Introduction

When viewing artworks implying motion, we feel that the subject matter is moving although there is no actual movement involved. That artists can successfully convey a sense of motion through static artwork, along with previous studies demonstrating “implied motion” activating visual motion processing areas, suggests that implied motion in artwork is processed in a way similar to actual motion [1, 2]. In the present study, we investigated this possibility by examining whether motion-induced time dilation effect reported previously (the duration of event with motion perceived longer than its actual duration) is also observed when viewing visual artwork, representative and abstract paintings, with implied motion [1, 4].

Methods

Stimuli Selection

A preliminary survey was conducted to select images for the main experiment that differ in terms of the intensity of perceived motion, while controlling for other factors that can influence perceived duration.

-Participants: 8 males, 8 females, mean age = 22.33
-Simuli: 139 paintings converted to grayscale (68 horse paintings with varying degrees of implied motion + 51 flower paintings; see text 1 in Task)

Selected Images

High IM Low IM No IM

Images matched for RMS contrast

Rating results

Significant difference within category was observed only in intensity of perceived motion and not in any other terms in the survey.

Representational

Three-Way Mixed ANOVA on proportion of “long” responses

- The main effect of image type and its interaction with image type and duration were significant (F (6, 51) = 2.787, p = .031; F (6, 51) = 2.006, p = .048). Three Greenhouse-Geisser corrected.
- The image type-duration interaction was analyzed using simple effects: the perceived duration of high IM was longer than that of low IM at 0.6s and 0.7s (p = .018, p = .002, both uncorrected), and also longer than that of no IM at 0.7s (p = .005, FDR corrected).

Abstract

Three-Way Mixed ANOVA on proportion of “long” responses

- The main effect of category order and its interaction with image type were not significant, so data were collapsed across category order.
- Only the main effect of image type was significant (F (2, 58) = 4.564, p = .014), so data were collapsed across duration for further analysis.
- Post-hoc paired t-tests on collapsed data revealed significant difference between high IM and low IM (t(29) = 2.915, p = .005, FDR corrected).

Discussion

For the representational category, intensity of implied motion modulates perceived duration. More specifically, implied motion causes time dilation, just as in the case of actual motion.

-However, for the abstract category, the results are not yet clear. This might arise from the subtlety of implied motion in abstract paintings, compared to representational paintings. It is plausible that due to such subtlety, the range of duration used in the current study (0.1s - 1s) is not appropriate for capturing the modulation by implied motion on abstract paintings. We are planning on conducting further research to examine these possibilities.

-These results have implications for how we, as viewers, understand the artists’ attempt to convey motion through static artwork.