision processes in the final revision