# Why We Aesthetically Value What We Do Not Like: The Effects of Simultaneous Repetition on Judgments of Liking, Aesthetic Value, and Awe

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**Abstract**

Repetition is ubiquitous in art and nature, yet its effects on aesthetic experience remain unclear. In a preregistered experiment, we demonstrate that increasing group size (1, 9, or 25 repeated faces) increases judgments of aesthetic value but decreases judgments of liking. We also identified the possible mechanisms underlying their dissociation. Mediation analyses revealed that both judgments (liking and value) were comparably influenced by fluency-based hedonic processing. Awe-related affective states contributed differently: threat-based awe was more closely associated with reduced liking, whereas positive awe more strongly enhanced aesthetic value. These findings highlight that liking and aesthetic value are not interchangeable indicators of a single hedonic response: liking is more tightly linked to survival-related processes, whereas aesthetic value is more strongly shaped by elaborated meanings and higher-order cognitive processing.

**Keywords:** repetition; aesthetic value; liking; awe; processing fluency

## Introduction

Repetition is one of the most pervasive strategies humans use to create aesthetic impact. From Andy Warhol's *Pop Art* to monumental ensembles such as the Chinese Terracotta Army, repetition does more than duplicate visual elements—it transforms experience. Encounters with large numbers of nearly identical elements often evoke awe rather than simple pleasure, suggesting that repetition and scale may qualitatively alter aesthetic experience rather than merely intensify responses to individual objects.

Traditionally, aesthetic experience has been treated as fundamentally hedonic, centered on pleasure (Brielmann & Pelli, 2018). Within this view, aesthetic outcomes, including affective states and verbal judgments such as liking *and* aesthetic value, are understood as outcomes of domain-general evaluation processes that assign hedonic value to sensory objects (Nadal & Skov, 2024). Accordingly, empirical aesthetics has often treated judgments of liking and aesthetic value as interchangeable indicators of a single hedonic response (Berlyne, 1972; Brielmann & Dayan, 2022; Brielmann & Pelli, 2018).

However, growing evidence suggests that evaluative judgments such as liking and aesthetic value may rely on partially distinct cognitive and affective processes. Recent work suggests that liking is more closely tied to rapid, fluent, and reward-based processing, whereas judgments of aesthetic value or beauty engage slower, more elaborative processes that place greater demands on cognitive resources (Che et al., 2024; Sidhu et al., 2018). This distinction aligns with dual-process accounts of aesthetic evaluation, which propose that aesthetic responses can arise from fast, stimulus-driven hedonic processing or from slower, reflective evaluation (Graf & Landwehr, 2015). Consequently, liking and aesthetic value need not covary, and repetition provides a critical context for revealing this dissociation.

Hedonic value is strongly affected by processing fluency, the subjective ease with which information is processed (Brielmann & Dayan, 2022; Reber et al., 2004; Tang et al., 2025; Yoo et al., 2024). Stimuli that are more fluent (i.e., require less cognitive effort) are therefore experienced and evaluated as more rewarding, a relationship reflected in the negative association between aesthetic liking and the metabolic cost of visual processing (Tang et al., 2025).

Repetition is a classic topic, and many studies documented that *mere-exposure*, sequential repetition of a single object, reduces processing effort (*increases* fluency) and enhances liking. In contrast, here we explore simultaneous repetition (multiplication) within one image. Such simultaneous repetition creates a more complex image. This should increase processing effort (reduce fluency), thereby lowering hedonic value as measured by liking.

Interestingly, simultaneous repetition remains an effective artistic strategy, suggesting that its aesthetic impact may not rely solely on fluency-based hedonic pleasure. In fact, aesthetic experience and judgments of value are also shaped by other affective states. One emotion closely linked to aesthetic appreciation is awe (Cowen & Keltner, 2017). Awe is a complex emotion that can be both positive and threat-based (Gordon et al., 2017). It involves meaning-making and can require demanding cognitive processing (Feierman & Oviedo, 2019; Monroy & Keltner, 2023). It is characterized by two core features (Keltner & Haidt, 2003). One is vastness -- the perception of something as much larger than one's ordinary frame of reference. The second feature is accommodation -- the need to adjust existing mental structures when new information cannot be readily assimilated. Importantly, awe can be elicited by stimuli that convey vastness and accommodation through repetition (Keltner & Haidt, 2003). Thus, simultaneous repetition may



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influence aesthetic judgments through multiple pathways. It may reduce processing fluency, due to increased complexity, and may also elicit awe due to its vastness and accommodation. These processes may operate both in sequence and in parallel. Perceived vastness and accommodation are, by definition, linked to processing demands, but they are not just about fluency. Accordingly, whereas changes in processing fluency may relate to some variation in awe-related responses, awe may also arise independently (e.g., via perception of vastness).

In our preregistered study, we examined how repetition shapes aesthetic judgments by manipulating group size (1, 9, or 25 identical facial images) and collecting separate judgments of liking and aesthetic value. To probe underlying mechanisms, we also measured subjective processing fluency, objective visual complexity, and awe, distinguishing between positive and threat-based awe. By jointly modeling these variables, we tested whether repetition exerts dissociable effects on liking and aesthetic value via fluency-based hedonic processes and awe-related affective states. We additionally assessed participants' explicit beliefs about the impact of group size to evaluate whether repetition effects could be explained by expectations based on such beliefs. Our findings shed light on the dissociation between liking and aesthetic value and the role of fluency-based hedonic processing and affective states in these aesthetic judgements.

# Method

## Participants

A total of 572 undergraduates were recruited via the UC San Diego SONA system. After trial-level (RT < 200 ms or > 10,000 ms) and participant-level exclusions (>10% excluded trials, >1 failed attention check, or invariant ratings within a block), the final sample comprised 500 participants (400 female, 89 male, 11 other; $M_{\text{age}} = 20.17$, $SD = 2.01$).

## Materials

Stimuli were 234 frontal White female faces with neutral expressions from three standardized databases (Chelnokova et al., 2014; DeBruine & Jones, 2021; Ma et al., 2015). Faces were used because they carry rich social meaning and are sensitive to group-based manipulations (Walker & Vul, 2014). For each identity, three conditions were created: individual face, a medium group (3 × 3 array; 9 identical faces), and a large group (5 × 5 array; 25 identical faces). Individual images were 300 × 300 pixels, and group arrays were constructed by tiling these images without rescaling (900 × 900 pixels and 1500 × 1500 pixels, respectively).

## Procedure

Participants were randomly assigned to rate one of five variables: aesthetic value, liking, processing fluency, positive awe, or threat-based awe throughout the experiment. Each participant viewed all 234 identities, evenly distributed across individual, medium, and large group conditions, with each identity shown once. Each trial consisted of a fixation (500–1,000 ms), stimulus presentation (3,500 ms), and then participants rated the entire picture corresponding to their assigned task, with no time limit (Figure 1). Four attention-check trials were included. After the rating task, participants completed questionnaires assessing beliefs about group size, desire for certainty, and demographic information.

## Measures

All measures used single-item 7-point Likert scales (1 = Not at all, 4 = Moderately, 7 = Extremely). Aesthetic value was assessed with: "How likely is this image to win an art contest focused on artistic beauty?". Liking was assessed with: "How much do you like this image?". Processing fluency was assessed with: "How easy is it to process this image?". Awe was measured with two items: positive awe ("To what extent does this image evoke feelings of admiration or wonder?") and threat-based awe ("To what extent does this image evoke feelings of fear or being overwhelmed?"). Beliefs about group size were assessed with five items probing perceived effects of the number of faces on each outcome measure (1 = decrease, 4 = no relation, 7 = increase). Visual complexity was quantified at the image level using a ZIP compression algorithm (Mayer & Landwehr, 2018) and was defined as the compression ratio (compressed/uncompressed size), with higher values indicating greater complexity.

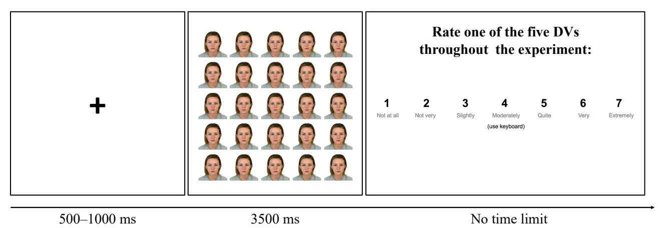


Figure 1. Procedure of the experiment.

# Results

## Group Size Differentially Shapes Evaluative Outcomes of Aesthetic Experience

To examine the effects of group size (individual, medium, large), we conducted image-level one-way repeated-measures ANOVAs for each dependent measure, with Holm–Bonferroni–corrected pairwise comparisons.

As expected, visual complexity increased significantly with group size, $F(0.65, 1.30) = 302.56$, $p < .001$, $\eta^2_G = 0.17$ (Figure 2a). Medium groups were more complex than individual images, and large groups were more complex than both medium and individual images (all $p$s < .001). In contrast, processing fluency decreased with increasing group size, $F(2, 466) = 928.18$, $p < .001$, $\eta^2_G = 0.69$ (Figure 2b). Both medium and large groups were rated as less fluent than individual images, and large groups were rated as less fluent than medium groups (all $p$s < .001).

Group size also influenced awe-related affective outcomes (Figure 2, c&d). Positive awe increased with group size, $F(2, 466) = 26.91$, $p < .001$, $\eta^2_G = 0.02$, with large groups eliciting greater positive awe than both medium and individual images, and medium groups eliciting greater positive awe than individual images (all $ps < .002$). Threat-based awe showed a similar pattern, $F(2, 466) = 269.01$, $p < .001$, $\eta^2_G = 0.15$, increasing monotonically from individual to large groups (all $ps < .001$).

Critically, aesthetic value and liking showed dissociable effects of group size. Group size had a significant effect on aesthetic value, $F(2, 466) = 28.51$, $p < .001$, $\eta^2_G = 0.01$ (Figure 2e), such that both medium and large groups were rated as more aesthetically valuable than individual images (all $ps < .001$), with no difference between medium and large groups ($p = .101$). In contrast, liking decreased significantly with increasing group size, $F(2, 466) = 101.64$, $p < .001$, $\eta^2_G = 0.04$ (Figure 2f): medium and large groups were less liked than individual images, and large groups were less liked than medium groups (all $ps < .001$). A two-way image-level repeated-measures ANOVA confirmed a significant group size × evaluative outcomes interaction, $F(2, 466) = 113.53$, $p < .001$, $\eta^2_G = 0.03$, further indicating dissociable effects of group size on aesthetic value and liking.

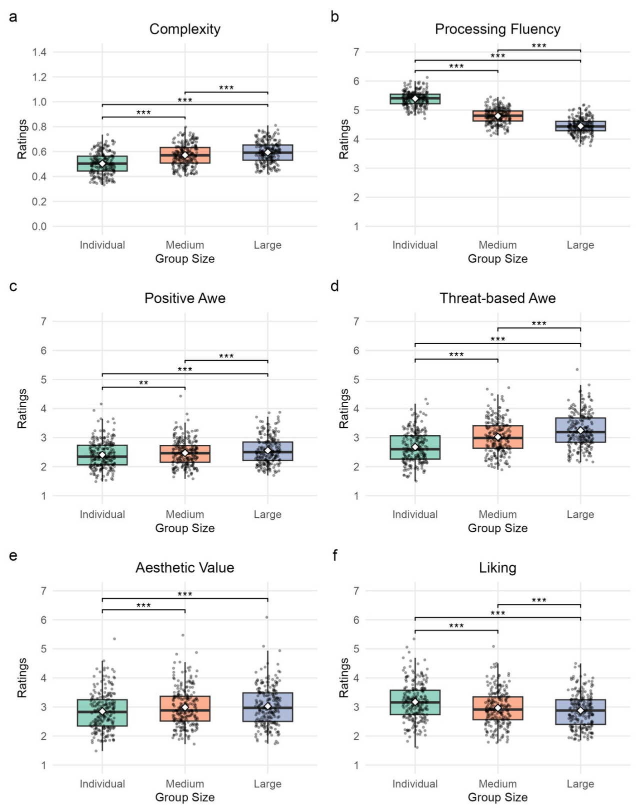


Figure 2. Effects of group size on (a) visual complexity, (b) processing fluency, (c) positive awe, (d) threat-based awe, € aesthetic value, and (f) liking. Dots show image-level means; boxes indicate interquartile ranges with medians, the white diamond indicates the mean rating, and whiskers extend to 1.5 × interquartile range. *$p < .05$, **$p < .01$, ***$p < .001$.

Despite the dissociable effects of group size on liking and aesthetic value, prior work has typically treated these judgments as closely related and overlapping (Brielmann & Pelli, 2018). Representational similarity analysis showed that the representational dissimilarity matrices (RDMs) for liking and aesthetic value were significantly correlated within each group-size condition ($r$s > 0.52, $ps < .001$; Figure 3), indicating substantial shared stimulus-level structure. Thus, observed dissociation reflects a divergence in how repetition shifts each judgment, rather than an absence of shared perceptual grounding.

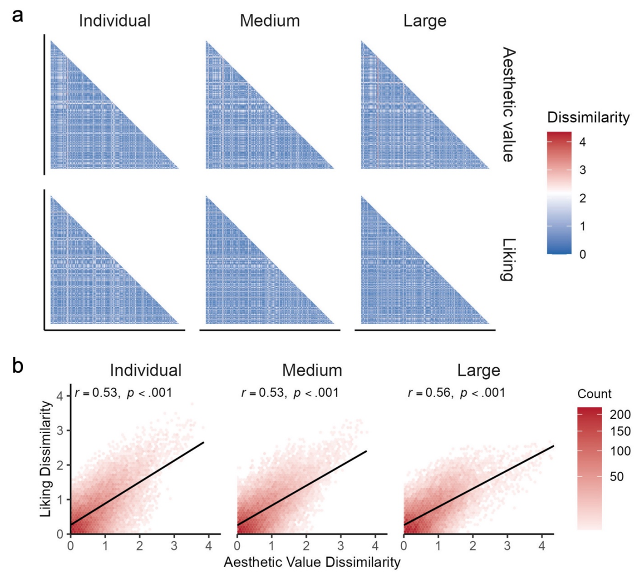


Figure 3. (a) Representational dissimilarity matrices (RDMs) for aesthetic value (top) and liking (bottom) in the individual, medium, and large group conditions, based on Euclidean distances of mean image ratings. (b) Correlations between aesthetic value and liking dissimilarities across image pairs within each condition. Points show binned image pairs, with color indicating bin counts. Insets report Spearman correlations between RDMs.

## Mediation Pathways for Evaluative Outcomes

To examine the mechanisms underlying these effects, we fit structural equation models linking group size (and, separately, visual complexity) to aesthetic value and liking. Group size was dummy-coded (with individual as the reference). Processing fluency was modeled as a first-stage mediator, whereas positive and threat-based awe were modeled as second-stage mediators. Positive awe and threat-based awe were allowed to covary.

**Group size as the predictor** Group size showed a positive total effect on aesthetic value (Medium: $\beta = 0.10$, $SE = 0.02$, $p < .001$; Large: $\beta = 0.13$, $SE = 0.02$, $p < .001$; Figure 4a). This increase arose from the pathways operating in opposite directions (Table 1). Larger group size showed negative indirect effects on aesthetic value via processing fluency, both directly via reduced processing fluency (Medium: $\beta = -0.10$, $SE = 0.03$, $p < .001$; Large: $\beta = -0.16$, $SE = 0.03$, $p <$

.001) and serial indirect effects involving processing fluency and awe. Specifically, reduced processing fluency decreased positive awe and increased threat-based awe, and both changes were associated with lower aesthetic value (Medium: $\beta$ = –0.24, $SE$ = 0.03, $p$ < .001, Large: $\beta$ = –0.38, $SE$ = 0.04, $p$ < .001 via positive awe; Medium: $\beta$ = –0.04, $SE$ = 0.01, $p$ = .004, Large: $\beta$ = –0.06, $SE$ = 0.02, $p$ = .004 via threat-based awe). At the same time, group size showed a positive indirect effect on aesthetic value directly via increased positive awe (Medium: $\beta$ = 0.28, $SE$ = 0.03, $p$ < .001; Large: $\beta$ = 0.48, $SE$ = 0.04, $p$ < .001). In addition, group size showed a positive direct effect on aesthetic value (Medium: $\beta$ = 0.19, $SE$ = 0.04, $p$ < .001; Large: $\beta$ = 0.24, $SE$ = 0.05, $p$ < .001). Together, the positive pathway outweighed the fluency-related suppressive pathways, resulting in an overall increase in aesthetic value.

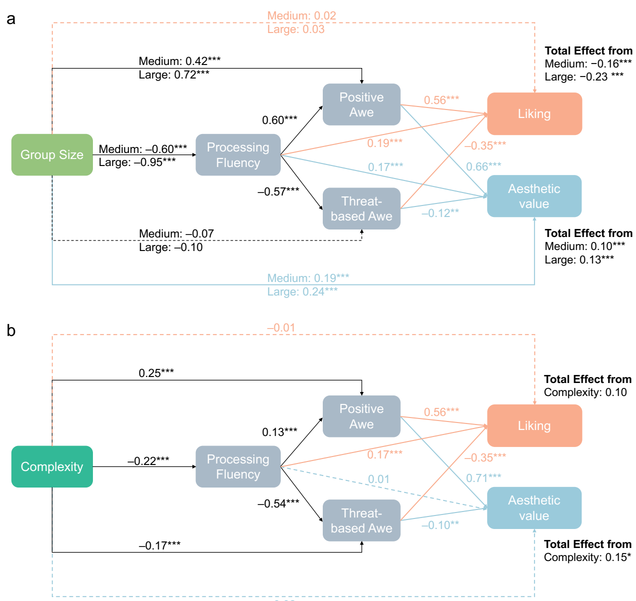


Figure 4. Structural equation model illustrating the pathways linking (a) group size (medium and large, relative to individual) to liking and aesthetic value and (b) complexity to liking and aesthetic value. Standardized path coefficients are shown. Dashed paths indicate nonsignificant effects. *$p$ < .05, **$p$ < .01, ***$p$ < .001).

In contrast, group size showed a negative total effect on liking (Medium: $\beta$ = −0.16, $SE$ = 0.02, $p$ < .001; Large: $\beta$ = −0.23, $SE$ = 0.02, $p$ < .001; Figure 4a) with no significant direct effect (Medium: $\beta$ = 0.02, $SE$ = 0.03, $p$ = .654; Large: $\beta$ = 0.03, $SE$ = 0.05, $p$ = .588). The decrease in liking was primarily explained by indirect pathways (Table 1): reduced fluency predicted lower liking ($\beta$ = 0.19, $SE$ = 0.04, $p$ < .001) and also shaped liking via awe. Specifically, reduced processing fluency decreased positive awe and increased threat-based awe, and both changes were associated with lower liking (Medium: $\beta$ = –0.20, $SE$ = 0.02, $p$ < .001, Large: $\beta$ = –0.32, $SE$ = 0.04, $p$ < .001 via positive awe; Medium: $\beta$ = –0.12, $SE$ = 0.02, $p$ = .004, Large: $\beta$ = –0.19, $SE$ = 0.02, $p$ < .001 via threat-based awe). In contrast, group size exerted a positive indirect effect on liking via increased positive awe (Medium: $\beta$ = 0.24, $SE$ = 0.03, $p$ < .001; Large: $\beta$ = 0.40, $SE$ = 0.04, $p$ < .001). However, this effect was smaller than the combined negative indirect effects operating through processing fluency, resulting in an overall decrease in liking.

Joint modeling indicated that the fluency-to-outcome paths did not differ across judgments ($\beta_{\text{diff}}$ = 0.02, $SE$ = 0.04, $p$ = .542). Positive awe ($\beta_{\text{diff}}$ = 0.10, $SE$ = 0.02, $p$ < .001) and the direct effect of group size (Medium: $\beta_{\text{diff}}$ = 0.18, $SE$ = 0.04, $p$ < .001; Large: $\beta_{\text{diff}}$ = 0.22, $SE$ = 0.05, $p$ < .001) contributed more strongly to aesthetic value than to liking, while threat-based awe exerted a stronger negative influence on liking than on aesthetic value ($\beta_{\text{diff}}$ = −0.23, $SE$ = 0.03, $p$ < .001). Thus, group size influenced both evaluations through a shared mediating structure, with divergence concentrated in different weighting of awe-related and direct pathways.

Table 1: Indirect Effects from Group Size

| Indirect Path | Medium | | Large | |
|---|---|---|---|---|
| | $\beta$ | $p$ | $\beta$ | $p$ |
| GS → PF → Aes | −0.10 | < .001 | −0.16 | < .001 |
| GS → PF → PA → Aes | −0.24 | < .001 | −0.38 | < .001 |
| GS → PF → TA → Aes | −0.04 | .004 | −0.06 | .004 |
| GS → PA → Aes | 0.28 | < .001 | 0.48 | < .001 |
| GS → TA → Aes | 0.01 | .125 | 0.01 | .151 |
| GS → PF → Liking | −0.12 | < .001 | −0.18 | < .001 |
| GS → PF → PA → Liking | −0.20 | < .001 | −0.32 | < .001 |
| GS → PF → TA → Liking | −0.12 | < .001 | −0.19 | < .001 |
| GS → PA → Liking | 0.24 | < .001 | 0.40 | < .001 |
| GS → TA → Liking | 0.03 | .074 | 0.03 | .099 |

*Note.* Indirect effects were estimated using standardized coefficients. GS = group size; PF = processing fluency; PA = positive awe; TA = threat-based awe; Aes = aesthetic value. The Medium and Large columns correspond to the two group-size contrasts (Medium vs. Individual; Large vs. Individual).

**Complexity as the predictor** Visual complexity showed a positive total effect on aesthetic value ($\beta$ = 0.15, $SE$ = 0.06, $p$ = .018; Figure 4b). This effect arose from indirect pathways operating in opposite directions (Table 2). Visual complexity exerted negative indirect effects on aesthetic value through serial pathways involving processing fluency and awe. Specifically, higher complexity reduced processing fluency, which attenuated positive awe and increased threat-based awe; both changes were associated with lower aesthetic value ($\beta$ = −0.02, $SE$ = 0.01, $p$ < .001 via positive awe; $\beta$ = −0.01, $SE$ = 0.01, $p$ = .013 via threat-based awe). At the same time, visual complexity showed positive indirect effects on aesthetic value through awe-related pathways independent of processing fluency. Higher complexity increased positive awe and reduced threat-based awe, yielding positive indirect effects on aesthetic value ($\beta = 0.18$, $SE = 0.04$, $p = .006$ via positive awe; $\beta = 0.02$, $SE = 0.01$, $p = .033$ via threat-based awe). After accounting for these indirect pathways, visual complexity showed no significant direct effect on aesthetic value ($\beta = -0.02$, $SE = 0.04$, $p = .674$).

Visual complexity did not show a significant total ($\beta = 0.10$, $SE = 0.06$, $p = .097$) or direct effect on liking ($\beta = -0.01$, $SE = 0.03$, $p = .828$; Figure 4b). Instead, its influence on liking was expressed via indirect pathways operating in opposite directions (Table 2). On the one hand, visual complexity exerted negative indirect effects on liking via processing fluency–dependent pathways. Higher complexity reduced processing fluency, which contributed to lower liking both via processing fluency indirect path ($\beta = -0.04$, $SE = 0.01$, $p < .001$) and via serial indirect pathways involving awe. Reduced fluency attenuated positive awe and increased threat-based awe, and both changes were associated with lower liking ($\beta = -0.02$, $SE = 0.004$, $p < .001$ via positive awe; $\beta = -0.04$, $SE = 0.01$, $p < .001$ via threat-based awe). On the other hand, visual complexity also showed positive indirect effects on liking via awe-related pathways independent of processing fluency. Higher complexity increased positive awe and reduced threat-based awe, both yielding positive indirect effects on liking ($\beta = 0.14$, $SE = 0.03$, $p < .001$ via positive awe; $\beta = 0.06$, $SE = 0.02$, $p = .001$ via threat-based awe).

Joint modeling indicated that processing fluency ($\beta_{diff} = 0.18$, $SE = 0.02$, $p < .001$) and threat-based awe ($\beta_{diff} = -0.24$, $SE = 0.03$, $p < .001$) had stronger effects on liking than on aesthetic value, whereas positive awe contributed more strongly to aesthetic value than to liking ($\beta_{diff} = -0.15$, $SE = 0.02$, $p < .001$). The direct effect of complexity did not differ across outcomes ($\beta_{diff} = -0.01$, $SE = 0.02$, $p = .699$). Together, complexity results converge with the group size in suggesting that aesthetic value and liking to share the mediation structure but diverge in the weighting of different paths.

Table 2: Indirect Effects from Complexity

| Indirect Path | Aesthetic Value | | Liking | |
|---|---|---|---|---|
| | $\beta$ | $p$ | $\beta$ | $p$ |
| VC → PF → | 0.002 | .739 | −0.04 | < .001 |
| VC → PF → PA → | −0.02 | < .001 | −0.02 | < .001 |
| VC → PF → TA → | −0.01 | .013 | −0.04 | < .001 |
| VC → PA → | 0.18 | < .001 | 0.14 | < .001 |
| VC → TA → | 0.02 | .033 | 0.06 | .001 |

*Note.* Indirect effects were estimated using standardized coefficients. VC = visual complexity; PF = processing fluency; PA = positive awe; TA = threat-based awe.

## Subjective belief alignment with group-size effects

Given that the SEM results indicated a positive direct effect of group size on aesthetic value, we next examined whether this effect was reflected in participants' explicit beliefs, measured after the main task completion. One-sample t-tests against the scale midpoint (4 = "no relation") were conducted on belief ratings, with Holm–Bonferroni correction (Figure 5). Participants did not explicitly believe that group size was related to aesthetic value or positive awe ($ps > .097$). In contrast, they believed larger group size to reduce liking and fluency and to increase threat-based awe ($ps < .001$). Thus, while post-task beliefs aligned with fluency- and threat-awe-related effects, they misaligned with the positive effect of group size on aesthetic value. This suggests that SEM results reflect implicit evaluative mechanisms rather than explicit beliefs, or possible demand characteristics.

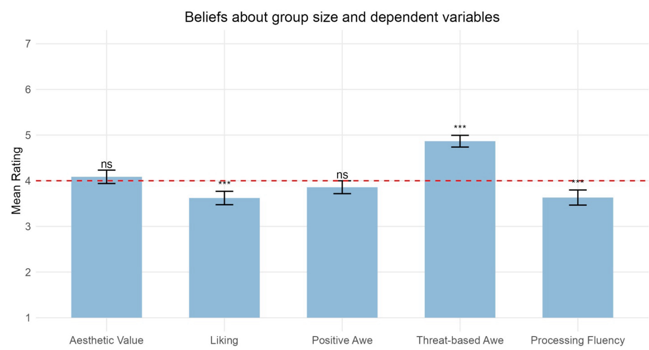


Figure 5. Subjective beliefs about group-size effects (1 = decrease; 7 = increase). Error bars indicate 95% CIs; the dashed line marks the midpoint (4 = no relation). Asterisks denote one-sample t-tests against the midpoint. ns = not significant; $***p < .001$.

## Discussion

The present study investigated how repetition shapes aesthetic judgments, with a particular focus on distinguishing aesthetic value from liking. We found that greater repetition increased judgments of aesthetic value, yet reduced liking. Larger groups were also perceived as more visually complex, less fluent and elicited stronger awe: both positive and threat based. These patterns were further supported by structural equation modeling, which revealed that processing fluency and awe jointly contributed to both aesthetic value and liking, but with different relative weights and pathways. Together, these findings support a multi-pathway account in which aesthetic value and liking arise from shared underlying mechanisms but diverge in how awe-related affective states are weighted and integrated into final evaluative judgments.

### Dissociation and shared representations

Prior work has often treated aesthetic value and liking as interchangeable (Berlyne, 1972; Brielmann & Dayan, 2022; Brielmann & Pelli, 2018). In contrast, the present findings reveal a clear dissociation between these judgments. Representational similarity analysis further shows how this dissociation coexists with their typically high correlations. Within each group-size condition, the two judgments shared substantial representational structure, but these correlation did not generalize across group-size conditions, indicating that repetition alters the relationship between aesthetic value and liking at a contextual level rather than eliminating their common representational structure.

## Divergent pathways: fluency and awe

Mediation analyses provide insight into the mechanisms underlying these effects. Consistent with processing fluency theories (Reber et al., 2004; Yoo et al., 2024), increasing group size (and thus complexity) reduced fluency, which in turn decreased both aesthetic value and liking. This finding reinforces the view that fluent processing enhances preferences by minimizing computational and energetic costs, perhaps reflecting shared evolutionary pressures favoring efficiency in perception, understanding, and evaluation (Mendelson et al., 2025; Tang et al., 2025).

Importantly, the present results extend fluency theories by demonstrating that cognitive effort does not merely influence pleasure. It also shapes evaluation via complex affective states: reduced fluency attenuated positive awe while amplifying threat-based awe, thereby suppressing aesthetic value and liking. The dissociable effects of processing fluency on positive and threat-based awe refine the accommodation-based accounts of awe (Keltner & Haidt, 2003) by suggesting that these two forms of awe reflect distinct accommodation processes rather than a single unified response. Threat-based awe is associated with lower perceived self-control and certainty (Gordon et al., 2017) and thus is more likely to arise under conditions of reduced processing fluency that heighten uncertainty and fear. By contrast, positive awe appears to depend on more structured and predictable information, allowing individuals to perceive coherence and meaning even as mental representations are updated.

At the same time, simultaneous repetition increased aesthetic value and liking by eliciting positive awe, independent of processing fluency. One reason repetition may elicit positive awe is that large-scale repetition conveys a sense of vastness, the core components of awe (Keltner & Haidt, 2003). Awe has also been theorized as a fundamentally social emotion, elicited by stimuli associated with collective values, shared goals, or outcomes that extend beyond the individual (Feierman & Oviedo, 2019; Monroy & Keltner, 2023), and repetition may serve as a visual cue to such collective relevance. These positive-awe-related experiences allow repetition to elevate aesthetic judgements even when perceptual processing is demanding.

Crucially, although aesthetic value and liking shared identical mediation structures, their divergence emerged at the weighting of different pathways. Processing fluency exerted comparable effects on both judgments, indicating a shared dependence on fluency-based hedonic processing rooted in basic cognitive efficiency (Mendelson et al., 2025; Tang et al., 2025). However, the two judgments diverged in how affective states were integrated. Threat-based awe exerted a stronger negative influence on liking, whereas positive awe exerted a stronger positive influence on aesthetic value. These results suggest that liking may remain more tightly coupled to survival-relevant affective signals, consistent with its closer alignment to immediate approach–avoidance tendencies shaped by evolutionary constraints (Janovcová et al., 2019). By contrast, aesthetic value is more related to positive awe, an affective state associated with meaning-making, cultural elaboration, and experiences of the sublime that extend beyond immediate pleasure (Keltner & Haidt, 2003; Monroy & Keltner, 2023).

Together, these results support the view that aesthetic value and liking rely on partially distinct cognitive processes (Che et al., 2024; Sidhu et al., 2018), consistent with dual-process accounts proposing that aesthetic responses can arise from either rapid, stimulus-driven or slower, elaborative processing that supports meaning-making (Graf & Landwehr, 2015). This distinction is also supported by neuroaesthetic evidence that expert aesthetic judgments recruit prefrontal and temporoparietal networks involved in cognitive control and semantic integration beyond immediate pleasure (Huang et al., 2026). More generally, the current findings highlight the distinction between valence (pleasure-related) and value (significance-related) processes in evaluation (Winkielman & Jasko, in press).

In addition, group size showed a positive direct effect on aesthetic value that was absent for liking. The SEM showed that visual complexity did not predict aesthetic value directly nor via processing fluency. Thus, aesthetic value may be directly sensitive to large-scale structural properties such as magnitude, and this cannot be reduced to changes in visual complexity alone. Repetition may convey information beyond low-level perceptual features, reflecting structural significance that contributes uniquely to aesthetic value.

Importantly, these effects cannot be attributed to demand characteristics or participants' explicit beliefs that larger groups are inherently more positive awe-inspiring or aesthetically valuable, as belief measures did not match the observed group-size effect.

## Limitations and future studies

Several limitations should be noted. First, the study used only faces, and it remains unclear whether the findings generalize to non-social domains. Second, the group-size manipulation may be confounded with low-level visual properties, including overall display size and element size. Third, stimuli were arranged in perfectly regular grids, which introduces additional perceptual regularity. Future work should test whether similar effects emerge with more varied stimuli and spatial arrangements.

In sum, simultaneous repetition increased aesthetic value while reducing liking. Although both judgments were influenced by fluency, awe-related states contributed differently to each outcome, leading to their divergence. Beyond visual complexity, repetition appears to convey higher-order structural and social information that uniquely enhances aesthetic value. Together, these findings argue against treating liking and aesthetic value as interchangeable measures of a single hedonic response and instead highlight their distinct roles in aesthetic evaluation.

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