

# **The effects of quantity, order, and spatial proximity of elements on subjective complexity judgment**

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Visual complexity is a fundamental property influencing aesthetic perception (Krpan et al., 2022). However, visual complexity is multidimensional, which might be a reason behind the seemingly inconsistent results between complexity and aesthetic decisions in previous studies (van Geert et al., 2020). In the present study, we aimed to identify multiple factors of complexity and examined their relative effects and interactions on subjective complexity judgment. We created visual stimulus arrays of which elements were manipulated in terms of the number (small vs. large), order (regular vs. irregular), and spatial proximity (close vs. distant). On each trial, two different stimulus images were presented laterally on the video monitor for 80, 150, or 500 msec, followed by the participant's button press to report their binary subjective complexity judgment. Results showed that stimulus arrays were judged as more complex with the large number of elements ( $F=36.119$ ,  $p<.001$ ), irregularly arranged ( $F=57.009$ ,  $p<.001$ ), and distant from each other ( $F=126.352$ ,  $p<.001$ ). With more factors contributing to complexity consist of the stimulus, the judgment of complexity was intensified. These patterns of results remain constant across varied stimulus presentation durations. Overall, our results demonstrated that the number of elements, order, and spatial proximity are all effective on subjective complexity judgment, and the combination of each factor showed additional effects enhancing complexity. Subjective complexity judgment seems to be based on the perceptual processing stage since the effects of the three factors are apparent with a brief presentation.

**Keywords:** empirical aesthetics, complexity, order, spatial proximity

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