

Toward Minimalist HUDs? Longitudinal Trends and Player Perceptions in Action-Adventure and Action-RPG Games

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Abstract. Heads-up displays (HUDs) in contemporary action-adventure and action-RPG games are often described as becoming more minimalist, but evidence for this claim is largely anecdotal. Moreover, it remains unclear whether expert-coded HUD minimalism corresponds to how players actually perceive and evaluate game interfaces. To address this gap, we combine a longitudinal analysis of prominent commercial games with a clip-based perception study. We coded 30 Game of the Year nominees released between 2014 and 2025 using a four-dimensional framework of HUD minimalism capturing diegetic integration, persistence, density, and contextuality, and complemented this analysis with a remote within-subject study ($N = 59$) in which participants rated perceived minimalism, expected immersion, clarity, preference, and HUD reduction intention across gameplay clips.

Results show a clear upward trend in composite HUD minimalism over time: later games more often present information through diegetic and context-dependent means while reducing persistent and visually dense overlays. Player judgments closely tracked this distinction. Interfaces perceived as more minimalist were also associated with higher expected immersion and stronger preference, whereas clarity was driven more by familiarity than by perceived minimalism. Rather than indicating a simple disappearance of HUDs, these findings point to a broader design shift toward selectively surfaced, integrated, and state-dependent information presentation in prominent action games.

Keywords: game UI, heads-up display, diegetic interface, HUD minimalism, player perception, immersion, action games

1 Introduction

Game user interfaces shape how players monitor system state, plan actions, and allocate attention. In action-adventure and action-RPG games, HUDs support performance but can also compete with cinematic presentation and environmental storytelling. Design discourse therefore often frames HUD design as a trade-off between clarity and immersion, especially when contrasting superimposed overlays with diegetic or otherwise integrated interfaces [4,1]. Prior work, however, suggests

that this trade-off is not straightforward: overlays may be preferred for clarity, transparent interfaces are not necessarily more involving, and the effects of HUD reduction can depend on player expertise [4,3]. Two questions therefore remain open: whether prominent action games have in fact become more minimalist over time, and whether such changes align with how players perceive and evaluate those interfaces.

We treat HUD minimalism not as the absence of interface elements, but as a strategy for distributing gameplay-relevant information. A HUD is more minimalist when essential information is embedded in the game world and/or revealed contextually, while the baseline overlay remains low in persistence and concurrent visual load. We operationalize this construct along four dimensions: diegetic integration (DIEG), persistence (PERS), density (DENS), and contextuality (CONT). Building on this definition, the paper makes three contributions: it operationalizes HUD minimalism as a multi-dimensional construct, applies that framework to a longitudinal corpus of high-visibility action games, and tests whether expert-coded minimalism aligns with player perception and expected experience in a remote clip-rating study.

2 Background and Related Work

2.1 HUD minimization in the diegesis/spatiality design space

A common conceptual basis for HUD minimization is the distinction between diegetic and non-diegetic UI, extended with spatial and meta representations [1]. This typology separates *where* information is shown (in-world vs. overlay) from *how* it is presented over time (persistent vs. contextual) and at any moment (sparse vs. dense). Importantly, diegetic UI is not inherently superior: overlays can convey precise information efficiently, and many modern designs are hybrids with ambiguous diegetic boundaries [1]. These nuances motivate measuring HUD minimalism as a graded, multi-dimensional property rather than a binary “diegetic vs. HUD” label.

2.2 Empirical evidence: immersion, clarity, and expertise

Player research cautions that greater UI transparency does not guarantee higher immersion-related involvement. Llanos and Jørgensen show that players may prefer overlays for clarity and that transparent interfaces have no necessary connection to involvement [4]. Controlled experiments further suggest that HUD reduction interacts with expertise: removing non-diegetic HUD elements can benefit involvement primarily for expert players, while novices may experience higher access barriers depending on task demands [3]. Together, prior work frames HUD minimization as a trade-off space (immersion vs. clarity, modulated by expertise).

3 Methodology

3.1 Trend analysis of HUD minimalism

We used The Game Awards (TGA) Game of the Year nominees from 2014 to 2025 as a bounded corpus of high-visibility titles that influenced mainstream design discourse. Our goal was longitudinal comparability among prominent releases rather than market representativeness. [9]

We retained action-adventure and action-RPG titles featuring real-time, character-centric control in directly navigable 3D environments, yielding broadly comparable HUD demands during traversal and combat. We excluded games whose interface logic follows materially different conventions, including platformers, 2D and top-down/isometric titles, strategy and sports games, predominantly horror-focused titles, heavily shooter-led first-person games, and strongly menu-, party-, or text-mediated RPGs.

These criteria yielded a primary corpus of 30 eligible TGA nominees. Titles considered during screening but excluded from the final corpus, together with the corresponding exclusion rationales, are documented in the supplementary repository [6]. We additionally report a clearly labeled supplementary analysis including *Ghost of Yōtei* as an extra late-period case in the same design space. Although it falls outside the strict GOTY-nominee frame, it had already entered the broader award discourse and provides one additional observation at the late end of the study window. Main trend analyses are therefore reported both for the primary corpus and for the extended corpus including this supplementary case.

Coding scheme Each game was coded using a fixed codebook specifying the anchor inventory, weights, and decision rules. Coders first identified which gameplay-relevant information anchors were applicable to the game’s mature default HUD (e.g., health, navigation, objective guidance). Anchors that were genuinely absent or irrelevant were excluded from the denominator so that scores reflected information presentation relative to a title’s actual demands.

DIEG captures the extent to which information is conveyed through in-world, avatar-based, equipment-based, or spatial cues rather than detached overlays. PERS captures how continuously information remains visible when relevant. DENS captures concurrent interface burden by combining how much applicable information is shown at once, how much screen space it occupies, and how fragmented or duplicated it is across the display. CONT captures the extent to which interface elements appear, disappear, or meaningfully reconfigure with gameplay state.

For DIEG, PERS, and CONT, coders assigned anchor-level values and aggregated them into normalized weighted indices on $[0, 1]$. DENS was computed separately as a context-level burden measure based on concurrent information visibility, screen-space occupation, and fragmentation/duplication across exploration/traversal and combat/high-load states, with exploration weighted more strongly than combat (0.60 vs. 0.40). For reporting and inter-rater reliability, each raw index was then mapped to a 5-point scale using fixed interval thresholds.

Both authors independently coded all titles using the same codebook. Coding targeted the mature default HUD as ordinarily encountered once core systems were available, excluding tutorial-only states, menus, accessibility presets, and user-customized layouts. To approximate ordinary HUD behavior, coders reviewed publicly available gameplay footage across major UI-relevant contexts. The full codebook, weighting scheme, boundary rules, and per-title coding notes are provided in the supplementary repository [6].

Inter-rater reliability. Agreement was assessed on independent pre-consensus 5-point scores obtained by interval-mapping each coder’s raw index values to the reported 1–5 scale. Quadratic weighted Cohen’s κ was 0.71 for DIEG, 0.86 for PERS, 0.81 for DENS, and 0.78 for CONT, indicating substantial agreement overall. Disagreements were then resolved through discussion. The values reported in Table 1 and used in the trend analyses are the post-discussion consensus 5-point scores.

Trend analysis We tested for temporal change by relating release year to each reported 5-point dimension score and to a composite minimalism score. The composite score was computed from the consensus 5-point values by z -standardizing DIEG and CONT, reverse-coding and z -standardizing PERS and DENS, and averaging the four standardized components. We also compare an early period (2014–2019) with a late period (2020–2025). Because the reported dimension scores are ordinal, we report Spearman rank correlations as a robustness check alongside Pearson correlations. To account for possible baseline differences between action-adventure and action-RPG titles, we also estimated a sensitivity model including genre as a covariate when predicting composite minimalism from release year. As a further sensitivity analysis, we repeated the composite trend analysis on year-level mean composite scores so that years with more eligible titles did not contribute disproportionate weight.

3.2 User study

Goals and research questions To complement the content analysis, we conducted a remote within-subject clip-rating study based on pre-recorded gameplay footage. The study examined whether expert-coded HUD minimalism aligns with participants’ intuitive judgments and how perceived minimalism relates to expected immersion, perceived clarity/information sufficiency, interface preference, and intentions to further reduce the HUD. Specifically, we asked whether (RQ1) expert-coded minimalist clips are perceived as more minimalist, (RQ2) perceived minimalism and familiarity predict expected immersion and clarity, (RQ3) interface preference is better explained by minimalism, clarity, or both, and (RQ4, exploratory) these relationships vary by player background.

Design Participants completed the study remotely on their own devices. Each participant watched the same six clips in randomized order and rated each clip

on 5-point scales measuring expected immersion, perceived clarity/information sufficiency, perceived HUD minimalism, HUD reduction intention, interface preference, and familiarity. Items were phrased in player-centered terms (e.g., clean vs. cluttered) rather than expert terminology.

Stimuli We selected six 90-second clips from the corpus by sampling from the higher and lower ends of the expert-coded composite minimalism distribution while keeping clip structure broadly comparable. Three clips came from games coded as more minimalist and three from games coded as more information-rich. Because standardized first-party captures were not feasible under the project constraints, we used publicly available gameplay recordings. Segments were chosen to include both exploration and combat, avoid tutorials and cutscenes, and reflect default HUD settings (i.e., no mods or UI customization). All clips were normalized to a common presentation format before inclusion in the survey. The minimalist set comprised *Ghost of Yōtei*, *Red Dead Redemption 2*, and *The Last of Us Part II*; the information-rich set comprised *The Outer Worlds*, *The Witcher 3: Wild Hunt*, and *Monster Hunter: World*. Stimulus sources and exact clip timestamps are documented in the supplementary repository [6].

Participants We targeted $N = 50$ – 60 participants and obtained $N = 59$ valid complete responses for analysis (all six clips rated). Eligibility was implemented directly in the survey: only respondents who indicated that they were at least 18 years old and engaged in gaming at least occasionally were allowed to continue.

Recruitment combined university and non-university channels. During data collection, the survey recorded 297 visits, 130 starts, 63 completed responses, and 59 valid cases retained for analysis. Participants provided informed consent and were informed about data handling and their right to withdraw without penalty.

Measures Participants first reported demographics and gaming background (age, gender, weekly gaming time, years of gaming experience, main platforms, self-described player type, and interest in action-adventure/RPG games). After each clip, they rated familiarity, expected immersion (IMM; four-item mean), clarity/information sufficiency (CLAR; three-item mean including one reverse-coded item), and perceived HUD minimalism (MIN; three-item mean including one reverse-coded item), plus single items for HUD reduction intention and interface preference. After all clips, participants completed two items on general preference for minimal HUDs and three yes/no items on prior HUD configuration behavior. Full item wordings and survey materials are available in the supplementary repository [6].

Procedure The study took approximately 20 minutes. After consent and the background questionnaire, participants were instructed to imagine playing each game and to judge how the HUD would affect their experience. They then watched the six clips in randomized order, completed the post-clip ratings after each one, and finally answered the general HUD attitude and behavior questions.

Data analysis In addition to descriptive statistics, we compared the minimalist and dense clip sets using within-participant contrasts and report corresponding effect sizes. Analyses involving interactions with player characteristics are treated as exploratory given the modest sample size and small number of stimulus clips.

Because each participant rated multiple clips and each clip was rated by multiple participants, we used linear mixed-effects models to analyze how perceived minimalism related to expected immersion, clarity, interface preference, and HUD reduction intention. Models included random intercepts for participant and clip. For within-participant association analyses, predictors were centered within participant so that coefficients reflect deviations from that participant’s own mean perception. Familiarity was included as a covariate where relevant. In the preference models, we additionally separated within- and between-participant components of the main predictors.

4 Results: Trends in HUD Minimalism

4.1 Corpus Overview

Table 1. Games included in the trend analysis and consensus 5-point expert scores for the four HUD dimensions.

Year	Game	Genre	DIEG	PERS	DENS	CONT
2014	Dragon Age: Inquisition	action-RPG	1	3	4	3
2014	Dark Souls II	action-RPG	1	5	4	1
2014	Middle-earth: Shadow of Mordor	action-adventure	2	5	3	3
2015	The Witcher 3: Wild Hunt	action-RPG	1	4	4	2
2015	Bloodborne	action-RPG	1	5	2	1
2015	Fallout 4	action-RPG	2	3	3	3
2015	Metal Gear Solid V	action-adventure	1	2	2	4
2016	Uncharted 4: A Thief’s End	action-adventure	2	2	1	4
2017	The Legend of Zelda: Breath of the Wild	action-adventure	3	4	3	3
2017	Horizon Zero Dawn	action-RPG	2	5	4	2
2018	God of War	action-adventure	2	3	2	2
2018	Assassin’s Creed Odyssey	action-RPG	1	3	3	3
2018	Marvel’s Spider-Man	action-adventure	1	3	3	2
2018	Red Dead Redemption 2	action-adventure	3	2	1	4
2018	Monster Hunter: World	action-RPG	1	5	4	2
2019	Sekiro: Shadows Die Twice	action-adventure	2	5	2	2
2019	Death Stranding	action-adventure	4	3	2	4
2019	The Outer Worlds	action-RPG	1	5	4	1
2019	Control	action-adventure	3	4	2	1
2020	Ghost of Tsushima	action-adventure	3	2	1	2
2020	The Last of Us Part II	action-adventure	5	1	1	2
2022	Elden Ring	action-RPG	2	2	2	4
2022	A Plague Tale: Requiem	action-adventure	3	2	2	3
2022	God of War Ragnarök	action-adventure	2	2	3	2
2022	Horizon Forbidden West	action-RPG	2	2	2	3
2023	The Legend of Zelda: Tears of the Kingdom	action-adventure	3	4	2	4
2023	Marvel’s Spider-Man 2	action-adventure	1	3	2	3
2024	Black Myth Wukong	action-RPG	2	3	2	5
2025	Death Stranding 2: On the Beach	action-adventure	4	3	2	4
2025	Kingdom Come: Deliverance II	action-RPG	2	4	2	3
2025	Ghost of Yōtei	action-RPG	5	1	2	5

4.2 Composite trend over time

Figure 1 shows the composite expert minimalism score by release year. The score was computed from the consensus 5-point dimension scores by z -standardizing DIEG and CONT, reverse-coding and z -standardizing PERS and DENS, and averaging the four standardized components. Higher values therefore reflect HUD profiles with greater diegetic integration and contextuality together with lower persistence and lower interface density.

Across the extended corpus, composite HUD minimalism increased with release year, $r(29) = .54$, $p = .002$ (Figure 1). Later titles in this sample therefore tended to rely more on diegetic and contextual presentation and less on persistent, visually dense baseline overlays. The same positive pattern appeared in a rank-based robustness check (Spearman's $\rho = .56$, $p = .001$), indicating that the result does not depend on treating the measure as strictly interval-scaled. In a simple linear model, the composite score increased by approximately 0.12 units per release year.

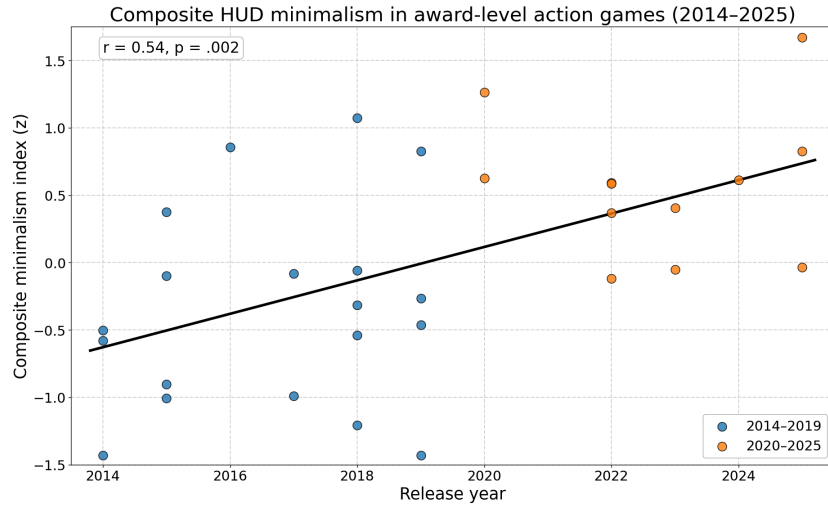


Fig. 1. Composite expert HUD minimalism index by release year. Points are colored by period (2014–2019 vs. 2020–2025); the line shows the least-squares fit.

4.3 Early vs. late period comparison

To aid interpretation, we compared an early period (2014–2019; $n = 19$) with a late period (2020–2025; $n = 12$). Late-period games scored substantially higher on the composite minimalism index than early-period titles ($M_{\text{early}} = -0.36$, $M_{\text{late}} = 0.56$), Welch $t(28.5) = -4.02$, $p = .001$, corresponding to a large effect ($|d| = 1.37$). Thus, later titles in this corpus were substantially more likely to

combine stronger diegetic integration and contextual modulation with lower persistence and density.

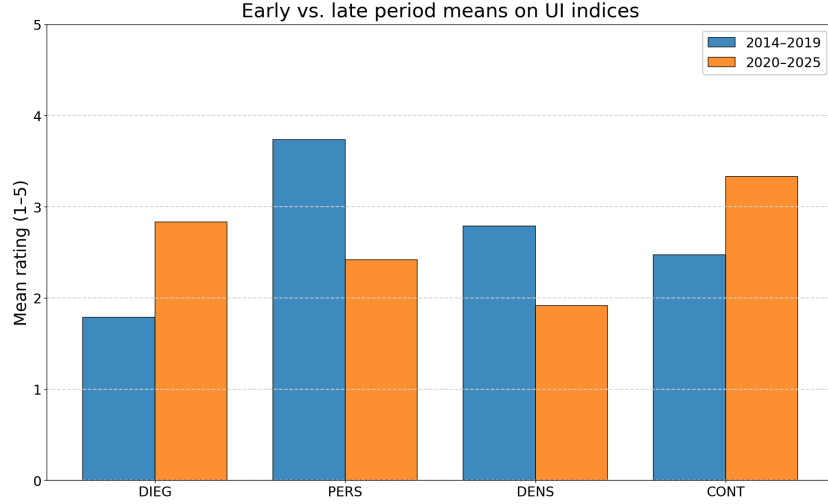


Fig. 2. Mean expert ratings on DIEG, PERS, DENS, and CONT for early (2014–2019) vs. late (2020–2025) periods. Higher DIEG/CONT and lower PERS/DENS correspond to more minimalist, contextual HUD designs.

4.4 Dimension-wise trends

The composite trend was reflected across all four dimensions. Diegetic integration increased with release year, $r(29) = .48$, $p = .006$, and was higher in the late than in the early period ($1.79 \rightarrow 2.83$), Welch $t(18.3) = -2.47$, $p = .023$. Persistence decreased over time, $r(29) = -.38$, $p = .037$, with lower baseline HUD visibility in late titles ($3.74 \rightarrow 2.42$), Welch $t(26.0) = 3.39$, $p = .002$. Density likewise declined, $r(29) = -.43$, $p = .016$, dropping from 2.79 to 1.92, Welch $t(27.9) = 3.12$, $p = .004$. Contextuality increased with release year, $r(29) = .42$, $p = .020$, and was higher in the late period ($2.47 \rightarrow 3.33$), Welch $t(21.3) = -2.17$, $p = .040$.

Sensitivity analyses did not change this conclusion. Excluding *Ghost of Yōtei* still yielded a significant positive composite trend, $r(28) = .48$, $p = .008$. In a regression controlling for genre, release year remained a significant predictor of composite minimalism ($b = 0.12$, $SE = 0.03$, $p = .001$), while action-RPG titles scored lower overall than action-adventure titles ($b = -0.55$, $SE = 0.23$, $p = .021$). Repeating the analysis on year-level mean scores produced the same positive pattern, $r(9) = .62$, $p = .040$.

Together, these analyses indicate that the increase in composite minimalism reflects coordinated change across all four dimensions rather than a shift in only one aspect of HUD design.

5 User Study Results: Player Perceptions of HUD Minimalism

5.1 Sample characteristics and limitations

A total of $N = 59$ participants completed the study and rated all six clips. The sample was young and student-skewed ($M_{\text{age}} = 21.78$, $SD = 5.32$), predominantly male (72.9%), and relatively experienced with games ($M_{\text{years gaming}} = 12.17$, $SD = 6.33$). Weekly gaming time was heterogeneous, and self-identified player type ranged from casual to competitive. These characteristics limit generalizability.

Two limitations are especially relevant. First, the remote design left display size, resolution, and viewing conditions uncontrolled, which may have affected clarity judgments for small HUD elements. Second, the six stimuli differed not only in HUD design but also in scene content, audiovisual presentation, and production style. Familiarity was included as a covariate, but the study should be interpreted as a clip-based perception study rather than an isolated test of HUD design effects.

5.2 Measurement quality (reliability and coding checks)

Internal consistencies were acceptable to high across clip ratings: $\alpha_{\text{IMM}} = .92$, $\alpha_{\text{MIN}} = .86$, and $\alpha_{\text{CLAR}} = .72$. Reverse-coded items behaved as intended. Two participants showed near-invariant responding, but excluding them in a sensitivity check did not change the main conclusions, except that the already small clarity difference reported below was no longer significant.

5.3 RQ1: Do expert-coded minimalist interfaces appear more minimalist to players?

Stimulus-level convergence with expert ratings. Across the six stimuli, mean perceived minimalism closely tracked the expert composite minimalism scores (Pearson $r = .97$, $p = .002$; Figure 3). Because expert-coded minimalism varied only at the clip level and this comparison is based on six observations, we interpret the result as strong descriptive convergence rather than as stand-alone inferential evidence. The same ordering appeared in the rank-based analysis, although the Spearman correlation did not reach conventional significance ($\rho = .77$, $p = .072$).

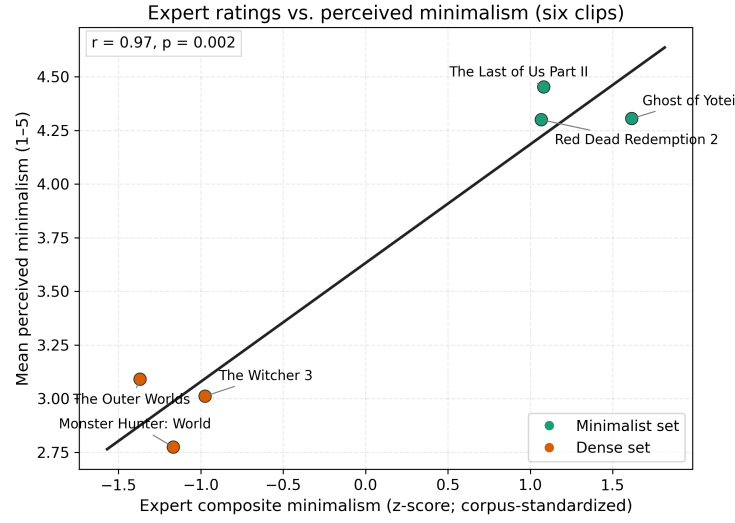


Fig. 3. Association between expert composite minimalism (z-scored index from DIEG/CONT and reversed PERS/DENS) and mean player-perceived minimalism across the six clips.

Manipulation check: minimalist vs. dense sets. At the participant level, the same contrast was clear. Averaged within participants, the three minimalist clips were rated as substantially more minimalist than the three dense clips (Figure 4), with a mean difference of $\Delta M = 1.39$ on the 1–5 scale, $t(58) = 13.50$, $p < .001$, and a very large within-subject effect size ($d_z = 1.76$). Participants thus clearly distinguished the intended difference in HUD style between the two clip sets.

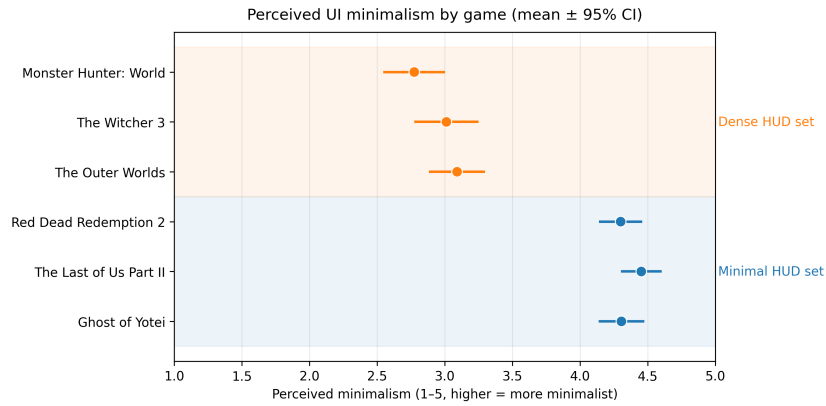


Fig. 4. Perceived UI minimalism by clip (mean $\pm$ 95% CI). Hatched bars indicate the dense HUD set.

5.4 RQ2: Minimalism, expected immersion, and the clarity trade-off

Minimalist clips elicited higher expected immersion. Within participants, expected immersion was higher for minimalist clips than for dense clips ($\Delta M = 0.74$), $t(58) = 7.91$, $p < .001$, $d_z = 1.03$ (Figure 6). This difference cannot be cleanly attributed to HUD alone because the clips also differ in game content and presentation. To test whether clip-to-clip differences in perceived minimalism within participants were associated with expected immersion beyond familiarity, we therefore estimated a linear mixed-effects model with random intercepts for participant and clip. Perceived minimalism was positively associated with expected immersion: $b = 0.45$, $SE = 0.03$, $z = 14.70$, $p < .001$. Familiarity also predicted expected immersion ($b = 0.23$, $SE = 0.03$, $z = 7.57$, $p < .001$), but the minimalism effect remained strong when controlling for familiarity. Figure 5 visualizes the within-participant association.

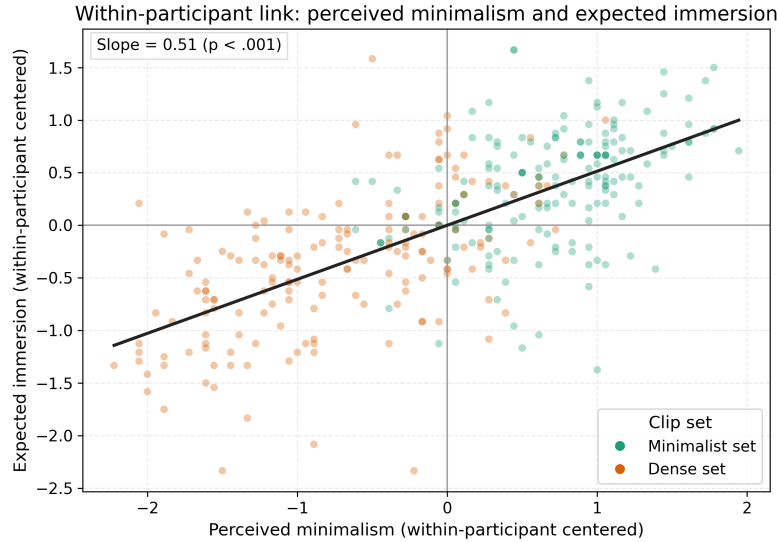


Fig. 5. Within-participant association between perceived minimalism and expected immersion (both centered per participant). Line shows the mixed-model slope.

Clarity: no robust evidence for a minimalism penalty once familiarity is considered. A simple paired comparison showed slightly lower clarity for minimalist vs. dense clips ($\Delta M = -0.16$), $t(58) = -2.01$, $p = .049$, with a small effect ($d_z = -0.26$). However, this difference was not robust: it disappeared in a sensitivity analysis excluding two near-invariant responders ($p = .058$), and it was not supported by the mixed-model association analysis. To test whether this apparent clarity difference remained once repeated observations and familiarity were taken into

account, we estimated a parallel mixed-effects model predicting clarity. In this model, perceived minimalism did *not* predict clarity ($b = -0.04$, $SE = 0.04$, $z = -1.12$, $p = .262$), whereas familiarity did ($b = 0.24$, $SE = 0.04$, $z = 6.49$, $p < .001$). Any apparent clarity difference was better explained by familiarity and clip-specific factors than by perceived minimalism itself.

5.5 RQ3: What predicts interface preference and HUD reduction intentions?

Preference is jointly driven by minimalism and clarity. Participants preferred the minimalist set overall ($\Delta M = 0.80$), $t(58) = 5.80$, $p < .001$, $d_z = 0.76$ (Figure 6). To examine what drove interface preference beyond the simple minimalist-versus-dense contrast, we estimated a mixed-effects model predicting preference from perceived minimalism and clarity while controlling familiarity. In this model, both predictors were strong and significant: minimalism $b = 0.60$, $SE = 0.04$, $z = 15.91$, $p < .001$; clarity $b = 0.55$, $SE = 0.06$, $z = 9.15$, $p < .001$. This indicates that participants’ attraction to an interface is not purely “cleaner is better”; it increases when the HUD feels both unobtrusive *and* sufficiently informative.

Dense HUDs are associated with stronger intentions to reduce the HUD. HUD reduction intention was much higher for dense clips than for minimalist clips ($\Delta M = -1.26$, minimalist minus dense), $t(58) = -9.26$, $p < .001$, $d_z = -1.21$ (Figure 6). We then estimated a mixed-effects model to test whether clip-level increases in perceived minimalism were associated with lower intentions to hide or reduce the HUD. Consistently, perceived minimalism strongly reduced HUD reduction intention ($b = -0.87$, $SE = 0.04$, $z = -19.96$, $p < .001$). Note that this item also showed a floor tendency (many ratings at “1”), which likely *attenuates* rather than inflates the observed effect.

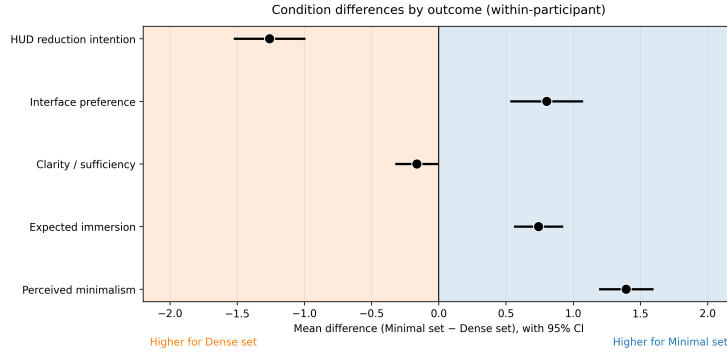


Fig. 6. Within-participant mean differences between minimalist and dense HUD sets (Minimal – Dense; 95% CI). Positive values favor minimalist clips; negative values indicate stronger reactions to dense clips (e.g., higher HUD reduction intention).

5.6 RQ4 (exploratory): Do reactions differ by player background?

Because the study was not powered for fine-grained subgroup comparisons (e.g., small largely student-based competitive subgroup), all background effects are treated as exploratory and interpreted conservatively. To explore RQ4, we extended the mixed-effects models above with interaction terms between the focal post-clip predictors and participant-level background variables.

Familiarity did not moderate the minimalism–clarity or minimalism–expected immersion link. Contrary to our moderation hypothesis, the interaction between perceived minimalism and familiarity was not significant for clarity ($p = .933$) and did not meet significance for expected immersion ($p = .064$). In other words, within this dataset we do not find evidence that minimal interfaces become *less* clarity-costly only when players already know the game; rather, familiarity increases clarity in general.

General UI preference moderates how strongly minimalism translates into liking. Participants’ general preference for minimalist HUDs (mean of UI1/UI2) significantly amplified the within-participant link between perceived minimalism and interface preference (interaction $b = 0.16$, $SE = 0.04$, $z = 4.17$, $p < .001$). Simple slopes indicate that for participants with higher general minimal-HUD preference ($+1SD$), a 1-point increase in perceived minimalism corresponded to a larger increase in preference (slope ≈ 0.74) than for participants with lower general preference ($-1SD$; slope ≈ 0.42 ; Figure 7).

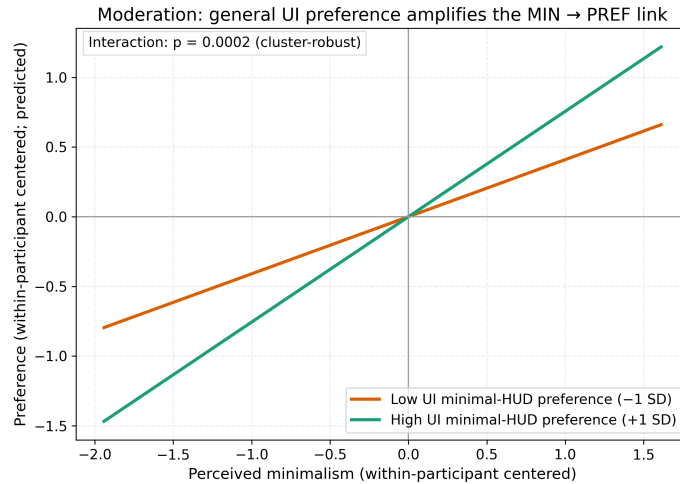


Fig. 7. Moderation by general minimal-HUD preference (UI1/UI2). Lines show predicted within-participant changes in preference attributable to perceived minimalism for low vs. high general minimal-HUD preference ($\pm 1SD$).

Other background variables. We also tested whether the perceived-minimalism relationships with expected immersion, clarity, preference, and HUD reduction intention varied across participants’ background characteristics. No additional moderation effects were significant after accounting for limited subgroup sizes and the exploratory nature of these analyses; therefore, we do not interpret descriptive subgroup differences beyond general HUD preference and prior HUD-configuration behavior.

Past HUD reduction behavior predicts stronger reactions against dense HUDs. Participants who reported having previously reduced HUD/UI information showed higher overall HUD reduction intentions and a larger dense-vs-minimal difference (interaction with set: $p = .009$). This pattern supports the interpretation that HUD customization tendencies are a stable individual difference that shapes how strongly dense HUDs are perceived as “too much.”

6 Discussion

Taken together, the findings support a measured account of HUD change in contemporary action games. Within this corpus, later titles tend to rely more on diegetic and contextual presentation while reducing baseline persistence and interface density. Players also recognized and generally valued that pattern: perceived minimalism was associated with higher expected immersion and stronger interface preference, whereas clarity was more strongly tied to familiarity than to perceived minimalism itself. The implication is not that less HUD is inherently better, but that unobtrusive interfaces are attractive when they remain learnable and sufficiently informative.

This interpretation is consistent with prior HCI work showing that the relationship between interface transparency, clarity, and immersion is not monotonic and can depend on player expertise and task demands [4,3]. Our results extend that picture in two ways. First, they suggest that the visual language of prominent action games has shifted over time toward more selective and integrated information presentation. Second, they indicate that players generally recognize and often appreciate that shift, but not because information has become unnecessary. Rather, preference appears highest when interfaces feel both unobtrusive and sufficiently informative.

Developer commentary helps contextualize this pattern. Studios often frame reduced on-screen guidance as a way to preserve world focus and immersion, but contemporary design materials also emphasize readability, recoverability, and user control [5,8,7,2,10]. The emerging logic is therefore not simple subtraction, but layered optionality: less persistent default presentation paired with stronger customization and alternative ways to surface critical information when needed.

Several limitations constrain these conclusions. The corpus is intentionally narrow and based on a high-visibility award frame rather than the broader market. The user study relied on six non-interactive clips viewed under uncontrolled remote conditions, capturing expected experience rather than actual play. Cross-game clip

comparisons also confound HUD design with scene content, pacing, audiovisual style, and familiarity. Because participants rated both perceived minimalism and the post-clip outcomes immediately after each clip, some associations may reflect global impressions or response tendencies rather than the effects of HUD minimalism alone. The results should therefore not be interpreted causally.

7 Conclusion

This paper examined whether high-visibility action-adventure and action-RPG games have moved toward more minimalist HUD design over time, and whether that shift is reflected in how players perceive and evaluate those interfaces. To address this question, we operationalized HUD minimalism as a multi-dimensional construct spanning diegetic integration, persistence, density, and contextuality, applied that framework to a longitudinal corpus of prominent titles released between 2014 and 2025, and complemented the analysis with a remote clip-based user study.

Across the coded corpus, later titles tended to exhibit more minimalist HUD profiles: information was more often integrated into the game world or surfaced contextually, while persistent and visually dense overlays became less dominant. The user study showed that this distinction was not merely analytic. Participants reliably perceived expert-coded minimalist interfaces as more minimalist, and higher perceived minimalism was associated with greater expected immersion and stronger interface preference. By contrast, perceived clarity was more strongly related to familiarity than to minimalism itself. Taken together, these findings suggest that the contemporary shift in HUD design is not best understood as simply “removing the interface,” but as reorganizing gameplay-relevant information in ways that are more selective, state-dependent, and visually integrated.

Beyond the substantive findings, the study contributes a structured way of analyzing HUD minimalism that moves beyond binary labels such as diegetic versus non-diegetic. This is useful because many contemporary game interfaces are hybrid designs that balance readability, immersion, and player control rather than pursuing transparency at all costs. At the same time, the present results should be interpreted within the limits of a bounded award-based corpus and a non-interactive clip-rating study. Future work should extend the corpus beyond highly visible titles, test similar patterns in genres with different informational demands, and examine these effects in controlled interactive settings. Overall, the findings indicate that minimalist HUD design in contemporary action games is less a matter of subtraction than of strategic information distribution.

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