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Testing Inductive Learning Effects from Changing Attentional Focus with Training Instructions

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ABSTRACT

Participants studied a variety of artists' paintings with different instructions regarding which elements of the paintings to focus on. The identification and recognition of trained and novel paintings was then tested. The additional instructions did not significantly alter memory performance or inductive learning .

BACKGROUND, HYPOTHESES, & PROCEDURE

Background:

Kornell and Bjork (2008) showed that superior inductive learning performance of artists' styles occurred when participants were trained with interleaved examples of paintings by different artists rather than blocked examples of paintings from each artist. Our study proposes that varying tasks, while keeping materials interleaved, during training is another factor that can influence the success of inductive learning. We previously conducted an eyetracking experiment that indicated simple questions about each painting can draw participants' attention to different areas of the paintings. In this study, we test whether consistent or varying kinds of questions will enhance or hinder learning.

METHODS

Participants:

37 participants completed on Prolific and from the subject pool at DePauw University 8 were removed for recorded distracted seconds and low performance ratings

Procedure:

During training, participants viewed 6 images by 12 different artists. Depending on the randomized category they were placed into, the participants either viewed the question in a massed or spaced strategy. The questions ranged from: What is the entry point? What is the dominant color? Is the transition between earth and sky smooth or abrupt? The blocked condition showed the images and the questions consecutively , while the interleaving condition intermixes the questions and images. The participants were then asked to identity, recognize, and rate their likeability of each image. Afterwards, they then completed a survey about their strategies, previous familiarity and percieved accuracy.

Materials:

- 36 paintings were adapted from Kornell and Bjork (2008)
- Javascript and jsPsych were used for implementation of this experiment so participants could complete the study in a web browser
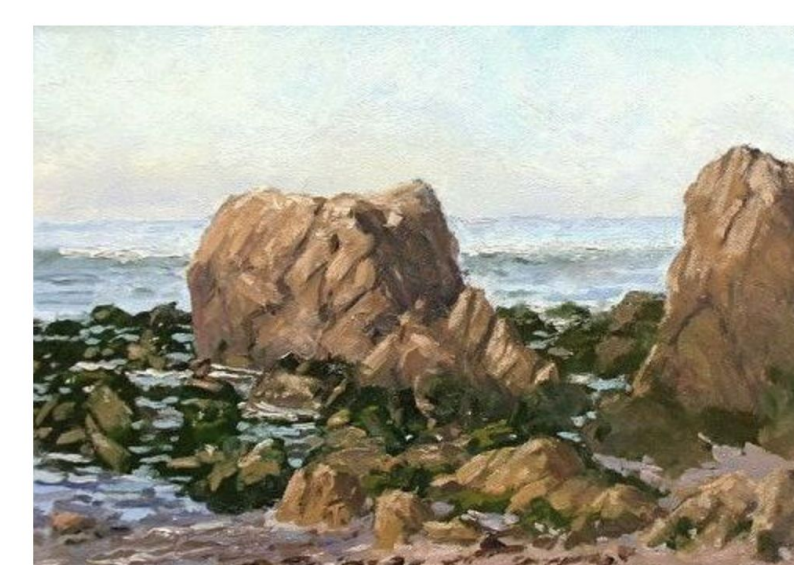- Prolific for online recruitment of participants

METHODS (Continued)

Training

Participants were shown 3 paintings by 12 different artists and were asked to focus on specific elements of the painting, such as the entry point, horizon and color. they were also given the name of the artist below the painting.

What is the dominant color palette in the painting?
Artist: Ron Schlorff

What is the 'entry point' that leads you into the painting?
Artist: Ciprian Stratulat

Is there a smooth or abrupt transition between earth and sky in the painting?
Artist: Bruno Pessani

Testing

Participants were shown 3 paintings that they have seen before and 3 paintings that they have not seen before by each of the 12 artists. Participants were then asked if they recognized or could identify the artist. They were then asked to rate their likeability of the painting on a scale of 1 - 9 (1 = strongly dislike, 9 = strongly like)

Recognition

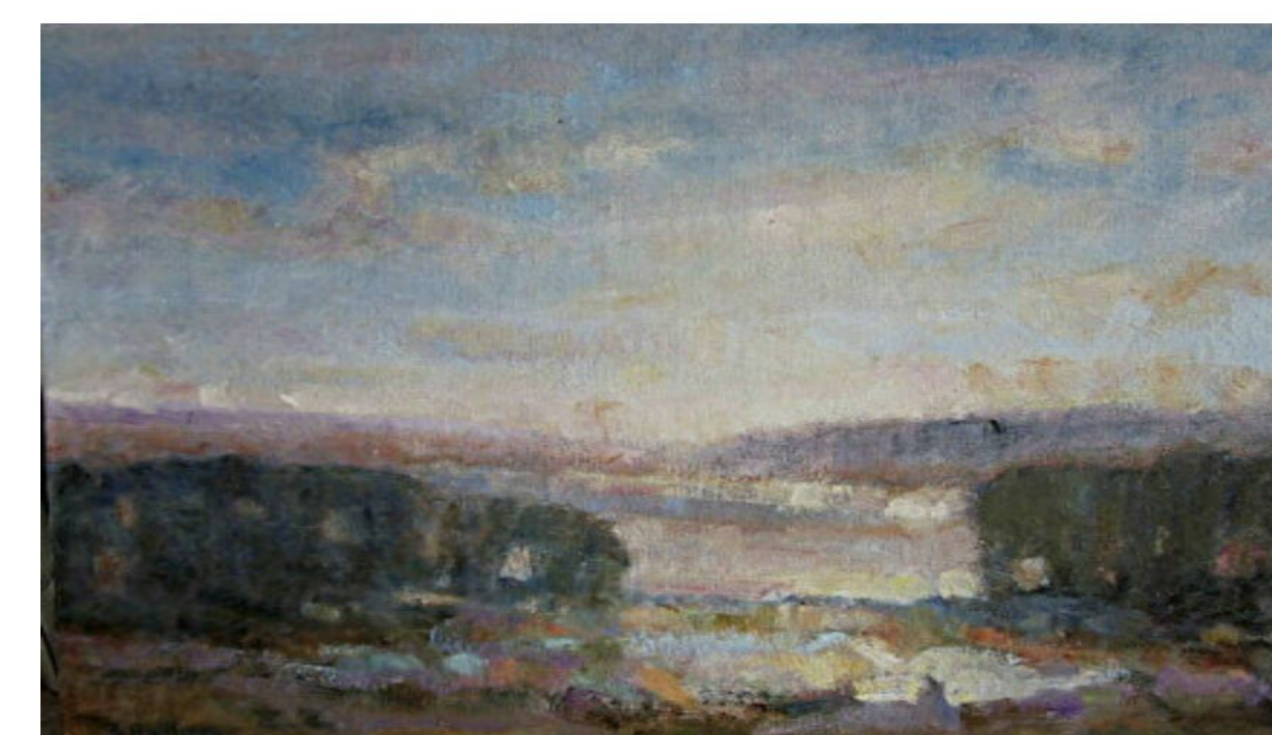Have you seen this painting in the training? Type 'y' for yes and 'n' for no.

Identification

Identify the artist who painted this.
*
○ Bruno Pessani
○ Ciprian Stratulat
○ George Wexler
○ Georges Braque

Likeability

How much do you like this painting? Choose from 1 to 9 (1: strongly dislike, 9: strongly like).

RESULTS

Repeated Measures ANOVAs tested for differences in memory performance, inductive learning performance, and likeability based on the training conditions (whether paintings for a category were paired with color, entry, horizon, or a mixture of those instructions during training). Eight participants were excluded for not having normal color vision or for being low performance outliers or spending a lot of time off task.

Recognition memory:

Recognition of previously trained images was significantly different based on training condition, $F(3, 84) = 16.14$, $p < .001$. The descriptive statistics are shared below in Table 1. Post hoc analyses indicate that the entry instruction led to significantly better recognition performance than the color condition, but there was no significant difference in performance between entry and the color or mixed conditions. In the post-experiment survey, several participants commented that the entry instructions were less clear to them. However, there were no significant differences in recognition memory for the new images (for which the correct answer is "no"). Table 2 indicates that participants answered similarly when it came to identification.

Training Instruction	Mean	SD	N
ColorSeen	0.636	0.201	29
EntrySeen	0.828	0.141	29
HorizonSeen	0.594	0.198	29
MixedSeen	0.701	0.183	29

Identification Performance	Mean	SD	N
ColorUnseenCorrectID	0.215	0.236	29
EntryUnseenCorrectID	0.276	0.273	29
HorizonUnseenCorrectID	0.318	0.277	29
MixedUnseenCorrectID	0.249	0.241	29

Identification/inductive learning:

There was no significant difference in identification performance for previously seen paintings based on the training condition, $F(3, 84) = 2.43$, $p = .07$. Most importantly, for inductive learning, there was no significant difference in identification performance for *new* paintings based on the training condition, $F(3, 84) = 1.95$, $p = .13$. However, the means (shown in Table 2) indicate that our participants were approximately half as accurate as Kornell and Bjork's participants (who had means above 60%), which may indicate a floor effect because our training only included 3 paintings per category while their training included 6 paintings per category.

Likeability:

A 4 (training condition) x 2 (trained or new painting) repeated measures ANOVA indicated a main effect for old/new paintings, $F(1, 84) = 21.01$, $p < .001$, in which participants gave higher likeability ratings to trained images. There was no main effect for training instruction and no interaction effect.

DISCUSSION

The results suggest that there are no substantial memory or inductive learning effects from manipulating attention via only one question or via a mixture of relevant questions during inductive learning. However, as note above, performance in our study may indicate a floor effect. We are currently conducting a conceptual replication.

References:

Kornell, N., & Bjork, R. A. (2008). Learning Concepts and Categories. *Psychological Science,19*(6), 585-592. doi:10.1111/j.1467-9280.2008.02127.x