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When Complexity Is Symmetric: the Interplay of Two Core Determinants of Visual Aesthetics

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Is processing fluency sufficient to understand how consumers form aesthetic preferences? We show for objective symmetry and complexity positive results on aesthetic liking: complexity through a direct (cognitive) effect, symmetry through moderated mediation in enhancing the effect of fluency. Results imply to include different design factors in consumer research conjointly.

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The Interplay of Two Core Determinants of Visual Aesthetics

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EXTENDED ABSTRACT

Good product design can be a key factor in attracting consumers in today's world (e.g., Apple, Braun, IKEA), and it has been suggested that processing fluency is the key process explaining aesthetic preference (Reber, Schwarz, and Winkielman 2004).

Several design properties have been identified as important determinants of aesthetic preference (e.g., symmetry, contrast, prototypicality), and it has been suggested that this is because these objective stimulus features increase processing fluency (Reber et al. 2004). The robustness of fluency effects on consumer preferences has been demonstrated in a wide range of studies (e.g., Lee 2001; Lee and Labroo 2004). From this point of view, visual complexity should contribute negatively to processing fluency and thus have a negative impact on aesthetic liking, as more complex information is more demanding for cognitive system processing. Yet, empirical results show otherwise. Landwehr, Labroo, and Herrmann (2011) for instance showed a positive effect of complexity such that prototypical but complex car designs are most successful in terms of sales. The critical question therefore is: Is processing fluency a sufficient mechanism to understand the effects of objective stimulus characteristics on aesthetic liking?

Positive effects of fluency have been shown in consumer research for a wide range of contexts (e.g., Herrmann et al. 2013; Novemsky et al. 2007). Fluency theory states that higher fluency is inherently positive and experienced as gut-level positive affect (Winkielman and Cacioppo 2001). Following this account, fluency increases aesthetic liking because the positive affect is attributed to the eliciting stimulus unless its informational value is called into question (Schwarz 2004).

There are several objective stimulus features that are related to experienced fluency (Reber et al. 2004). The current research focuses on two of these features—symmetry and complexity—to allow an examination of more complicated relationships because only a few recent studies started to consider interactions between fluency-related stimulus variables (e.g., Landwehr et al. 2011). The research question hence was how visual symmetry and visual complexity mutually influence fluency and liking. We used pictures of abstract art to answer this question.

The stimulus set (n = 620) was digitally created, generative digital art, all from one single artist. Objective design complexity was measured with the size of the ZIP compressed image file as this measure correlates positively with subjective complexity (e.g., Forsythe et al. 2011). We calculated objective design symmetry with a new approach based on the correlation of pixel grayscale values. The idea is that a picture is vertically symmetric (i.e., mirrored on vertical axis) if each corresponding pixel left and right of the axis line are the same (perfect symmetry) or close to each other regarding its pixel value. In the present research, we focused only on vertical symmetry as the most common type of symmetry. Per picture ratings for aesthetic liking and subjective fluency experience were obtained separately from overall 2509 participants (47.8% female) using Amazon's MTurk platform.

We ran an OLS regression predicting aesthetic liking from objective complexity, objective symmetry, and the interaction of these two factors. Symmetry and complexity were positively related to liking and there was no interaction effect, indicating that both objective measures contribute independently to aesthetic liking (see table 1).

We then conducted a moderated mediation analysis (MacKinnon 2008) to investigate whether fluency mediates the effects of complexity and/or symmetry on aesthetic liking, while allowing the two independent variables to act as moderators at any point within the mediating process. To this end, we first estimated an additional OLS-model where we regressed subjective fluency on objective symmetry, objective complexity, and their interaction. The results of this second model show that symmetry contributes positively to fluency. Complexity, however, decreases subjective fluency. Again, there is no significant interaction between the two measures. Third, we estimated a model where we regressed aesthetic liking on objective symmetry and objective complexity and include fluency as a mediator, as well as all possible interaction effects. Results of this third and final model show that objective complexity has a positive direct effect on aesthetic liking. Objective symmetry is now only marginally significant compared to the results of the first model. Fluency strongly increases liking. Yet, the interaction between fluency and symmetry is significant, showing that symmetry moderates the positive effect of fluency. This pattern of results proved to be robust in several supplementary analyses where the non-significant interactions are sequentially omitted, and where ideal point parameterization of the objective design measures was tested.

In predicting subjective ratings of aesthetic liking by objective measures of symmetry and complexity and taking fluency as a mediator into account, this research examined how symmetry and complexity mutually influence processing fluency and aesthetic liking. Results showed that aesthetic liking is not solely based on fluency but rather influenced directly by complexity. Symmetry moderates the positive effect of fluency such that a subjective feeling of fluency is taken more into account for more symmetric pictures. An explanation for the observed interactive effect is the diagnostic role symmetry plays in human beauty (Rhodes 2006) such that a possible discounting process of fluency is prevented. Findings further show a suppressor effect of fluency on the relationship between complexity and aesthetic liking. Taken together, our results suggest that complexity triggers a cognitive process that positively impacts aesthetic liking, as argued by Labroo and Kim (2009), and this process takes place independently of the affective impact of fluency. This is well in line with dual process theories of information processing (e.g., Kahneman 2003; Strack and Deutsch 2004).

Overall, our findings make emphasis to include different design factors in consumer research conjointly. In order to understand how aesthetic preferences are formed in consumers, it is not sufficient to consider objective characteristics separately. We showed for objective symmetry and objective complexity positive results on aesthetic liking: complexity through a direct (cognitive) effect, symmetry through moderated mediation in enhancing the effect of ease of fluency. The found suppressor effect of fluency on complexity may explain why previous research was partially inconclusive.

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