education sciences

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Achievement Goals, Student Engagement, and the Mediatory Role of Autonomy Support in Lecture-Based Courses

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Abstract: What makes first-semester students stay engaged in non-mandatory lecture-based courses? This study aims to answer this question by analyzing the relationship between student engagement with autonomy support and achievement goals. Data gathered through self-reports from 340 students attending four introductory lecture-based courses at four German universities were used to test the following hypotheses: (1) students who pursue goals for self-improvement display emotional, behavioral, and cognitive engagement, (2) emotional engagement is predicted by students' perceptions of autonomy support, and (3) students who aim to outperform their peers display higher emotional engagement compared to cognitive engagement. After confirming the hypotheses with multiple regression analyses, additional results indicated a statistically significant relationship between both emotional engagement and achievement goals with autonomy. Further, results indicate a moderate positive association between emotional engagement and both behavioral and cognitive engagements. These findings confirm the presence of both mastery and performance goals in courses with a lecture-based teaching. This study highlights some limitations for statistical analyses with agentic engagement as well as the need to analyze study participants' school culture for further research on student engagement.

Keywords: mastery goals; agentic engagement; emotional engagement; lectures; autonomy; school culture; Germany

Citation: Montenegro, A.; Schmidt, M. Achievement Goals, Student Engagement, and the Mediatory Role of Autonomy Support in Lecture-Based Courses. *Educ. Sci.* **2023**, *13*, 912. https://doi.org/10.3390/educsci13090912

Academic Editor: Diana Da Silva Dias

Received: 12 June 2023
Revised: 1 September 2023
Accepted: 5 September 2023
Published: 8 September 2023

1. Introduction

The literature on higher education recognizes that the transition from school to university can be difficult for students [1]. Issues that make this transition difficult include larger class sizes [2,3] and limited contact time with instructors perceived as a lack of support [4].

At university level, lecture-based courses are characterized by high undergraduate enrollment rates. A lack of motivation and dropout rates lead educational researchers to further investigate student engagement in large courses. Our research question is thus: What makes first-semester students stay engaged in large non-mandatory lecture-based courses?

High levels of behavioral and cognitive engagement, as well as few opportunities to display agentic engagement, are expected due to the lecture-teaching format. However, the degree of emotional engagement is more uncertain. As possible mediators, we examined students' achievement goals (both mastery and performance goals) and autonomy support, which have emerged as important personal and contextual contributors to student engagement [5–7].

Previous studies on student engagement have focused on its association with internal psychological processes, such as students' goals [8] and proximal environmental factors, such as students' perceptions of teacher support [9,10].

The present research consists of a cross-sectional and correlational study that aimed (1) to extend our knowledge of student engagement in on-site lecture-based courses, and

(2) to better understand what interactions, if any, exist between student engagement and certain motivational constructs in non-mandatory courses.

2. Theoretical Background

2.1. Student Engagement and Achievement Goals

A four-dimensional model of student engagement is implemented in the present study. For a long time, a three-dimensional model of student engagement summarized by Fredricks et al. [11] prevailed in engagement literature. Their model consists of behavioral engagement (students' behaviors with regard to classroom norms), emotional engagement (positive and negative affective reactions in the classroom), and cognitive engagement (the use of metacognitive and self-regulated strategies). But for nearly a decade, studies have demonstrated the significance of agentic engagement (the ability to be proactive in improving one's own learning conditions, making suggestions, and communicating preferences) and its inclusion within the larger engagement construct, which provides a fuller picture of students' involvement in learning activities [5,12].

Current research on student engagement reframes the four dimensions of engagement into two classes of internal and external dimensions [13]. The internal or non-observable dimensions of engagement are cognition and emotion [14], whereas the observable or external dimensions refer to behavior and agency [13,15]. All four dimensions of engagement occur at the intersection of achievement goals and environmental influences such as teacher behaviors [15–18].

As cognitive-dynamic aims that focus on competence [19], achievement goals are evaluated by relative intrapersonal standards or normative standards [19,20]. They are established in relation to the activity itself (e.g., enjoyment learning new things) or the outcome of the activity (e.g., getting good grades) [21].

Achievement goals are associated with differential patterns of affect, cognition, and behavior [22], referring to the reasons why people engage in achievement-related behaviors [23]. Goals are categorized within a dichotomous model that includes mastery and performance goals [20]. Mastery goals orient students to strive to improve skills, whereas performance goals orient students to demonstrate superior competence or to mask inferior competence in school-related work [24]. Both mastery and performance goals can take different forms depending on students' motivation to either attain success or to avoid failure [19]. From this perspective, approach goals are differentiated from avoidance goals (for an overview see [25,26]).

Mastery goals have shown relatively consistent effects on learning, indicating that those who pursue these goals enjoy learning, are persistent when facing academic difficulties, find their courses interesting, and implement learning strategies [27]. Mastery-approach goals focus on striving to attain mastery or improvement [28]. They focus on the intrinsic value of learning, aiming to increase competence, or master something new [29]. On the other hand, mastery-avoidance goals are driven by the fear of not acquiring enough knowledge, forgetting what is already known, or not understanding the learning contents [30]. These goals focus on avoiding, not developing, one's own competencies to the fullest extent and hinder the possibility of a decrease in skill [31].

Research on performance goals has shown both positive and negative effects for learning (for a review, see [32]). Performance-approach goals (i.e., trying to outperform others) center on being perceived as competent [33]. Competitiveness is the major predictor of these goals [31]. On the other hand, performance-avoidance goals center on avoiding appearing incompetent [31,33], are grounded in fear of failure, and are associated with less favorable academic outcomes [34,35].

Although achievement goals have been greatly researched in education, they have yet to be explored in the learning environment of the lecture hall. This study adopts the dichotomous view of motivational goals as its theoretical foundation to investigate why students attend non-mandatory lecture-based courses. With this purpose, two key

studies on achievement goals and engagement conducted in lecture-based courses guided our research.

Firstly, Pekrun et al. [34] investigated the relationship between achievement goals, positive and negative emotions (i.e., enjoyment versus anxiety), and academic achievement in introductory-level psychology lecture courses (n = 218 undergraduates). Their study implemented a trichotomous model of achievement goals (mastery, performance-approach, and performance-avoidance). As expected, their results showed that mastery goals were a positive predictor of positive emotions and a negative predictor of boredom.

Similar to Pekrun et al.'s study, Lüftenegger et al. [36] implemented a model of achievement goals in order to examine associations with emotions and exam achievement in a research methods and evaluation lecture course. They also found no gender effects for goals, exam achievement, or emotional engagement. Contrary to Pekrun et al.'s study, they found a positive link between avoidance goals and emotional engagement. However, as they explained, the association was only moderate and lower than those between approach goals and enjoyment.

Achievement goals are highly determined by students' socioeconomic backgrounds [37]. However, correlational analyses between student engagement and achievement goals have tended to ignore the inclusion of cultural characteristics, narrowing the particularities and relationships of the concepts [37]. Certain characteristics of students attending introductory level courses in Germany, such as having gained self-regulation skills at upper secondary school, highlight the importance of autonomy support in secondary schools before attending higher education.

2.2. Autonomy Support

Autonomy support refers to a cluster of behaviors that "collectively create that interpersonal tone of support and understanding" [38], (p. 407). Such support is promoted by eliciting and acknowledging student's perspectives, supporting self-initiatives, offering choices, providing relevant information, and minimizing pressure and control [39]. In response to autonomy support, students experience more engagement [18,40–42] and positive emotions [43].

Connected to autonomy support, showing structure when teaching creates an orderly and organized learning environment [44]. Offering clarity of information supports students to know what is expected of them and how they can effectively achieve the desired outcomes [45,46]. Structure is important for creating a motivating learning environment. For example, Mazer [47] analyzed the effects of teacher communication behaviors on 518 undergraduate students' engagement. Mazer found that an interaction effect occurred between the clarity of teachers' behaviors (e.g., structure) and both cognitive and emotional engagements.

When combined with structure, autonomy support is effective in fostering self-regulation [48]. Both motivational strategies allow students "to know how they can regulate their learning" [49]. Students who have experienced autonomy support in previous schooling express relatively less need to defend being self-determined. This is because the previous environment has already instigated a fulfillment of autonomy [50]. Student self-efficacy (an aspect of autonomy) responds positively to experiences that confirm that the student is capable of working autonomously [51].

An autonomy-supportive context promotes choice and decision-making, acknowledges potential difficulties, and involves the use of non-controlling language [52]. Such style stresses the importance of student engagement by building rapport with students, understanding that learning occurs in a social context, and being enthusiastic about a course and teaching in general [53]. Ceding responsibility and generating a positive learning environment based on mutual trust is a characteristic of this teaching environment [44].

Positive associations between student perceptions of autonomy support and structure suggest that teachers tend to combine them [45,54]. For example, telling students that a certain activity helps develop understanding and regulate their learning would lead to

different cognitive processing than telling them that the activity evaluates certain abilities [5]. Thus, teachers set the intellectual standards and the quality of performance they expect from students as well as exemplify their values through the quality of the work they provide.

3. Methods

3.1. Participants

The survey participants were undergraduate students from sociology, linguistics, and communication (social sciences) who attended introductory lecture-based courses. The four universities included were state-run institutions located in the German federal state of North Rhine-Westphalia. University introductory courses were selected for this study for two reasons: (1) a small number of empirical studies on student engagement (mostly on behavioral engagement) exist in introductory courses [55–57], and (2) no study in Germany has included an analysis of students' perceptions to understand motivational elements (students' goals and teaching autonomy support) that influence student engagement in large courses.

All selected courses were in-person (face-to-face). The seating capacity of the lecture halls ranged from 150 to 350, and the selection of the students was limited to those who reported being in the first semester. The selected lecture-based courses were offered in the German language. The sampling consisted of 340 first-semester students: 93.2% German with a mean age of 20 years (SD = 2.7 years) and 108 men, 229 women, and 3 participants who did not report their gender. These courses took place once a week and attendance was not mandatory. During week 8 to week 10 of the winter semester 2017, a paper-based questionnaire was distributed to all students within a given lecture and collected after 10 min. The students were instructed to answer all survey questions with reference to their particular course.

3.2. Hypotheses

Considering the work of Pekrun et al. [34] and Lüftenegger et al. [36] and given the important role of goals, autonomy support, and emotions in learning, we investigated the following hypotheses: (1) Students who pursue goals for self-improvement (mastery goals) display emotional, behavioral, and cognitive engagement; (2) Emotional engagement is predicted by students' perceptions of autonomy support; and (3) Students who aim to outperform their peers (performance goals) display higher emotional engagement compared to cognitive engagement.

3.3. Measures

Implementing a cross-sectional and correlational design, the questionnaire was composed of three main motivational constructs—student engagement, achievement goals, and perceived autonomy support, followed by eight items regarding reasons for course participation, and six socio-demographic items (age, main field of study, academic semester, gender, mother tongue, and place of birth), for a total of 52 items. The scales were developed by adapting existing scales in the literature, as described in subsequent sections. The questionnaire was written and administered in German.

3.3.1. Student Engagement

We assessed four dimensions of engagement, four types of achievement goals, and perceived autonomy support. Behavioral, emotional, and agentic engagement items were adapted from Reeve [7], and the items for cognitive engagement were adapted from the Program for International Student Assessment (PISA) index of elaboration strategies, including rehearsal, elaboration, organization, and meta-cognitive strategy use [58]. Behavioral (5 items), emotional (4 items), and cognitive (5 items) engagements were assessed using a 4-point scale for agreement with options ranging from strongly agree (1) to strongly disagree (4). Agentic engagement (4 items) was assessed using a frequency scale based

on a four-point scale: in every/almost every lecture, in about every second lecture, rarely, and never.

3.3.2. Achievement Goals

The items on achievement goals were adapted from the Achievement Goal Framework that leads to four different types of goals as described by Nicholls [59] and Dweck [60]. This scale measures mastery-approach, performance-approach, mastery-avoidance, and performance-avoidance and reflects efforts to (a) acquire and improve knowledge (mastery-approach goal), (b) prove superior ability (performance-approach goal), (c) avoid losing knowledge and skills (mastery-avoidance goal), and (d) avoid failure and the demonstration of inferior ability (performance-avoidance goal) [19,61].

For four mastery goals and four performance goals, the scale ranged from strongly agree (1) to strongly disagree (4). Some sample items are: "My goal is ... to learn as much as possible (mastery-approach goal), ... to perform better than the other students (performance-approach goal), ... to understand fully the content of the course (mastery-avoidance goal), and ... to avoid performing poorly compared to others (performance-avoidance goal)".

3.3.3. Autonomy Support

The four items used to measure 'autonomy support' were taken from the PISA index [58]. They included instructional behavior regarding 'interest in students learning', 'extra help', 'clarification until students have understood', and 'opportunities to express opinions'. Both items for achievement goals and autonomy support were assessed with the same 4-point scale. In addition to student engagement, achievement goals, and perceived autonomy support, students responded to eight items describing reasons why students do not participate orally in lecture-based courses.

3.4. Data Analysis

In order to scale the described constructs into single variables, i.e., to reduce the multiple variables in the questionnaire into single underlying variables (or dimensions), a categorical principal component analysis (CATPCA) was applied to the four sets of engagement variables. The dimension reduction through CATPCA analysis was also conducted for the two constructs measuring achievement goals as well as for autonomy support separately, extracting one dimension each.

The hypotheses were tested with regression analysis. For this, three multiple linear regression models were calculated to examine relations among mastery and performance goals (as independent variables) with behavioral, emotional, and cognitive engagements. In all three models, the variables gender, German nationality, German as native language, and the four lecture-based courses, with course 1 as the reference group, were included as controls.

4. Results

The greatest level of agreement for all student engagement variables was found for emotional engagement, followed by behavioral engagement and cognitive engagement (Table 1). High values for emotional engagement were expected considering that students come voluntarily to these courses (no attendance list). Variables on agentic engagement show very low agreement scores, which can be explained by the lecture-based teaching format of these courses. This is highest for the variable "giving suggestions", with over 90% disagreement. Due to its lack of variance, this variable was excluded from further analysis.

Table 1. Engagement items with percent response.

Items	Strongly Agree	Agree	Disagree	Strongly Disagree	Factor Loading
Emotional engagement					
Feeling good	59.0	36.3	4.1	0.6	0.63
Learning new things	38.2	46.2	14.7	0.9	0.66
Feeling interest	19.2	47.5	27.7	5.6	0.89
Enjoyment	19.5	50.5	27.1	2.9	0.89
Behavioral engagement					
Punctuality	76.5	17.9	5.0	0.6	0.15
Attendance until the end	82.4	14.4	2.9	0.3	0.44
Attention	19.4	58.5	19.7	2.4	0.72
No writing private messages	10.6	17.4	29.1	42.9	0.84
No Internet surfing	15.6	22.6	30.9	30.9	0.87
Cognitive engagement					
Finding new solutions	6.5	44.2	42.1	7.1	0.59
Relating knowledge to everyday situations	10.3	37.1	40.6	12.1	0.76
Relating previous to new knowledge	15.3	49.4	30.6	4.7	0.79
Thinking of other ways to solve problems	4.4	28.3	51.3	15.9	0.77
Interdisciplinary reflection	14.5	52.1	27.2	6.2	0.73
Agentic engagement					
Asking questions	0.0	3.5	34.1	62.4	0.86
Answering questions	1.2	9.1	39.7	50.0	0.79
Asking for clarification	0.6	3.5	35.3	60.6	0.83
Giving suggestions	0.9	0.3	6.2	92.6	-

These variables were reduced through four separate CATPCA into one dimension per construct, resulting in four factors with eigenvalues of 2.42, showing moderate explained variance, and Cronbach's alpha $\alpha = 0.78$, showing a good internal consistency, for emotional engagement (4 items), eigenvalue 2.19 and $\alpha = 0.68$ for behavioral engagement (4 items), eigenvalue 2.68 and $\alpha = 0.78$ for cognitive engagement (5 items), and eigenvalue 2.05 and $\alpha = 0.76$ for agentic engagement (3 items). Each item loaded distinctly on the factor for which it was designed.

Correlations between all engagement dimensions were calculated (Table 2). Results indicate a moderate positive association between emotional engagement and both behavioral and cognitive engagements ($r = 0.22$, $p < 0.01$ and $r = 0.25$, $p < 0.01$, respectively). This means that students who are emotionally engaged also tend to report higher levels of behavioral and cognitive engagements.

Table 2. Inter-dimension correlation matrix of reactive dimensions of engagement.

	Emotional	Behavioral	Cognitive
Behavioral	0.222 **		
Cognitive	0.249 **	0.135 *	
Agentic	0.085	0.062	0.248 **

* $p < 0.05$ ** $p < 0.01$.

There is a significant positive correlation between (1) emotional and behavioral; (2) cognitive and emotional; and (3) agentic and cognitive dimensions of student engagement. Agentic engagement is only significantly associated with cognitive engagement, which supports the theoretical linkage between levels of thinking (i.e., higher order cognitive skills) and students' proactive actions (i.e., asking questions and asking for clarification). As expected, none of the correlations are very high, despite being significant.

Overall, the analysis of achievement goals indicates that mastery goals (both approach and avoidance) and performance-avoidance goals were highly and moderately

reported by students, respectively (Table 3). The highest agreement scores are found for mastery-approach goals, with its first two items obtaining 98.2% of agree and strongly agree responses. Performance-avoidance goals (i.e., the items 'perceptions of being not worse than the others' and 'not worse than average') also show very high agreement.

Table 3. Achievement goals (mastery and performance) and autonomy support items, in percent.

Items	Strongly Agree	Agree	Disagree	Strongly Disagree	Factor Loading
Mastery goals					
Understanding as much as possible	70.3	27.9	1.8	0.0	0.78
Understanding most of the content	73.9	24.3	1.5	0.3	0.78
Reaching perfection	15.9	39.8	33.9	10.3	0.61
Full understanding	40.7	50.1	8.8	0.3	0.76
Performance goals					
Better grades than others	10.7	33.2	40.9	15.1	0.86
Better in comparison to others	8.9	37.0	37.3	16.9	0.85
Not worse than the others	40.2	42.6	10.9	6.2	0.76
Not worse than average	43.9	42.4	8.6	5.0	0.83
Autonomy support					
Interest in students' learning	19.3	52.7	25.3	2.7	0.77
Support when needed	33.7	50.9	13.6	1.8	0.83
Clarification until students have understood	29.8	45.2	22.3	2.7	0.83
Opportunities to express opinions	54.3	38.9	6.5	0.3	0.57

Both dimensions of achievement goals show high internal consistency with Cronbach's alpha of $\alpha = 0.71$ and eigenvalue 2.15 (performance goals, 4 items) and $\alpha = 0.84$ and eigenvalue 2.73 (mastery goals, 4 items). The two dimensions also significantly correlate with each other ($r = 0.19$; $p < 0.001$). For the autonomy support variables, measured with 4 items, the resulting dimension shows a Cronbach's alpha of $\alpha = 0.75$ and eigenvalue of 2.30.

For autonomy support items (Table 3), findings reveal that the highest score is for the item 'opportunities to express opinions' across the four courses (93.2%), followed by 'support when needed' (84.6%).

To test the first hypothesis "Students who pursue goals for self-improvement (mastery goals) display emotional, behavioral, and cognitive engagement", multiple regression models were calculated for cognitive, behavioral, and emotional engagement to measure how they are affected by the total scores of achievement goals and student engagement when controlling for demographic and course data (Table 4).

Table 4. Beta coefficients of multiple regressions for reactive dimensions of student engagement and multiple variables.

	Model 1	Model 2	Model 3
	Cognitive	**Behavioral**	**Emotional**
Performance Goals	−0.039	0.011	0.015
Mastery Goals	0.288 ***	0.193 ***	0.231 ***
Male	0.057	0.186 ***	−0.004
Age	0.028	0.139 **	0.019
German Language	0.073	0.038	0.048
Born in Germany	−0.041	−0.004	−0.007
Course 2	−0.226 ***	0.09	0.209 ***
Course 3	−0.102	−0.127 *	0.429 ***
Course 4	−0.026	0.224 ***	0.434 ***
Autonomy Support	0.127 *	0.108 *	0.323 ***
Adjusted R^2	**0.121**	**0.184**	**0.457**

* $p < 0.05$ ** $p < 0.01$ *** $p < 0.001$.

For the regression analyses, agentic engagement—the only proactive dimension—was excluded, as the requirement of linearity was not met. The first model, with cognitive engagement as the dependent variable, shows a low-moderate explained variance with an adjusted $R^2 = 0.12$. The variables mastery goals and autonomy support have a statistically significant, positive effect on engagement (ß = 0.288, $p < 0.001$ and ß = 0.127, $p = 0.025$, respectively). While all courses show a negative effect on cognitive engagement in comparison to reference course 1, this effect is only significant, but moderate, for course 2 (ß = 0.226, $p < 0.001$).

A second model, with behavioral engagement as a dependent variable, shows moderate explained variance with an adjusted $R^2 = 0.21$. As in Model 1, the variables mastery goals (ß = 0.193, $p < 0.001$) and autonomy support (ß = 0.108, $p = 0.047$) have a statistically significant, positive effect on engagement. Sociodemographic characteristics show that male students have a higher behavioral engagement than female students (ß = 0.186, $p < 0.001$) and that behavioral engagement significantly increases with age (ß = 0.139, $p = 0.006$). In this model, affiliation to the three courses had various effects when compared with course 1, with course 2 having a weak effect ß = 0.090, course 3 showing a weak negative effect on behavioral engagement (ß = −0.127, $p = 0.048$) and course 4 showing a positive significant effect (ß = 0.224, $p < 0.001$).

Model three—inspecting effects on the dependent variable emotional engagement—has the highest explained variance with an adjusted $R^2 = 0.47$ and show that mastery goals (ß = 0.231, $p < 0.001$) and autonomy support (ß = 0.323, $p < 0.001$) have high statistical significance for this variable. In this model, all three courses show very strong, highly significant positive effects on emotional engagement when compared to course 1, while no sociodemographic characteristics are significant.

Compared to performance goals, mastery goals have the highest correlations with behavioral, emotional, and cognitive engagements, thus providing considerable support for H1. This finding confirms the presence of goals for mastering and for avoiding losing knowledge as well as goals for avoiding being worse in comparison to peers.

When these results are evaluated, it is clear that there is a statistically significant, positive association between autonomy support and all reactive dimensions of student engagement. In other words, it is likely to conclude that as perceived autonomy support levels increase, (emotional) engagement levels also increase, supporting the second hypothesis "Emotional engagement is predicted by students' perceptions of autonomy support".

Emotional engagement was positively linked to stronger mastery goals but also stronger performance-approach goals and less performance-avoidance goals. This provides support for the third hypothesis "Students who aim to outperform their peers (performance goals) display higher emotional engagement compared to cognitive engagement". This finding is similar to Pekrun et al.'s study [34] who found a positive link between avoidance goals and emotional engagement.

On examining the contributions made by the independent variables in the models shown in Table 4, mastery goals make the greatest contribution for all reactive dimensions of student engagement. The present study complements previous studies [34,62] by showing that a measure of mastery goals is positively related to cognitive and emotional engagements (ß = 0.288 and ß = 0.231, respectively).

5. Discussion

We have demonstrated emerging relationships among student engagement, achievement goals, and perceived autonomy support. Similar to Buchanan and Palmer [63], this study shows that students like lecture-based courses. The students highlighted the characteristics of the lecture format as a particular learning setting that implicitly demands time and concentration to process the course content. The fact that most students enjoy their lecture-based courses should be considered in the context of the current movement against lecture-teaching formats.

Students attending large introductory lecture-based courses in Germany may not demand a change of course structure. If the students have positive attitudes toward learning and autonomous behavior, they may make more of an effort to attend and participate autonomously. Oga-Baldwin [16] suggests a potential hierarchy of relationships within the engagement dimensions, with behavioral engagement correlated with and predicting the other dimensions. From this perspective, engagement in lecture-based courses 'at least once reaching a certain level' begins with behavioral engagement since students come voluntarily to these courses and display a disposition to come and avoid being disruptive.

Similar to Mazer's findings [47], there was predictive significance of autonomy support on cognitive and emotional engagement. Additionally, cognitive engagement was positively and highly correlated to mastery goals. Autonomous motivation has been associated with cognitive engagement in past studies [48]. This suggests that students who enjoy learning are likely to implement cognitive strategies such as analyzing problems while attending classes. Cognitive engagement serves to help students understand content, do assignments, and apply tasks to daily life. This process is influenced by students' self-regulation to future academic and professional aspirations [14].

Not only positive correlations among the reactive dimensions of engagement and the types of achievement goals were found, but also among internal dimensions of engagement and autonomy support. With the absence of external pressure (e.g., an attendance list), the satisfaction of autonomy support benefits cognitive and emotional engagement (internal dimensions of engagement). The data confirmed the prediction that students' perceptions of autonomy support are highly related to emotional engagement.

In these courses, student agentic actions are neither prohibited nor expected during lecturing. Such disposition of 'listening lectures' is part of the school culture in large lecture-based courses in Germany. After conducting the descriptive and statistical analyses, we excluded the data of agentic engagement for the regression models. This decision was also supported by considering the characteristics of the teaching format of these courses as well as the school culture of the participants.

Not all students enter lecture-based courses with a history of engagement or a willingness to engage. For better teaching and learning practices, it is important to learn to identify emotional engagement during learning activities, which refers to affective responses of interest and affective reactions such as anxiety and boredom [11].

Achievement goals cannot be generalized from one context to another. Results of this study showed endorsement of both mastery goals (referring to self-improvement) and performance goals (referring to peer competition) by the students. Students who attend lecture-based courses, at least in this study, are primarily responsible for engaging themselves and demonstrating competency to display both mastery and performance goals. The German educational system is oriented toward making the students discover their own abilities and making use of them through autonomous and independent work. Considering this, students' development of autonomy is a valuable predisposition to engagement in higher education that enables them to reach high levels of commitment in courses that do not demand attendance.

Observing the distinction for mastery goals, the results showed relative endorsement of mastery-approach (stronger than mastery-avoidance) as was found in Elliot and McGregor's study [31]. Mastery-approach goals were consistently positively related to enjoyment (also shown by Pekrun et al. [34]). As predicted in H1, perceptions of mastery goals were related to high levels of reactive engagement [43,62]. This relationship highlights an emergent research development in traditional teaching scenarios such as large lecture-based courses that tend to focus on cognitive development. Emotions may influence goal adoption, which implies that mastery goals and emotions are linked by a reciprocal connection [34].

Two items measuring mastery-avoidance goals ('reaching perfection' and 'full understanding') obtained 55.8% and 90.9% of agreement responses across the four lecture-based courses. This result is related to the first item's construction that contained a certain negative connotation (i.e., perfection as 'impossible' or 'unreachable'). Although 'perfectionism'

was initially conceptualized as a unidimensional negative characteristic of personality, there is now consensus among researchers that it is a multidimensional personality construct with positive as well as negative effects on behavior [64]. Empirical findings of perfectionism in lecture-based courses are rare. In line with Lüftenegger et al. [36] and Pekrun et al. [34], these findings also suggest that future research could attempt to construct better items for the avoidance component of mastery goals in relation to perfectionism (performance-avoidance goals).

Findings also highlight performance-avoidance goals as motivating components. This result is surprising because performance-approach goals refer to the sense of competitiveness, which is not expected to be high in large courses where students are not able to easily identify their peers' performance. Nearly half of all students reported agreement on the item 'avoiding negative reactions from peers'. This means students pursuing performance avoidance goals use external standards, that is, comparing their performance with the performance of others and seeking to avoid negative results.

The presence of both mastery and performance goals in this study suggests that students not only focus on self-improvement but also consider peer competition. Empirical research argues that students adopting performance goals guide their behavior towards demonstration of competency [65]. This observation suggests that students can actually pursue both types of goals simultaneously and thus students' achievement goals may not be structured by singular goals as once theorized, but instead may reflect multiple configurations of achievement-related goals [66].

Findings of this study on achievement goals contribute to the Achievement Goal Theory and school culture literature. Describing a broadened role of school culture in students' autonomous behavior is particularly critical to this theory. The students' desire for the 'appearance of being self-confident' (performance-approach goal) may be enhanced by the competition-oriented school culture in which they participate.

As predicted in H2, students experience more engagement and positive emotions in response to teacher behavior [18,40,42,67]. Students perceived that their courses fostered them with autonomy support, which corroborates that autonomy goes beyond the power dynamics involved in grading policies and attendance lists. The highest score of autonomy support across the four courses was 'opportunities to express opinions'. This result is surprising considering the characteristics of these courses. These findings provide empirical support for student engagement models and warrant further exploration of engagement and self-expression opportunities.

6. Limitations and Further Research

There are three limitations addressed, which provide directions for future research. First, the participants were all first-year students from Germany and the sample consisted of an unequal percentage of women and men. In future research, more attention could be given to samples of students from different semesters, and in which the percentage of women and men is balanced.

Second, we limit our study to students' engagement and achievement goals in four introductory social sciences courses. Our research could be extended by using our research design to cover other fields. Additionally, although the sample size is sufficient for our analysis, we acknowledge that with a larger sample, conclusions from statistical associations would be stronger in some cases. The generalizability of these results to other ages and contexts remains an open question. Notwithstanding these limitations, this is the first study to our knowledge to investigate the role of achievement goals and autonomy support on student engagement in non-mandatory lecture-based courses. In addition to this, the German perspective has been studied here, laying the foundation for future research on student engagement and motivation in the German school culture.

Lastly, future correlational research could (dis)confirm if the observed correlation between emotional engagement and achievement goals exists for students of different ages, cultural backgrounds, and in different academic disciplines. More efforts are also

needed for examining the engagement experienced by today's first-year students. As in other European countries, Germany is facing the demands of a standardized university system that should be cautious and draw on evidence-based research regarding students' transition from upper secondary school to university.

Access to higher education for the new generation after the wave of immigrants over the past decade is also a rather new research topic [68]. In this respect, there has been little research on the effects of culture on students' achievement goals [69], which should also be encouraged for further studies.

7. Conclusions

This study indicates that students who pursue goals for self-improvement (mastery goals) display emotional, behavioral, and cognitive engagements. The results also confirm that perceived autonomy support increases the likelihood of student engagement. To the question of what makes first semester students stay engaged in non-mandatory lecture-based courses, we concluded that when students perceive autonomy support, they display higher levels of student engagement, with emotional engagement the highest motivating dimension.

This study supports the engagement literature to date and reinforces the significance of achievement goals and autonomy support for student engagement, even in non-mandatory courses. Concretely, this study confirms the statement that there is a greater chance of perceiving teaching autonomy support as emotional engagement increases, which reflects students' positive feelings toward lecturing.

Results of this study showed endorsement of both mastery goals (referring to self-improvement) and performance goals (referring to peer competition) by the students. This finding emphasizes the literature of goal achievement, from single-goal to multiple-goal pursuits, supporting the four-group model of achievement goals.

Author Contributions: Conceptualization, A.M.; formal analysis, M.S.; writing—original draft preparation, A.M.; writing—review and editing, A.M. and M.S. All authors have read and agreed to the published version of the manuscript.

Funding: This research received no external funding. The publication of this article was supported by the Open Access Publication Fund of the University of Bonn.

Institutional Review Board Statement: Ethical review and approval were waived for this study due to the fact that the study was in accordance with the General Data Protection Regulation (https://www.datenschutzgrundverordnung.eu/wp-content/uploads/2016/04/CONSIL_ST_5419_2016_INIT_EN_TXT.pdf (accessed on 1 June 2023)).

Informed Consent Statement: Informed consent was obtained from all subjects involved in the study.

Data Availability Statement: The data presented in this study are available upon request from the corresponding author.

Conflicts of Interest: The authors declare no conflict of interest.

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