

MEMORY FOR PICTURE FRAMES*

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ABSTRACT

Does the frame in which a picture appears become incorporated with our mental representation or memory for the picture? In five experiments, participants were shown several colored drawings, each set in a unique frame, and then later were given an unexpected memory test for the drawings and frames. Participants who initially performed a task that focused their attention on the drawings alone (rating the pleasingness or visual complexity of the drawings) were unable to correctly identify the frames as same or different at above chance levels. In contrast, participants who initially performed a task that focused attention on the drawings in relation to the frames (rating the suitability of the frames for the drawings, or the darkness of the drawings compared to the frames), showed significantly greater than chance frame identifications. Relational or interactive encoding of a picture and its frame is critical for memory of picture frames.

A picture frame may be many things at once. It may be an enclosure, boundary, or border, emphasizing the separation and integrity of a work of art and helping to isolate it from the exterior world. Or the frame may be a transitional context, an intermediate and intermediary zone that, rather than isolating a work of art from the outside world, establishes the "footing" on which we should approach its interior world, attuning us to that inner world's unique scale, depth, and tone. Yet again, a picture frame may be (or aspire to be) an aesthetic complement or extension of the work of art, a place neither of division nor of focus or attunement, but of continuity, with picture and frame forming an aesthetic compositional whole.

Conceived as a surrounding and enclosing space that is neither entirely *beyond* nor yet entirely *of* the picture itself, picture frames pose a complex aesthetic

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challenge. How can a picture frame simultaneously serve these multiple functions and yet not too insistently intrude (Lebensztejn, 1988) with its presence? Frames, through their ambiguous status, also present something of a representational enigma at a cognitive-perceptual level. Does the frame in which a picture appears—that space that is neither entirely beyond nor entirely of the picture itself—become incorporated with our mental representation or *memory* for the picture?

One philosopher claimed that if you “were to reflect upon the paintings you know best, you would find that you cannot recall the frames in which they are set . . . We are not used to *seeing* a frame except when it is in the carpenter’s shop, bereft of a painting; that is, when the frame is not fulfilling its function, when it’s, so to speak, out of a job” (Ortega y Gasset, 1990, p. 188). But is there any empirical evidence to support this contention? Is it true that we are unaccustomed to seeing picture frames or that we—presumably as a consequence of that same visual inattentiveness—if put to the test would prove quite unable to recollect them?

A search of the psychological literature revealed a surprising dearth of empirical evidence concerning how picture frames affect our initial aesthetic response to pictures or works of art—or our subsequent memory for those encounters. On the one hand, the claim that we do not usually even *see* a frame certainly appears inconsistent with the often passionate solicitude demonstrated by artists, art critics, and museum curators concerning how paintings should be framed (Arnheim, 1988; Cannon-Brookes, 1990; Celant, 1982; Herbert, Cachin, Distel, Stein, & Tinterow, 1991; Hoenigswald, 1988; Mendgen, 1995; Merrill, 1992; Paquin, 1992; Prak, 1971; Savedoff, 1993; Schapiro, 1969; Sheffield, 1988). For example, we know that the frame was imbued with great significance by Whistler (Mendgen, 1995; Merrill, 1992) and Seurat (Herbert et al., 1991; Prak, 1971), and Van Gogh’s letters to family and friends contained numerous references to the color, texture, and materials of frames that he believed would allow his pictures to “show well” (Hoenigswald, 1988). If, much of the time, we do not even see the frame in which a painting is set, why exert so much thought and effort on its behalf? On the other hand, such solicitude need not entail an assumption that the frames themselves will be *independently seen and registered*—only that their presence may affect (for good or ill) how the painting is perceived. That is, the frame might well be a potent perceptual, aesthetic, and structural force in determining our response to a painting or work of art, without its being consciously singled out or recognized and acknowledged as such.

If we do actually *see* picture frames, visually processing and encoding information about the frame at the same time as we perceive a drawing or painting, so that the frame becomes incorporated with our memory for the picture, then it might be possible to detect the effects of that incorporation on a later memory test. Perhaps the most direct form that such a test might take is a recall or recognition test for the frames themselves. However, in addition to such a direct

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query, several other probes of memory for picture frames are also possible. One such probe involves treating the frame, not as itself the to-be-remembered target, but as providing a unique and meaningful context for the picture it frames. Specifically, if the frame provides an aesthetically significant context for a picture, then altering the frame might also adversely affect an individual's ability to consciously recognize the painting or drawing itself. Researchers have found that changing the particular context that accompanied a verbal stimulus (Light & Carter-Sobell, 1970; Tulving & Thomson, 1971) or a photograph (Watkins, Ho, & Tulving, 1976; Winograd & Rivers-Bulkeley, 1977) during a participant's first encounter with it decreases participants' ability to recognize the stimulus compared to stimuli presented in a constant context. Likewise, if a picture frame provides an aesthetically meaningful "context" for the picture with which it occurs, then altering the frame might impair an individual's ability to recognize the picture.

This article presents the results of five experiments, each of which employed a new experimental paradigm that was developed to explore the degree to which frames become incorporated into our memory for pictures. All of the experiments entailed a two-phase design involving the presentation of a set of framed pictures (colored drawings) followed by a memory test. The drawings were always initially presented under incidental learning conditions (that is, no mention was made of a subsequent memory test) with participants being required to provide qualitative ratings of some aspect of the drawings alone, or of the drawings in relation to the frames. The test stimuli consisted of previously presented drawings, set either in the same or a different frame as that present during the participant's initial encounter with the drawing, as well as entirely new drawings. Both a direct query of participants' ability to recognize the frames and the more indirect method of examining recognition accuracy for the *drawings* under conditions where the frame either comprised a same or different context for such recognition were used.

METHOD

Participants

All participants took part in these experiments in conjunction with another verbal learning experiment. Participants (primarily undergraduate students) were solicited through sign-up sheets posted at Harvard University and were paid for their participation. Eighteen individuals took part in each experiment, with no person participating in more than one experiment.

Stimulus Materials

The initial stimuli consisted of twenty-seven black and white line drawings of wild flowers. These drawings had all been rendered by a single artist (Kennedy,

1971) and were first photocopied onto 21.5×28 cm sheets of white paper. They were then colored with color pencils, using realistic color depictions of the flowers (Kennedy, 1971) as a guide. Each drawing was unique, and the drawings were selected so as to be as different from each other as possible both in form and in color.

A set of twenty-seven unique "frames" was constructed using colored paper mats, with outer dimensions of 28×35.5 cm and inset (bevel-cut) picture dimensions of 19.5×24.5 cm. Nine of the frames were left in their original form, and consisted of nine different colors ("color only" frames). Another nine of the frames—one of each color—were altered to include an inner border comprised of two narrowly spaced solid black lines ("border" frames). This border was placed 1 cm from the inner window of the frame and was constructed using Letraline tape. The remaining nine frames (one of each color) were decorated with a pattern of four small black oval shapes as well as four smaller squares. These frames ("pattern" frames) were also constructed using Letraline tape, and a cut-out stencil was used to ensure that the pattern was identical for each of the nine frames.

The colored drawings were mounted on sturdy white boards, each 28×35.5 cm, and then the frames were mounted on this board using Velcro fasteners. The drawings thus appeared as set within their frames yet the Velcro adhesive permitted the frames to be readily and unobtrusively interchanged with one another.

The drawings were assigned to three stimulus sets (A, B, and C) such that, within a set, the drawings were as different from each other as possible. The frames were also assigned to three sets, with each set consisting of three color only frames, three border frames, and three pattern frames. No frames within a set consisted of the same color. Each of these frame sets was then paired with one of the three stimulus sets (A, B, or C). Changes in frames from initial presentation to test presentation only occurred within a frame set (A, B, or C) but always occurred *across* the subsets comprised of color only, pattern, or border. Thus, a frame change from initial presentation to test never consisted of a change on only one dimension but always involved a change in color and "style" (plain, pattern, or border).

The full set of twenty-seven drawings and frames was used in the first three experiments. Experiments 4 and 5 excluded nine of the drawings and excluded the nine pattern frames. These experiments also involved a new assignment of drawings and frames to subsets, with six rather than nine items per subset, but the same principles as used in the first three experiments were again employed (e.g., the drawings within a stimulus set were as different from each other as possible, etc.).

Procedure

A two-phase "study-test" design was used in each of the five experiments reported here. Participants were first shown several framed drawings (18

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drawings in Experiments 1, 2, and 3; 12 drawings in Experiments 4 and 5) under incidental learning conditions. Each drawing was presented individually, and was set in an upright position against a neutral background approximately 1.5 meters in front of the participant. Participants were asked to view each stimulus and then to rate the drawing, or the drawing in relation to its frame, on a particular dimension.

In Experiment 1, the participants were asked to rate how visually complex each drawing was, with the instructions indicating that they should "take into account both the overall form of the flower (including the leaves and stems) and the colors of the drawing." Participants were given a response form on which to write their ratings, at the top of which was printed a 7-point scale anchored with three descriptors: not at all complex = 1, somewhat complex = 4, and extremely complex = 7. Participants were encouraged to try to use the entire range of the scale. The other experiments followed a very similar rating procedure, but with different rating dimensions. In Experiments 2 and 4, participants were asked to rate how pleasing the drawing was (1 = not at all pleasing, 4 = somewhat pleasing, 7 = extremely pleasing). The instructions for performing the complexity and pleasingness ratings made no reference to the frames in which the drawings were presented. In contrast, in the interactive encoding conditions participants were informed that each drawing would be presented in a different frame, with their task in Experiment 3 being to rate "the degree to which the frame suits the drawing" (1 = not at all suitable, 4 = somewhat suitable, 7 = extremely suitable) and in Experiment 5 to rate "how dark each drawing is compared to the frame in which it appears" (1 = not at all dark, 4 = somewhat dark, 7 = extremely dark).

Participants were given five seconds to make each rating. The order of stimulus presentation was pseudo-random: the framed drawings were presented in one of three pseudo-random orders at study, and one of three different pseudo-random orders at test. Both the study and test presentation orders were constructed with the constraints that no more than two frames occurred consecutively from the same stimulus dimension (color only, border, or pattern), and that no more than two frames from a given stimulus set (A, B, or C) occurred consecutively.

Following a fifteen- to twenty-minute retention interval (during which participants completed unrelated questionnaires in an area outside of the testing room and the experimenter changed the frames of some of the drawings), participants were unexpectedly given a recognition test for the drawings. Participants were again shown framed colored line drawings and were asked to indicate (on an appropriately labelled response sheet) whether they had been shown the drawings earlier. Also, for those drawings that they judged to have been shown previously, participants were asked to indicate whether the drawing had earlier been presented in the same frame or in a different frame from that in which it now appeared.

The proportion of items on the recognition test always consisted of one third new items (never previously presented drawings set in never previously presented

frames), one-third same-frame pictures (drawings presented in the same frame as on the first presentation), and one-third different-frame pictures (drawings presented in a previously presented but now re-paired frame). Stimulus sets were counterbalanced across participants such that each set was represented in each of these conditions (new, same frame, different frame) equally often. The presentation of the items during recognition testing was self-paced.

RESULTS

The means for each of four recognition test measures (drawing recognition, false alarms, frame identification, and frame identification conditionalized on the level of recognition of the drawings) are presented in Table 1. These means are shown for each of the five experiments and separately as a function of frame status (same or different). For ease of exposition and comparison, the experiments have been grouped according to the nature of the encoding task employed. Experiments 1, 2, and 4 involved "drawing focused encoding" tasks and are shown in the upper portion of the table; Experiments 3 and 5 involved "interactive encoding" tasks and are shown in the lower portion of the table. The means for Experiments 1, 2, and 3 are each based on a total of 162 observations (18 participants \times 9 items per condition); the means for Experiments 4 and 5 are each based on a total of 108 observations (18 participants \times 6 items per condition).

Table 1. Recognition Test Results for Five Experiments as a Function of Frame Status (Same or Different) and Encoding Task

	Drawing Recognition		False Alarms ^a		Frame Identification		Conditionalized Frame Identification	
	Same	Diff	Same	Diff	Same	Diff	Same	Diff
<i>Drawing Focused Encoding</i>								
Complexity (Expt. 1, 27 items)	.77	.77	.11	.09	.39	.41	.50	.55
Pleasingness (Expt. 2, 27 items)	.80	.75	.10	.09	.41	.35	.51	.45
Pleasingness (Expt. 4, 18 items)	.82	.84	.05	.07	.35	.36	.42	.42
<i>Interactive Encoding</i>								
Suitability (Expt. 3, 27 items)	.72	.63	.12	.27	.48	.40	.66 ^b	.63 ^b
Darkness (Expt. 5, 18 items)	.79	.72	.07	.24	.48	.44	.62 ^b	.63 ^b

^a"Same" and "Diff" here indicate the proportion of incorrectly recognized drawings that were accompanied by "same frame" versus "different frame" responses respectively.

^bAfter conditionalizing on the level of recognition for the drawings, frame identification performance in each of these conditions was significantly above chance levels.

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Considering first the experiments that involved a *drawing focused encoding* task, separate analyses of variance conducted on the drawing recognition accuracy scores, treating frame status (same or different) as a within subjects factor revealed no effect of frame status (all $F_s < 1$). Following drawing focused encoding, participants were equally likely to recognize drawings set in a same frame (average of 80%) as drawings set in different frames (average of 79%). False alarms in response to the drawings (i.e., cases where newly presented drawings were incorrectly designated as having been encountered previously) were equally often accompanied by "same" and "different" frame responses ($F_s < 1.5$). Despite correctly recognizing an average of nearly 80 percent of the drawings, participants who performed the drawing focused encoding tasks were rarely able to identify the frames in which the drawings had been presented (average frame identification = 38%, average frame identification conditionalized on level of recognition for the drawings = 48%). One-sample t -tests conducted on each of the six conditionalized frame identification means from these experiments showed that, after conditionalizing on the level of recognition, frame identification did not exceed the 50 percent expected by chance.

Turning next to a consideration of the means for the two *interactive encoding* task experiments, a somewhat different pattern emerges. Overall recognition of the drawings (average of 72%) appears to be slightly lower than was true for the drawing-focused experiments. Comparisons as a function of frame status also reveal differences between the drawing focused and interactive encoding tasks. For both Experiment 3 (suitability encoding) and Experiment 5 (darkness comparison encoding) there was a trend toward impaired recognition of drawings presented in different frames relative to recognition of drawings in identical frames (see Table 1), with this impairment especially marked following the suitability encoding task ($F(1,17) = 4.11$, $MSe = .02$, $p = .06$; for the darkness comparison task, $F(1,17) = 1.77$, $MSe = .02$, $p = .20$). A meta-analysis combining the two studies, using the Stouffer method of adding Z_s (Rosenthal, 1991) yields a standard normal deviate of 2.23, with an associated one-tailed probability of .01. This suggests that the combination of these two results was unlikely to have occurred by chance and that, following the interactive encoding tasks, recognition of drawings presented in changed frames was impaired relative to recognition of drawings in the same frames.

In the interactive encoding experiments, there was a marked tendency toward assuming that a falsely recognized drawing had a "different frame," with a significant effect of frame status on false alarms apparent both in Experiment 3 ($F(1,17) = 9.18$, $MSe = .02$, $p = .008$) and Experiment 5, ($F(1,17) = 13.91$, $MSe = .02$, $p = .002$). It is possible that participants experienced a weaker sense of familiarity for falsely recognized items than for the studied items but incorrectly attributed that relatively weaker familiarity to a change in the frame (rather than to the drawing itself being novel).

Finally, conditionalized frame identification under the interactive encoding tasks was markedly higher than under the drawing focused encoding conditions. Taking into account the level of recognition for the drawings, frame identification accuracy following the suitability encoding task was 65 percent; following the darkness comparison task, the corresponding value was 63 percent. For these interactive encoding tasks, conditionalized frame identification performance significantly exceeded chance levels in all four conditions (Expt. 3: same frame, $t(17) = 3.41$, $p = .003$; different frame, $t(17) = 2.98$, $p = .008$; Expt. 5: same frame, $t(17) = 2.19$, $p = .04$; different frame, $t(17) = 2.23$, $p = .04$). Thus, individuals could classify the frames as being the same or different with a reasonable and significant degree of accuracy when a task that encouraged encoding of the drawing and the frame in relation to one another was employed.

DISCUSSION

Do we remember picture frames? The results of the experiments reported here suggest that we *may*, or *may not*, depending on how we approach a painting or work of art. If—as is probably most often the case—we specifically focus on the painting or artwork, concentrating on its aesthetic, perceptual, formal, or other qualities independently of and without regard to the frame that surrounds it, it is unlikely that we will remember the frame. If, on the other hand, in approaching a work of art we—for some reason—are led to explicitly include the frame within our attentional, perceptual, or aesthetic field, examining the work in relation to its encompassing frame, then our memory for the work may also include information about the frame.

In the present study, participants who were asked to evaluate the aesthetic or perceptual qualities of colored drawings (their pleasingness or visual complexity) later were quite unable to determine if the frame in which those drawings was set was the same, or different, from that in which it had initially appeared. Taking into account the degree to which participants could correctly recognize the drawings as “old” or “new,” responses on a “same” or “different” frame discrimination task were no more accurate than would be expected by random guessing. In contrast, using this same dependent measure (conditionalized frame identification), participants who were initially asked to evaluate the drawings *in relation* to their surrounding frames later could identify same-framed and differently-framed drawings at substantially—and significantly—greater than chance levels. Relational or interactive encoding led to improved memory for the frame both when participants were encouraged to judge the drawing in relation to its frame from an aesthetic viewpoint (determining how suitable the frame was for the drawing) and when a more specific perceptual evaluation was requested (determining how dark the drawing was compared to the frame).

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The latter findings clearly indicate that—at least under some conditions—we do remember picture frames. But what is it that we remember? In performing the frame identification task, participants could have used any perceptual input from the stimulus array to make their decisions, including aspects of the array that they may not have been able to consciously articulate. That is, participants only needed to somehow globally assess or “read” the entire array to arrive at a feeling of “sameness” or “difference.” Quite subtle alterations arising from a variety of sources—such as changes in the color contrast of the frame with the drawing or the degree to which the pattern on the frame complemented or detracted from the lines and form of the drawing—might have contributed to feelings of “sameness” or “difference” independently of whether the participant was consciously or explicitly aware of those factors. We simply do not know—from the frame identification task—how much or what types of information about the frame participants could have consciously articulated (or might have been able to spontaneously or intentionally recall).

The results from the drawing recognition task provide a hint in this regard. For the interactive encoding conditions, placement of a drawing in a different frame from that in which it was originally encountered tended to impair participants' recognition of the drawings compared to the level of accuracy obtained for drawings presented in unchanged frames. This impairment was to some extent evident when participants were required to judge the darkness of the drawing relative to the frame, but emerged more strongly when individuals were asked to judge the suitability of the frames for the drawings. This depressed recognition for items in the changed frame condition might be seen as an instance of “context dependent recognition” and raises the possibility that part of what is remembered of the frame is a contextual (aesthetic and perceptual) interpretation that, when present, facilitates recognition but, when absent, makes recognition more difficult (cf. Light & Carter-Sobell, 1970; Tulving & Thomson, 1971; Watkins, Ho, & Tulving, 1976; Winograd & Rivers-Bulkeley, 1977). Memory for frames may, in part, involve not only memory for the frame as an independent object, but memory for its “framing effects.”

In the present study the degree of interactive encoding was manipulated via the instructional set given to participants. The extent to which interactional encoding might occur spontaneously during the viewing of works of art remains an open and unexplored question. Several possible factors that might draw our attention to the frame, and so could lead to an interactive encoding of a work with its encompassing frame, can be noted in critical and historical discussions of picture frames. For example, contrasts or correspondences of the form of the frame with aspects of the image, as when doors, mirrors, windows, or other structures in the image echo, follow, or almost seem to “re-duplicate” the frame (Lebensztejn, 1988; Prak, 1971; Savedoff, 1993) may result in a conjunctive encoding of the

painting and its frame. Similarly, feelings of tension, incompleteness, or incongruity arising from the frame's interception, crossing, or curtailment of the image, as when the image seems to be unnaturally and uncomfortably constrained and compressed by the frame or when, contrariwise, the image seems to defy or disregard those bounds by appearing to extend beneath and beyond the frame (Arnheim, 1988; Schapiro, 1969) may lead to an interactive encoding of the frame and the picture. Future empirical efforts might involve direct manipulations of the drawing and frame relationship on these or similar dimensions to determine if they are indeed sources of interactivity that can enhance memory for either the frames themselves, or their framing effects.

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