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DOI

[10.1167/jov.20.11.1741](https://doi.org/10.1167/jov.20.11.1741)

Publication date

2020

Document Version

Final published version

Published in

Journal of vision

Citation (APA)

Zhao, Y., de Ridder, H., & Wijntjes, M. W. A. (2020). The appearance of depictions. *Journal of vision*, 20(11), Article 1741. <https://doi.org/10.1167/jov.20.11.1741>

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The appearance of depictions

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Journal of Vision October 2020, Vol.20, 1741. doi:<https://doi.org/10.1167/jov.20.11.1741>

Abstract

Similar objects can appear different because of natural or man-made variations. Depictions of objects also exhibit appearance differences. If two painters paint the same object, the appearance difference can be called style. Artists use colors, shading, brushstroke etc., to give their work a unique signature. However, it is implicit and difficult to quantify. In this study, we investigated how humans perceive different depiction styles. In an online experiment, we used (fragments of) paintings as stimuli. The creation years of the paintings varied from the 17th to 20th century. There were four sets of stimuli: 10 flower paintings, 10 flower fragments, 16 apple fragments, and 16 peach fragments. In each trial, two stimuli were presented side by side. After five practice trials, participants were asked to rate depiction style differences on a 0-100 scale, from “not so different” to “very different”. 80 participants completed the rating task (20 for each set). To quantify inter-observer agreement, we computed correlations between individual and mean data. We found that on average, observers agreed most on peaches ($r=0.75$) and least on flower fragments ($r=0.51$). Multidimensional scaling analysis was then performed to position the stimuli in a perceptual space. After calculating stress values, 2D spaces were the best fit, except for peaches (1D). In the 2D perceptual space of apples, a clear gradient of creation years was present. This confirms that style changes with time. Furthermore, for the flower fragments, two clusters emerged from a single cluster in the whole-painting condition, suggesting that participants were using different criteria to judge style differences. We showed that people are capable of distinguishing different depiction styles. We found that one of the underlying criteria is creation year. Furthermore, the scale difference for the flower paintings suggest that brush strokes contribute to these perceptions.

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