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Brief article

The role of similarity, sound and awareness in the appreciation of visual artwork via motor simulation

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ABSTRACT

One way to increase art appreciation is to create congruency between the actions performed by the artist and the actions performed by the viewer. Leder, Bar, and Topolinski (2012) successfully created such a link by asking participants to make either stroking or stippling motions while viewing stroke-style and pointillist-style paintings. We carried out a direct replication of Leder et al. (2012) in Experiment 1 but failed to reproduce their results. In Experiment 2, we achieved the desired cross-over interaction between image and action but only when the relationship was made more transparent. Experiment 3 demonstrated that this effect requires a motor component and cannot be reproduced by simply hearing the sounds associated with drawing production. Experiment 4 investigated whether either an external manipulation or a self-report measure of awareness of the image–action match modulated the liking ratings, in addition to artwork familiarity and participants' own hypotheses regarding the direction of the image–action effect. Participants who predicted that congruent relationships between what they saw and what they did would increase liking showed enhanced congruency effects. The links between historical production and contemporary exposure to art may then be an overt rather than covert process.

1. Introduction

The idea that cognition is influenced by the physical constraints of the organism (embodied cognition; Freedberg & Gallese, 2007) is an appealing and popular thesis. Two recent papers have made remarkable claims regarding the role of bodily movements in cognition in the context of aesthetic appreciation. Specifically, when viewing artwork, if viewers produce hand movements that approximate the methods by which the artwork was originally created (Taylor, Witt, & Grimaldi, 2012), such movements increase liking for the art (Leder, Bar, & Topolinski, 2012). These examples, in addition to resonating with the embodied cognition idea, also connect with how the repetition of action serves to facilitate processing (Hommel, 2004; Pashler & Baylis, 1991). This mimicry of the mode of artistic production at the time of viewing has been claimed to serve almost as a time travel device, creating empathy and "sympathetic resonance" (Leder et al., 2012, p. 1479) between viewer and artist, yielding a deeper appreciation of the work in question. To wit: "...the mere viewing of paintings engages the observers' motor system. Motor simulations give artists the ability to reach out to their audience across great distances and even generations via paint and canvas..." (Taylor et al.,

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2012, p. 36), and, "...artistic style as a concretization of the artist's act of creation links the artwork's creation with the moment of art perception; this connection bridged 100 years in the present case..." (Leder et al., 2012, p. 1480–1481). In the latter study, participants in the critical experimental group made either stroking or stippling motions while viewing artwork of a stroke-style and of a pointillist-style. Increases in artwork liking were observed when the artistic style resembled the motion produced (congruent; e.g., stroking motion with stroke-style painting) relative to when the artistic style did not resemble the motion produced (incongruent; e.g., stippling motion with stroke-style painting).

There are a number of reasons to be cautious about these specific claims. First, it is not currently clear how exact the relationship between art production and art perception has to be. In the case of Taylor et al. (2012), brushstrokes indicative of left-to-right and right-to-left motion appeared to facilitate similar directional movements made by the participant. In the case of Leder et al. (2012), liking of the artwork of Vincent van Gogh and Claude Monet could be enhanced by the request to make 20 cm horizontal stroking motions, while the appreciation of the artwork of Paul Baum and Georges Seurat was facilitated with the request to make stippling or tapping motions. Not only does this appear to do somewhat of a disservice to the original artists' techniques but it also raises the issue of how aware participants must be of the link between artwork and motion before such an effect is manifest. Second, it is not currently clear how robust these effects are. In the case of Taylor et al. (2012), it appears that the speeding of reaction time when the direction of the brushstroke in the artwork and the direction of actual responding by the participant were congruent was more robust when making a right-to-left as opposed to a left-to-right response. In the case of Leder et al. (2012), the average magnitude of the difference between artwork liking when congruent and incongruent actions were undertaken while viewing the artwork was 0.55 on a 1–7 scale. This appeared equivalent to an effect observed in the opposite direction, favoring incongruent action when viewing pointillist paintings, for a control group (−0.46) where action and viewing were temporally distinct (although see Ticini, Rachman, Pelletier, & Dubal, 2014, for the apparent success of a temporally distinct action-viewing effect using pointillist-style paintings). Therefore, to investigate the specificity and robustness of motor simulation effects on art appreciation, we began with a direct replication of Leder et al. (2012) with higher statistical power.

2. Experiment 1

2.1. Methods

136 undergraduate students from Ryerson University, Toronto, Canada, consented for their data to be used in analysis and no observations were excluded. As per a recent recommendation regarding the sample size of replication attempts (Simonsohn, 2013), we chose a sample size of at least 2½ times the size of the original experiment. We focused on replicating Leder et al.'s (2012) critical experimental condition, which included 48 participants, split between a stippling group ($n = 24$) and a stroking group ($n = 24$). Our stippling group ($n = 70$) consisted of 57 females with mean age of 19.5 years ($sd = 4.6$). The stroking group ($n = 66$) consisted of 57 females with mean age of 19.8 years ($sd = 5.7$). Participants were tested in groups of up to 6. All studies were approved for testing by the Research Ethics Board of Ryerson University, and participants received course credit for participation.

The study began with participants reading on-screen instructions and filling out their age, gender and years of formal art training on a sheet of paper provided. The 5 examples of "neoimpressionist, pointillist-style paintings and ...postimpressionist, stroke style paintings" (Leder et al., 2012, p. 1479; hereafter 'pointillist-style' and 'stroke-style') were used in Experiment 1 and these 10 pieces of art were presented in random order. Participants viewed each artwork for 30 s each via a projector screen. When viewing the artworks, participants generated drawings (either stippling or stroking, following the instructions in Leder et al., 2012) using a dominant hand-held pencil, and a blank piece of paper supported by a mouse mat. Individual covered plastic boxes were used to house and shield the drawing from both the drawer and other participants. In between viewing artworks, participants used their non-dominant hand and a second pencil to respond to an artwork pleasantness prompt (1 = do not like at all, 7 = like very much), presented for 15 s. Following artwork rating, participants completed a brief questionnaire based on Leder et al. (2012) regarding their understanding of the task and then were debriefed.

2.2. Results and discussion

A mixed-model ANOVA with the between-participants factor of action (stippling, stroking) and the within-participants factor of image (pointillist, stroke) produced a main effect of image only: $F(1,134) = 30.80$, MSE = 0.500, $p < .001$, $\eta_p^2 = .187$. Both the main effect of action ($F(1,134) = 1.33$, MSE = 1.169, $p = .251$, $\eta_p^2 = .010$) and the interaction between action × image ($F(1,134) = 0.02$, MSE = 0.500, $p = .880$, $\eta_p^2 < .001$) failed to reach statistical significance. As seen in Fig. 1a, participants expressed more liking for stroke-style images (4.53) relative to pointillist-style images (4.05), independently of which hand movement they produced. One possible reason for failing to replicate Leder et al. (2012) might be that the connection between the hand movements and the painting style must be explicitly recognized in order to increase liking of the relevant images. Perhaps in our study, participants simply failed to notice the relationships between their hand movements and the style of the paintings they viewed. Therefore, to strengthen the connection between the hand motions participants made and the pictures they viewed, we presented a selection of the drawings generated by participants in Experiment 1 as the artwork in Experiment 2.