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In the white cube: Museum context enhances the valuation and memory of art[☆]

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ABSTRACT

Art museum attendance is rising steadily, unchallenged by online alternatives. However, the psychological value of the real museum experience remains unclear because the experience of art in the museum and other contexts has not been compared. Here we examined the appreciation and memory of an art exhibition when viewed in a museum or as a computer simulated version in the laboratory. In line with the postulates of situated cognition, we show that the experience of art relies on organizing resources present in the environment. Specifically, artworks were found more arousing, positive, interesting and liked more in the museum than in the laboratory. Moreover, participants who saw the exhibition in the museum later recalled more artworks and used spatial layout cues for retrieval. Thus, encountering real art in the museum enhances cognitive and affective processes involved in the appreciation of art and enriches information encoded in long-term memory.

1. Introduction

Art plays a fundamental role in all human societies, embodying culturally significant meaning (Danto, 2013). Art is created, performed, and appreciated in specific settings to embellish, to heighten shared values, or to emphasize the exceptionality of certain occasions (Anderson, 1989; Dissanayake, 1988). Even in Western societies, where art has become largely institutionalized, people place a high value on the experience of art, as evidenced by the large investment of resources in exhibiting, preserving, and engaging with art. The construction of many new exhibition spaces in China for national and international artists (Perlez, 2012) is an example of a truly globalized trend for creating new art museums. Moreover, attendance to art museums has risen steadily in the last five years.[1]

The burgeoning of museum foundation and attendance is surprising given how much human activity today is performed through digital media with little or no contextual constraints. Music and books, for instance, are commonly stored in virtual drives to be enjoyed anywhere, and videogames and online games no longer even require the players to be in the same location. In contrast, attendance to art museums and galleries has not been replaced by open-context and free virtual tours and galleries available on the World Wide Web. Rather, such virtual internet resources are used to complement the real visit (Marty, 2007, 2008). What drives such individual and public investments despite the current availability of digital alternatives?

From a theoretical perspective, it has been argued that art museums foster a certain kind of experience of art; an experience that virtual alternatives cannot provide (Groys, 2008). In a museum context, artworks become a class of objects whose sole purpose is to be appreciated as art and provide special experience. Galleries and museums exalt the special artistic status of the exhibited items, and draw visitors' attention to this status (O'Doherty, 1986). However, the added psychological value of attending an art exhibition — as opposed to online or offline reproductions — has not been empirically examined. The reason for this is that most studies aimed at understanding the psychological processes involved in art appreciation have been carried out in laboratories.

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[1] Data from Frankel, Paternò, Rivetti, & Skeggs, 2012; Pes & Sharpe, 2013; Skeggs, McNaught, Saraceno, & Sharpe, 2014; Sharpe et al., 2010; Stoilas et al., 2011.

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Thus, although art experiences “in a museum are difficult, if ever possible, to reproduce in a lab” (Augustin & Wagemans, 2012, pp. 455–456), in general, research is preferably performed in the highly controllable laboratory setting instead of the less controllable museum setting. This laboratory approach is related to the notion that the experience of art is, to a large extent, contextually impermeable, which has its roots in early 20th century formalist art theory. Formalism, in short, claimed that the essence of art appreciation resides in the formal properties of the work, especially combinations and arrangements of lines, colors, forms, and so on (Bell, 1914). Because these relations and combinations remain constant, they are unaffected by context: “Great art remains stable and unobscure because the feelings that it awakens are independent of time and place (…)” (Bell, 1914, p. 37).

These formalistic assumptions are not in line with the growing awareness among researchers of the relevance of ecological factors for the experience of art, with current models of aesthetic experience (Chatterjee & Vartanian, 2014; Leder, Belke, Oeberst, & Augustin, 2004), or with the recent developments in cognitive science that emphasize the situatedness of cognition, and the role of contextual constraints and affordances in perception, memory, and action (Barsalou, 2008; Clark, 1997, 2013; Hutchins, 1995; Smith & Vela, 2001). From this perspective, “Mental events and human behaviors can be thought of as states that emerge from moment-by-moment interaction with the environment rather than proceeding in autonomous, invariant, context-free fashion from preformed predispositions or causes. Inherently, a mind exists in context.” (Barrett, Mesquita, & Smith, 2010, p. 5).

There are at least three major reasons to believe, contrary to formalist claims, that the experience of art is no exception to the pervasive role of context in cognition in general, and that, in fact, context plays a substantial role in the appreciation and memorability of artworks. First, it is well established that the perception of any object whatsoever is not context-free, and that contextual information is stored in memory together with object-related information, facilitating subsequent object recognition (Bar, 2004; Engel, Maye, Kurthen, & König, 2013; Oliva & Torralba, 2007). Second, it has been shown that verbal and visual semantic contextual framing have a profound influence on art appreciation, as well as the underlying neural processes (Gartus & Leder, 2014; Kirk, Skov, Hulme, Christensen, & Zeki, 2009; Noguchi & Murota, 2013). Third, the few studies comparing art appreciation of original works exhibited at museums and their reproductions in the laboratory found differences regarding the appreciation of art.

Locher, Smith, and Smith (1999, 2001) directly compared the evaluation of original art in the museum with different forms of art reproductions (slide projections, computer presentations) in a non-museum setting. Although they studied the effects of format presentation on the hedonic value attributed to the works, most of their scales were related to stimuli features, such as symmetry, balance, or complexity. They found that evaluations of such stimuli features were mostly unaffected by format or context. However, evaluations that were related to the affective aspects of art experience, such as interest or pleasantness, differed between original artworks in the museum and their reproductions. In line with this, Brieber, Nadal, Leder, and Rosenberg (2014) found that original artworks — art photographs in this case — in the museum are liked more, found more interesting, and looked at longer than their reproductions in the laboratory.

The present study aimed to extend this line of research by including a broader selection of art forms, a more diverse examination of affective and cognitive aspects of art experience and, especially, a first investigation of the effects of context on the memorability of art. To achieve this goal, we asked participants to rate their experience of an art exhibition presented in two contexts: a museum, where it is common to experience art, and a laboratory, where it is common to study the experience of art. This choice allowed us to address both major issues that motivated this study: assessing the contextual sensitivity of the experience of art, and determining the psychological value of experiencing art in a museum. We also performed a recall test, which allowed us to examine how context influences the memory for art. We expected that, if the experience of art is indeed sensitive to context, the experience of art would be different in both contexts. Specifically, we predicted an enhanced experience in the museum, as compared to the laboratory. Moreover, we expected that contextual information, such as the order and spatial layout of the artworks, would be stored in memory together with the representation of the artworks, improving the subsequent recall of the artworks.

2. Method

2.1. Participants

We recruited 137 participants (93 women; age: $M = 22.47$, $SD = 4.88$) among psychology students at the University of Vienna. Participants were recruited and randomly assigned to three groups until the exhibition closed. The ML group (Museum–Lab) included 44 participants (32 women; age: $M = 23$, $SD = 6.54$), who viewed the exhibition in the museum in the first session and in the laboratory in the second. The LM group (Lab–Museum) included 42 participants (33 women; age: $M = 22$, $SD = 3.09$), who viewed the exhibition in the laboratory in the first session and in the museum in the second. The LL group (Lab–Lab) included 51 participants (28 women; age: $M = 22$, $SD = 4.41$), who viewed the exhibition in the laboratory on both occasions. Participants knew beforehand that there would be two sessions, one in the museum and one in the laboratory. However, they did not know that they would see an actual and the same exhibition twice. We asked participants not to visit the museum or the website of the museum again until the next session was over. Participants were treated in accordance with the provisions of the World Medical Association Declaration of Helsinki.

2.2. Materials

The stimuli used in this experiment belonged to an exhibition entitled Beauty Contest (http://www.musa.at/en/musa-archive/museum/exhibitions-archive/beauty-contest), held at the Museum Startgalerie Artothek (MUSA) in Vienna. It included artworks reflecting upon self-image, identity, sexuality, and the desire for and striving towards physical beauty. We took into account 25 artworks in the study. These included paintings, photographs and collages.

We created a computer-simulated version of the exhibition that included the general information on the gallery's panels, the reproductions of the artworks, and their corresponding information labels. Participants visiting the exhibition through this simulation could navigate from one artwork to the other, go forwards or backwards, and view or hide information labels as they wished by typing the arrows on the keyboard. The museum provided us with high-quality digital reproductions which were presented in a rectangular area (9.85×7.50 inch) in the center of a 24″ computer screen (1920×1080 pixel). Zooming in to the screen was not possible. While looking at an artwork in the museum, neighboring artworks are usually also seen in peripheral vision. To simulate this in the laboratory context, smaller versions (3.35×2.55 inch) of artworks that came before and after the currently viewed artwork in the exhibition were always present at the left and right lower corners of the screen, respectively. Simulated visits were programmed with E-Prime 2.0 software (Psychology Software Tools, Pittsburgh, PA) and were conducted in a common psychological laboratory setting.

To assess the impact of participants' general visual memory on performance in our tasks, we used material from the extended version of the Rey–Osterrieth Complex Figure Test (ROCF; Meyers & Meyers, 1995). In this test, a complex, geometrical line drawing is presented, and people are asked to copy, recall, and recognize the figure. Here, we only used the recognition trial, which consisted of 24 smaller, less complex figures, some of them actually being a part of the original complex figure.

2.3. Procedure

Participants in all groups performed all phases of the experiment individually. In the first session they were greeted at the museum or the laboratory, depending on the group they belonged to. They were then asked to freely view the real or the virtual exhibition. They were told that they could move through the room or the computer simulation and take as long as they wished. In both conditions participants viewed the artworks in the same order, forming a defined path through the museum, or a sequence in the computer simulation. After they had completed the free viewing phase, participants in the ML group were given a booklet with the rating sheets. These included the five rating scales for each of the artworks. The scales were: Arousal, Valence, Liking, Interest, and Understanding. These scales were chosen in accordance with the rich possibilities of appreciation afforded by art, especially contemporary art, and attempted to capture the affective and the cognitive poles of the experience of art (Leder et al., 2004). Whereas Liking, Interest, and Understanding scales have often been used in empirical aesthetic research (e.g. Leder, Carbon, & Ripsas, 2006; Silvia, 2005; Swami, 2013), we also included Arousal and Valence scales to examine the affective experience in more detail than other similar studies have done before (Brieber et al., 2014; Locher et al., 1999, 2001). All were 6-point Likert scales, were 1 stood for "very little" and 6 for "a lot", except for valence, where 1 stood for "very negative" and 6 for "very positive". The order in which the artworks were rated was randomized, as were the scales on each sheet. They were instructed to go to each of the artworks again, in the order specified in the booklet, and rate each of them. Participants in the LL group and LM group, whose first session was in the laboratory, performed the same task but provided their responses by means of a computer keyboard. Participants were told that they could take as long as they wished. After completion of the ratings, participants were shown the ROCF image and asked to look at it for 30 s. As aforementioned, we used this test as a measure of general visual memory, and as a means to discard the possibility that any differences in the recall of the artworks was due to differences in general visual memory. Finally, they received an appointment for the second session a week later. At no point in this session, however, were they told that they would be performing a recall task in the next one.

In the second session, participants were greeted at the museum or the laboratory, depending on the group they belonged to. This time they were asked to carry out three tasks. First, they performed a free-recall task: They were asked to tell the experimenter what artworks they remembered from their first viewing of the exhibition. The experimenter made a note of each correctly remembered artwork and the order in which the artworks were remembered. After the free-recall task, participants were requested to perform the same rating task as in the first session, and the procedure was identical to that described above. Finally, participants were shown the 24 test items of the ROCF recognition trial, and asked whether each of them was part of the original figure they saw at the end of the first session.

3. Results

3.1. Impact of context on the experience of art

The descriptive statistics show that ML and LM group participants rated all scales lower in the laboratory than in the museum, whereas there was little change in the scores awarded in both sessions by LL group participants (Fig. 1). A mixed MANOVA including the five rating scales, with group (LL, ML, LM) as a between-subjects factor, and session (first, second) as a within-subjects factor, revealed a significant effect of the group and session interaction on the ratings [Wilks $\Lambda = 0.691$, $F(10,260) = 16.35$, $p < .001$, $\eta_p^2 = .38$]. Thus, context had a considerable effect on the experience of art, expressed on the five scales [Arousal: $F(2,134) = 75.90$, $p < .001$, $\eta_p^2 = .53$; Valence: $F(2,134) = 14.11$, $p < .001$, $\eta_p^2 = .17$; Liking: $F(2,134) = 26.59$, $p < .001$, $\eta_p^2 = .28$; Interest: $F(2,134) = 78.70$, $p < .001$, $\eta_p^2 = .54$; Understanding: $F(2,134) = 18.56$, $p < .001$, $\eta_p^2 = = .22$]. Pairwise comparisons showed that ML group participants found the artworks significantly less interesting, less understandable, less positive and less arousing, and liked them significantly less, in the laboratory than in the museum (all $ps < .001$, with a Bonferroni-corrected value for multiple comparison of $\alpha = .017$). The same effects were observed for LM group participants, who also found the artworks significantly more interesting, positive, and arousing, and liked them more, in the museum than in the laboratory (all $ps < .001$), though showed no difference regarding understanding ($p = .123$). Conversely, our analysis showed that there was no change in any of the ratings awarded in both sessions by LL group participants (all $ps > .059$). The ratings awarded by participants in this group suggest that the effects of the repeated presentation of the exhibition were negligible.

We found the same differences in art experience between contexts when analyzing between-groups differences in the first session with separate one-way ANOVAs for each scale. Specifically, participants in the museum (ML group) awarded higher ratings on all scales than participants in the laboratory groups (LL and LM group) [Arousal: $F(2,134) = 23.99$, $p < .001$, $\eta_p^2 = .26$; Valence: $F(2,134) = 10.36$, $p < .001$, $\eta_p^2 = .13$; Liking: $F(2,134) = 13.19$, $p < .001$, $\eta_p^2 = .16$; Interest: $F(2,134) = 16.41$, $p < .001$, $\eta_p^2 = .20$; Understanding: $F(2,134) = 9.73$, $p < .001$, $\eta_p^2 = .13$; for all Bonferroni-corrected pairwise comparisons $ps < .021$]. In line with the results above, groups in the same context in the first session (LL and LM group) showed no significant differences among their ratings on any of the scales (all $ps > .221$).

Overall, thus, our results demonstrate that the context in which art is experienced has a large impact on the experience itself. Moreover, the ratings awarded by participants in the ML group provide evidence that previous contexts in which artworks have been encountered also play a role. Not only did participants in this group give lower arousal and interest scores in the laboratory setting than they had done in the museum context: their ratings on these scales in the laboratory were even below those awarded by the other two groups in the same context (all $ps < .001$, with a Bonferroni-corrected value for multiple comparison of $\alpha = .017$). Thus, after encountering the artworks in the museum a week before, participants in the ML group found the experience in the laboratory particularly disappointing. Thus, the experience of art is influenced by previous contexts where the artwork has been encountered, which are used as a basis for comparison.

3.2. Impact of context on memory of art: Data preparation

Before analyzing the impact of context on recall we first carried out three procedures: (i) for each participant we calculated the ROCF score, (ii) for each participant we also calculated a measure of the extent to which recall order coincided with the layout of the exhibition, (iii) we reduced the data structure to optimize the subsequent linear mixed effects models.

3.2.1. Calculation of individual ROCF scores

One point was awarded for each of the 24 items correctly recognized in the second session as having been presented in the first session. A measure of difficulty for each of the items was created by calculating the proportion of participants who correctly recognized them and subtracting this value from 1. Thus, the value of the items varied continuously from 0 (easiest, recognized by all participants) to 1 (most difficult, recognized by none of the participants). Finally, participants' scores were calculated by adding up the difficulty value of the items they correctly recognized.

3.2.2. Calculation of the LocLI

In order to measure the correspondence between the order in which artworks were recalled and the order in which they were originally viewed, a local layout index (LocLI) was calculated for each participant. The LocLI, constituted an estimate of the extent to which participants

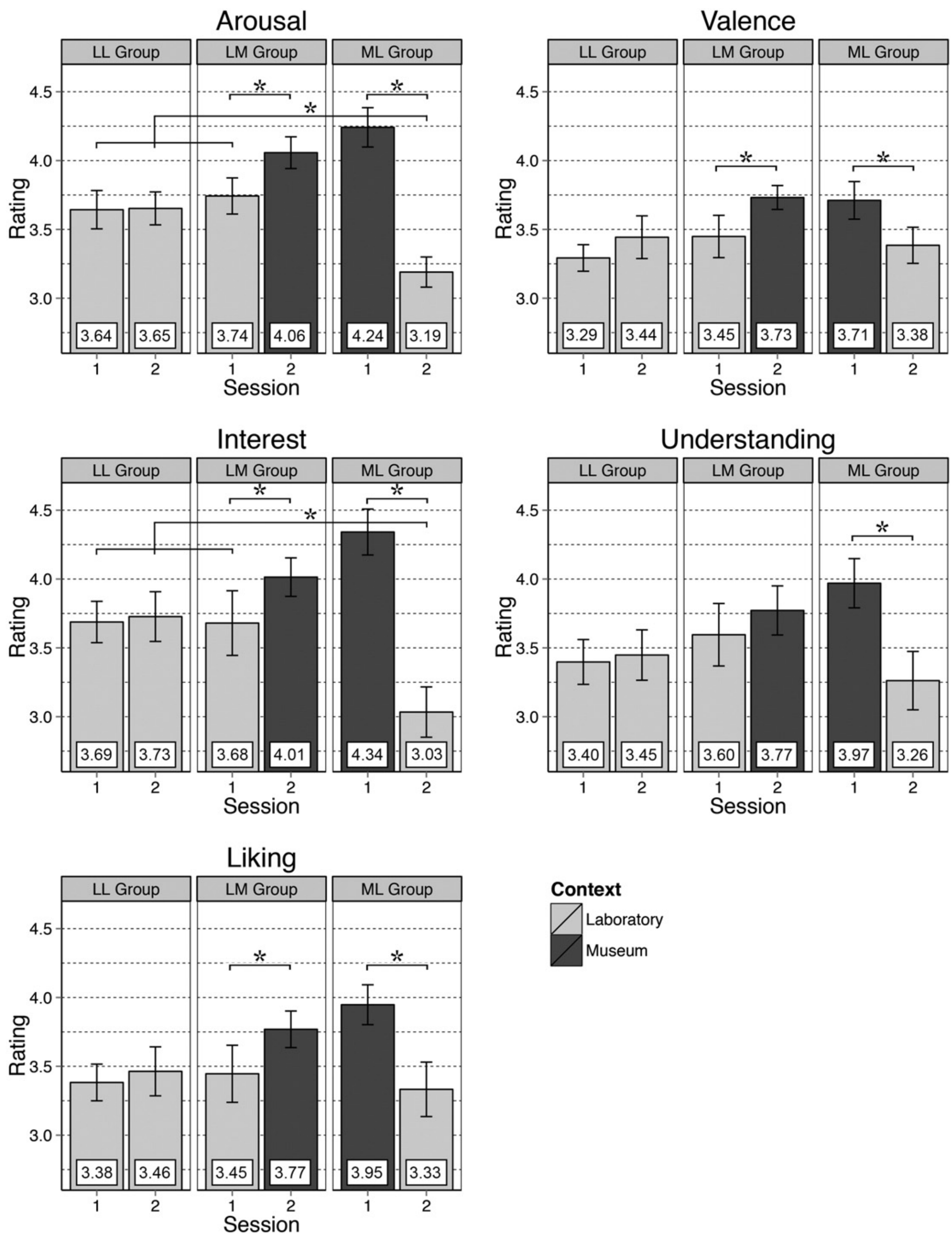

Fig. 1. Comparison of the five rating scales in the first and second session for the three groups. Vertical axis indicates the average rating for each scale, the horizontal axis indicates the session in which each rating was performed, the panels indicate the groups, mean values are shown in the boxes, and error bars indicate 95% CIs. $^*p < .001$.

used the exhibition's local layout to retrieve the artworks from memory. The index was computed by dividing the number of consecutive pairs of freely recalled artworks that actually corresponded to pairs of consecutive artworks in the exhibition (or separated by one) by the total number of consecutive pairs of recalled artworks.

3.2.3. Data reduction for linear mixed effects models

We wished to understand the reasons that explained the recall of artworks by means of generalized linear mixed effects modeling (Hox, 2010; Snijders & Bosker, 2012). This method allows simultaneously examining the between-subjects and within-subjects effects of context, exhibition layout, and experience on recall, without aggregating over participants or artworks (Baayen, Davidson, & Bates, 2008; Judd, Westfall, & Kenny, 2012). However, such models are susceptible to problems related to multicollinearity and non-convergence. In order to gauge potential multicollinearity, we examined the correlations among the rating scales (Table 1).

Table 1
Correlations among the rating scales.

	Valence	Liking	Interest	Understanding
Arousal	.17 [.14, .20]	.43 [.40, .45]	.54 [.52, .56]	.36 [.33, 39]
Valence		.55 [.53, .58]	.40 [.38, .43]	.28 [.25, .31]
Liking			.79 [.77, .80]	.51 [.48, .53]
Interest				.56 [.54, .58]

Note. The 95% confidence interval lower and upper limits are shown in square brackets.

As shown in Table 1, correlations were considerably high among certain pairs of rating scales, especially between liking and interest. In view of this situation, we opted to simplify the data structure by carrying out a principal component analysis (PCA). Kaiser's criterion recommends retaining factors whose eigenvalues are over 1. This is usually considered to be accurate if communalities after extraction are greater than .70. In our case, however, commonalities for arousal, valence, and understanding were below this mark ($h^2_{\text{arousal}} = .42$; $h^2_{\text{valence}} = .37$; $h^2_{\text{liking}} = .79$; $h^2_{\text{interest}} = .80$; $h^2_{\text{understanding}} = .51$). We thus chose to follow Jolliffe's (1972a, 1972b) criterion that recommends retaining factors whose eigenvalues are greater than .7. This produced a two-component solution (Table 2), which we subjected to an oblique (oblimin) rotation, given that it stands to reason that the factors, which capture aspects of aesthetic appreciation, are related (Leder et al., 2004).

In the rotated solution, PC1 summarized mostly the arousal, interest and understanding ratings, while PC2 mainly reflected valence ratings. Liking ratings loaded almost equally on both components. We used this component structure to calculate both component scores for each participant's rating to each artwork. These new variables were called rating component 1 (RC1), which summarized arousal, interest, understanding and liking ratings, and rating component 2 (RC2), which summarized valence and liking. RC1 and RC2 were used in the subsequent generalized linear mixed effects model to represent participants' experience of the artworks.

3.3. Impact of context on the recall of art: Results

The descriptive statistics reveal that participants in the ML group recalled more artworks ($M = 10.88$, $SD = 4.07$) than participants in the LL group ($M = 5.67$, $SD = 2.0$) and LM group ($M = 6.17$, $SD = 1.87$). Generalized linear mixed effects modeling was used to determine the factors that predicted free recall of the artworks for participants in the three groups. Thus, our outcome variable was binary: whether each specific participant recalled each specific artwork or not. Aiming to ascertain the impact of context, art experience, and the exhibition's local layout on free recall, we included group, both rating components, and the LocLI as predictors. Additionally, the interaction between group and each of the rating components and the interaction between group and LocLI were added as predictors to model the possibility that the impact of exhibition's local layout or art experience on free recall differed between groups. To control for other sources of variation, we also included artwork order and ROCF scores. Following Barr, Levy, Scheepers, and Tily's (2013) recommendations on maximal random effects structure, we included random slopes and intercepts for both rating components within participants and within artworks. The analyses were carried out within the R environment (R Development Core Team, 2008), using the *glmer()* function of the 'lme4' package (Bates, Maechler, & Bolker, 2013). All continuous predictors were grand mean centered, and categorical predictors were dummy coded.

The fixed effects of the model are shown in Table 3. The intercept values reflect the log-odds of participants in each group recalling an artwork when the values of all other variables are average (given that they have been grand mean centered). Transforming these values into probabilities reveals that, on average, artworks had a greater probability of being recalled in the second session if they had been viewed during the first session in the museum (.57 in the ML group) than if they had been viewed in the laboratory (.30 in the LL group and .32 in the LM group). These differences between both contexts were statistically significant (for the ML-LL comparison, $z = 6.75$, $p < .001$; for the ML-LM comparison, $z = 6.21$, $p < .001$; for the LM-LL comparison, $z = 0.394$, $p = 0.693$). For all groups, the slopes of both variables reflecting the ratings awarded in the first sessions (RC1 and RC2) are not statistically different from 0. Transforming the log-odds values into odds-ratios reveals that each increase in 1 point in RC1 led to a 9.4% increase in the chances of recalling an artwork in the ML and LL groups and an 8.3% increase in the case of the LM group. None of these values reaches statistical significance (all $ps > .3$), nor do the differences among them (all $ps > .3$). Likewise, though independently of the group, each increase in 1 point in RC2 led to a non-significant 9.4% increase in the chances of recalling an artwork (all $ps > .3$). These results suggest that the probability of recalling any given artwork did not depend on participants' experience of it. Similarly, recall was not influenced by the artworks' order ($p = 0.436$) or participants' general visual memory ($p = 0.529$).

In contrast, the slope for the local layout index (LocLI) is considerable, though only in the case of participants who initially viewed the artworks in the museum (ML group; Fig. 2). In this case, each increase of 1 point in LocLI (the entire span of this variable) leads to a 0.89 increase in the probability of subsequent recall. In other words, in the ML group every 10% increase in participants' LocLI led to an 8.9% increase in the chances of recalling any given artwork ($z = 4.00$, $p < .001$). This means that participants in the ML group were successfully using local spatial cues to retrieve the artworks from memory, and this allowed them to recall a greater amount of artworks. Such an effect was absent in both groups who encountered the artworks in the laboratory in the first session (LL and LM groups).

Table 2
Unrotated and rotated principal component analysis solution with two components.

Rating scale	Unrotated solution		Rotated solution		
	PC1	PC2	PC1	PC2	h^2
Arousal	.65	−.56	.90	−.27	.73
Valence	.61	.70	−.02	.93	.86
Liking	.89	.17	.57	.54	.82
Interest	.89	−.10	.77	.28	.81
Understanding	.72	−.17	.68	.14	.54

Note. PC = principal component; h^2 = communalities.

Table 3
Fixed effects in the generalized linear mixed effects model predicting recall.

Fixed effects	Group	Estimate	*SE*	*z*	*p*
Intercept	ML	0.28	0.22	1.275	.202
	LL	−0.83	0.21	−3.931	<.001
	LM	−0.77	0.22	−3.556	<.001
RC1 slope	ML	−0.02	0.09	−0.216	.830
	LL	0.09	0.09	1.021	.307
	LM	0.08	0.08	0.857	.391
RC2 slope	ML	−0.15	0.09	−1.578	.115
	LL	0.02	0.09	0.177	.860
	LM	−0.05	0.09	−0.491	.623
LocLI slope	ML	2.20	0.55	4.000	<.001
	LL	0.19	0.57	0.336	.737
	LM	−0.61	0.64	−0.952	.341
Order slope		0.02	0.02	0.778	.436
ROCF slope		0.04	0.07	0.615	.529

Note. Estimates are presented as log-odds. *SE* = standard error; RC1 = rating component 1 summarizing arousal, interest, understanding, and liking ratings; RC2 = rating component 2 summarizing valence and liking ratings; LocLI = local layout index; ROCF = Rey–Osterrieth Complex Figure Test score.

4. Discussion

Our results demonstrated that the experience of art is not isolated from the context in which it occurs. Contradicting formalist theory, though in line with the postulates of situated cognition, context played a role both in the experience of and the memory for art. Specifically, the affective and cognitive aspects of art appreciation (Leder et al., 2004) were enhanced in the museum context: Artworks were experienced as more arousing and more positive, more interesting and liked more. These results confirm and extend previous findings showing that original artworks in museums are liked more and found more interesting and pleasant in comparison to reproductions in non-museum

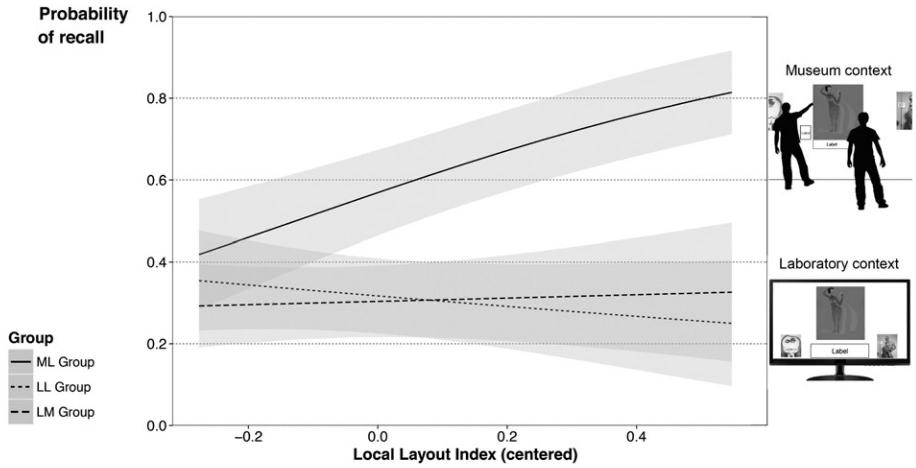

Fig. 2. Effects of the local layout index on the number of recalled artworks in each group. Shaded areas indicate 95% confidence intervals of the slopes.

environments (Brieber et al., 2014; Locher et al., 1999, 2001). Our study's design allows us to reject the possibility that such effects were due to order or repetition, given that these effects were found independently of the order in which participants attended both contexts, and that participants who viewed the exhibition twice in the laboratory gave similar ratings on both occasions. Nevertheless, we found evidence that the context in which the artworks were first experienced influences the experience on the second occasion. Thus, in addition to the effects of the present context on the experience of art, previous contexts in which the artworks were encountered are used as a basis for comparison.

There are several features inherent to the museum context that could lead to this enhancement: The size of the artworks (Clarke, Shortess, & Richter, 1984), which was larger in the museum than in the laboratory, the fact that participants encountered the original pieces in the museum and digital reproductions in the laboratory (Locher et al., 1999, 2001; Newman & Bloom, 2012), or that the museum exalted the artistic status of the pieces and the simulated exhibition did not (O'Doherty, 1986). In addition to the effect of the original artwork or the museum *in situ*, people's prior expectations about museum experiences in general (Smith & Wolf, 1996) might have also contributed to this effect by anticipating that the museum experience must be "the real thing". It stands to reason that all of these factors contribute in some measure to enhancing the experience of art in the museum, but further research is required to determine the extent to which they do.

The present study was the first of its kind to use a repeated measures design. Thus, in addition to showing the impact of context on the experience of art, we were also able to determine the influence of context on the memory for art. Specifically, artworks encountered in the museum were more likely to be recalled than when encountered as reproductions in the laboratory. This enhancement of memory was unrelated to the original experience, the order of the artworks along the exhibition path, or individual differences in visual memory. Our analysis showed that the increase in the number of recalled artworks encountered in the museum owed to participants' use of the local layout of the exhibition during the retrieval process. The aspects of the museum space they had encoded in memory enabled them to simulate navigating through some of its segments, whereby the recall of one artwork was used to prompt the recall of artworks exhibited in its vicinity. The more participants used this strategy, the more artworks they recalled. Participants who had viewed the artworks in the laboratory as a virtual exhibition lacked the spatial information linked to the artworks' placement, for they were all shown on the same computer screen. In the absence of this anchoring information, they recalled fewer artworks from the exhibition. It can be surmised, therefore, that the encoding and subsequent retrieval of the exhibition's artworks from long-term memory is related to the possibility of navigating the museum's three-dimensional space. Thus, the navigation and physical movement in space through a sequence of aesthetic episodes is what makes the museum visit distinct.

However, it is likely that this increase in memory due to the use of spatial cues is neither specific to art nor to museums. Memory for objects (artwork or non-artwork) improves if each has a unique place in a given space (museum, living room, entrance hall, etc.). The presence or absence of spatial cues is the essential point here. In the laboratory context, all artworks were presented on a single position within the laboratory space: on a fixed computer screen. This is similar to people looking at depictions of artworks on the internet or as slide projections in a classroom. Moreover, it is the common setup for the majority of research on art appreciation. In contrast to these conditions, memory during the museum visit benefits from each artwork having its own place in real physical space.

The improved memory performance and enhanced art experience in the museum underscore the educational potential of museums. A more positive and arousing art experience in the museum may help to initiate an interest in art and motivate people to learn more about it. This learning process of merging new art related knowledge with visual information about the artwork is fostered by the spatial layout of the museum. Our results demonstrate that there is a relationship between museum visits and an improved memory for art. They therefore highlight the extent to which learning can be improved by conducting art education programs in museums, rather than solely in classrooms.

Finally, our study raises the possibility that the methods and settings commonly used in the field of psychology of art and aesthetics contribute to divorce the experience of art from its context, under the flawed assumption that it is purely a response to the formal and semantic content. For some artworks, the museum or gallery context might even be a crucial condition to foster an aesthetic orientation towards the work. While a traditional artwork, such as a painting, might be classified as art regardless of whether it is hanging on the wall of a museum or a dentist's waiting room, for objects such as Duchamp's Fountain or Warhol's Brillo Boxes, the museum context is essential for their consideration as art. In fact, the exploration of the limits of the class of objects regarded as art is actually the artistic merit of this sort of artworks. As noted by Danto (1997), the quality that makes them artworks is not in the objects themselves, but in their semantic relation to their context. Although theoretically every object, scenery, or even thought, can be approached with an aesthetic orientation, museums or galleries are environments especially designed to initiate or at least foster an aesthetic reception and contemplation (O'Doherty, 1986). Human cognition does not take place in the void; it relies to a considerable extent on the organizing resources present in the environment (Hutchins, 1995). However, psychological laboratories are designed to exclude the influence of factors that might influence participants, or distract them from the task at hand. By turning artworks into stimuli, the experience of art into a reactive task, and participants into passive responders, many of the contextual ingredients that make the experience of art are, therefore, stripped away in the common experimental laboratory setting. Thus, our results underscore the value of previous efforts to take the study of the experience and memory for artworks from the laboratory to art museums (e.g., Henkel, 2014; Mastandrea, Bartoli, & Bove, 2009; St. Jacques & Schacter, 2013; Tschacher et al., 2012).

In conclusion, if "human cognition is always situated in a complex sociocultural world and cannot be unaffected by it" (Hutchins, 1995, p. xiii), then art is no exception to this. Paraphrasing Barrett et al. (2010), art is inherently experienced *in* context and remembered *with* context. This is, precisely, the psychological added value of the museum: it enriches the experience and memory of art. By allowing people to encounter authentic artworks in a special context that enables actual physical exploration, art is experienced as more arousing, positive, and interesting, it is liked more and remembered better. This added value explains, in part at least, why people are willing to invest time and resources to visit museums, instead of taking inexpensive virtual tours.

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