

## DIFFERENCES IN REACTIONS TO PAINTINGS BY MALE AND FEMALE COLLEGE STUDENTS<sup>1</sup>

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*Summary.*—38 male and 55 female college students rated digitized color facsimiles of 40 paintings that varied in artistic period (Renaissance, Rococo, Impressionist, Post-Impressionist, 20th Century) and subject matter (portrait, landscape, still life, behavior depiction) on 12 7-point semantic differential scales, e.g., simple–complex. Women judged the content of Rococo and Impressionist paintings as more pleasing than did men and Impressionist paintings evoked greater feelings of pleasure and relaxation among women than among men. In addition, paintings that depicted behaviors evoked more pleasure and alertness among women than among men. The results were interpreted in terms of underlying differences between men and women in perceptual style and emotional sensitivity.

In their comprehensive study of the psychology of sex differences, MacCoby and Jacklin (1974) concluded that the most reliable differences occur when measuring verbal, perceptual, and mathematical abilities. Even so, the research findings in these areas are variable and heterogeneous (Halpern, 1986; Richardson, 1997). This certainly applies to the perception of art. Bernard (1972), for example, found that women were more attracted to impressionist paintings than were men, and men were more attracted to modern paintings than were women. In addition, both men and women generally preferred paintings depicting their own sex. Neperud (1982) found that women showed less preference for artistic patterns than did men, whereas men rated figurative, i.e., realistic, and abstract styles more favorably than did women. Cupchik and Gebotys (1988) found that women preferred representational art with soft, i.e., smooth, contours whereas men preferred abstract art and, especially, art with sharply defined contours. In the area of religious art, Polzella, Roten, and Parker (1998) found that women perceived devotional paintings and sculpture as having greater clarity than did men, and they reacted more favorably than men to post-Renaissance depictions. In contrast, Farrell and Rogers (1982), Limbert and Polzella (1998), and Lindauer (1990) each found no evidence of sex differences, so how to account for these inconsistent findings requires attention. One obvious characteristic of the studies was the small number of paintings that were used—fewer than 20, on the

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average. [Although Lindauer (1990) did use 44 paintings, they were all mass-produced "factory art," not works of museum quality.] Another characteristic was that different scales and methods were used to measure viewer reactions. The present study differs from previous ones in two important ways. First was the use of a larger, more representative sample of high quality art, including major artistic periods and subject matter categories. Second was the use of rating scales that have been validated in previous studies. This study was designed to answer two basic questions of whether (1) men and women react differently to paintings and (2) the style or subject matter of paintings affect their reactions.

## METHOD

### *Participants*

The participants were 93 students in Introductory Psychology at the University of Dayton—38 men and 55 women ( $M$  age = 19.5 yr.,  $SD$  = 2.6). Their participation was voluntary, although it partially fulfilled a course requirement.

### *Stimuli and Apparatus*

The stimuli were 40 digitized color facsimiles of a sample of representational paintings in the collection of the National Gallery of Art in Washington, DC (Whitely, 1983). They comprised four works by each of 10 artists (see Table 1). The paintings were not randomly selected. Rather, they were chosen to represent five artistic periods: Renaissance (Bellini, Titian), Rococo (Chardin, Fragonard), Impressionist (Cassatt, Renoir), Post-Impressionist (Cézanne, Matisse), and 20th Century (Bellows, Picasso). Although such a classification is somewhat arbitrary, it does provide a chronological continuum in which stylistic comparisons are possible. There were four types of subject matter: Portrait ( $n$  = 20), Landscape ( $n$  = 5), Still Life ( $n$  = 7), and Behavior Depiction ( $n$  = 8).

A Macintosh Quadra 700 computer running the Artware multimedia software (Brake, Polzella, & Kozar, 1997) provided full automation to the study, including the display of each work and the prompting and storing of the participants' reactions. Two monitors were used, placed side by side, approximately one-half meter apart. The right-hand monitor (Sony 13-in. Color Video Monitor PVM-1390) was used to display the works. The images ranged in size from 177 cm<sup>2</sup> to 385 cm<sup>2</sup>, averaging 277 cm<sup>2</sup>. The left-hand monitor (Macintosh 16-in. Color Display) was used to gather the ratings.

### *Rating Scales*

Participants indicated their reactions to each painting on 12 seven-point semantic differential rating scales: (1) Simple–Complex, (2) Displeasing–Pleasing, (3) Uninteresting–Interesting, (4) Ugly–Beautiful, (5) Weak–Power-

TABLE 1  
PAINTINGS USED IN STUDY

Renaissance	Auguste Renoir (1841-1919)
Giovanni Bellini (1430-1516)	Flowers in a Vase
Portrait of a Young Man in Red	Pont Neuf
Madonna and Child With Saints	A Girl With a Watering Can
Giovanni Emo	Young Spanish Woman With a Guitar
The Infant Bacchus	Post-Impressionist
Titian (1477-1576)	Paul Cézanne (1839-1906)
Portrait of a Venetian Gentleman	Houses in Provence
Doge Andrea Gritti	Flowers in a Rococo Vase
Venus With a Mirror	The Artist's Son
Venus and Adonis	Still Life With Peppermint Bottle
Rococo	Henri Matisse (1869-1954)
Jean-Siméon Chardin (1699-1779)	La Coiffure
Soap Bubbles	Pot of Geraniums
The House of Cards	Still Life: Apples on Pink Tablecloth
The Young Governess	La Nègresse
Still Life With Game	20th Century
Jean-Honoré Fragonard (1732-1806)	George Bellows (1882-1925)
A Game of Hot Cockles	Blue Morning
Love as Folly	The Lone Tenement
A Young Girl Reading	Portrait of Florence Davey
The Visit to the Nursery	Nude With Hexagonal Quilt
Impressionist	Pablo Picasso (1881-1973)
Mary Cassatt (1844-1926)	The Tragedy
Children Playing on the Beach	Lady With a Fan
Girl Arranging Her Hair	Still Life
Woman With a Red Zinnia	The Lovers
The Boating Party	

ful, (6) Passive-Active, (7) Unbalanced-Balanced, (8) Clear-Indefinite, (9) No pleasure-Extreme pleasure, (10) No discomfort-Extreme discomfort, (11) Relaxed-Tense, and (12) Drowsy-Alert. The scales were the same as those used by Berlyne (1973) to measure viewers' reactions to various aesthetic stimuli, including paintings. Berlyne chose these scales because they had been used extensively in previous studies, and their psychometric properties were well understood. The first eight scales are for judging stimulus characteristics, whereas the last four are for viewers' self-reported motivational source.

#### *Procedure*

Participants were tested individually, seated approximately one meter from the viewing monitors. The works were displayed on the right-hand monitor one at a time in random order and each work remained visible while it was being rated. The rating scales were displayed on the left-hand monitor, also one at a time and in random order. Participants indicated

their ratings by clicking a mouse at the desired position along each 7-point scale, e.g., Simple-Complex.

### RESULTS

The analysis of the effects of artistic period and the subsequent analysis of the effects of subject matter were based on mean ratings obtained by averaging over the respective paintings, an appropriate procedure given sufficient internal consistency in the ratings. Prior to obtaining these means, then, the internal consistency of the ratings was estimated by computing Cronbach coefficient alpha for each classification scheme, i.e., artistic period and subject matter. For artistic period, alpha ranged from .85 to .88 with a mean of .86. For subject matter, alpha ranged from .86 to .96 with a mean of .91.

The mean ratings for artistic period are shown in Table 2; those for subject matter are shown in Table 3.

#### *Effects of Artistic Period*

*Stimulus characteristics.*—A repeated-measures multivariate analysis of variance was used to test for differences among the mean ratings of artistic period on Scales 1 through 8. There was no overall difference between ratings by men and women ( $\lambda = .908$ ,  $p > .05$ ), but there was a significant multivariate interaction between sex and artistic period ( $\lambda = .858$ ,  $p < .01$ ). Significant univariate interactions were found for Scale 2, Displeasing-Pleasing ( $F_{4,364} = 7.17$ ,  $p < .001$ ), Scale 3, Uninteresting-Interesting ( $F_{4,364} = 4.24$ ,  $p < .001$ ), and Scale 4, Ugly-Beautiful ( $F_{4,364} = 4.88$ ,  $p < .001$ ). These interactions were analyzed further by comparing men's and women's ratings at each artistic period. A modified Bonferroni test (Keppel, 1982, pp. 147-150) was used to correct for familywise error. (To maintain a familywise Type I error rate of .05 in this case, the Bonferroni procedure required that each of the pairwise comparisons be tested at .013.) On Scale 2, women rated the Rococo and Impressionist paintings as more pleasing than did men ( $p < .01$ ). On Scales 3 and 4, none of the comparisons were significant ( $p > .01$ ).

*Motivational state.*—A repeated-measures multivariate analysis of variance was used to test for differences among the mean ratings on Scales 9 through 12. There was no overall difference between ratings by men and women ( $\lambda = .912$ ,  $p > .05$ ), but there was a significant multivariate interaction between sex and artistic period ( $\lambda = .887$ ,  $p < .001$ ). Significant univariate interactions were found for Scale 9, No pleasure-Extreme pleasure ( $F_{4,364} = 7.66$ ,  $p < .001$ ), Scale 10, No discomfort-Extreme discomfort ( $F_{4,364} = 6.32$ ,  $p < .001$ ), and Scale 11, Relaxed-Tense ( $F_{4,364} = 3.87$ ,  $p < .01$ ). These interactions were analyzed further by comparing men's and women's ratings at each artistic period, again using the modified Bonferroni correction. On Scale 9, women rated the Impressionist paintings as more pleasurable than did men

TABLE 2  
MEANS AND STANDARD DEVIATIONS FOR RATINGS AS A FUNCTION OF ARTISTIC PERIOD

	Renaissance		Rococo		Impressionist		Post-Impressionist		20th Century	
	M	SD	M	SD	M	SD	M	SD	M	SD
Complex										
Women	4.0	0.9	3.9	1.0	3.4	1.1	3.3	0.8	4.2	0.6
Men	4.0	0.9	4.1	0.9	3.7	1.0	3.4	1.0	4.1	0.7
Pleasing										
Women	3.3	0.9	5.1	0.8	5.2	0.8	4.3	1.1	3.7	0.7
Men	3.6	0.9	4.7	0.8	4.7	1.0	4.3	1.0	3.9	0.9
Interesting										
Women	4.3	1.3	5.1	1.0	5.0	0.9	4.0	1.2	4.5	1.0
Men	4.5	1.0	4.7	1.0	4.5	1.1	3.9	1.2	4.4	1.1
Beautiful										
Women	3.4	1.1	5.0	0.9	5.1	0.8	4.1	1.1	3.8	0.9
Men	3.9	1.0	4.9	0.9	4.8	0.9	4.2	1.0	4.0	1.0
Powerful										
Women	4.9	0.9	4.4	1.0	4.1	1.1	3.4	0.9	4.2	0.9
Men	4.9	0.9	4.3	0.8	3.9	0.7	3.5	0.9	4.2	0.9
Active										
Women	4.0	1.0	4.0	0.9	3.9	1.0	3.0	1.1	4.1	0.8
Men	4.0	1.0	4.2	0.8	3.9	0.9	2.8	1.0	4.0	0.8
Balanced										
Women	5.0	0.9	5.2	0.9	5.2	0.8	4.5	0.9	4.4	0.9
Men	5.1	0.9	5.1	1.0	4.9	0.9	4.6	1.0	4.5	0.8
Indefinite										
Women	2.9	1.0	2.9	0.8	2.7	1.0	3.6	1.0	4.0	0.8
Men	2.9	1.2	3.0	0.7	2.6	0.8	3.4	1.0	3.9	0.8
Pleasure										
Women	2.7	1.0	4.3	1.1	4.4	1.0	3.3	1.1	3.0	0.8
Men	3.0	0.9	3.7	1.0	3.8	1.0	3.3	1.1	3.2	1.2
Discomfort										
Women	3.5	1.0	2.1	0.6	1.9	0.7	2.2	0.9	3.2	1.0
Men	3.0	1.1	2.2	0.7	2.1	0.8	2.1	0.7	2.8	1.0
Tense										
Women	4.4	1.0	2.6	0.7	2.3	0.7	2.8	1.0	3.8	0.9
Men	4.2	1.1	2.8	0.9	2.8	0.9	2.8	0.8	3.8	1.0
Alert										
Women	4.3	1.0	4.2	1.1	4.3	1.1	3.7	1.1	4.2	0.8
Men	4.2	1.0	3.9	0.7	3.9	0.8	3.6	0.9	3.9	0.9

( $p < .01$ ). On Scale 10, none of the comparisons were significant. On Scale 11, women rated the Impressionist paintings as more relaxing than did men ( $p < .01$ ).

#### *Effects of Subject Matter*

*Stimulus characteristics.*—A repeated-measures multivariate analysis of variance was used to test for differences among the mean ratings of Subject

ter on Scales 1 through 8. Neither the main effect of sex nor the multi-  
 variate interaction between sex and subject matter was significant ( $\lambda = .880$ ,  
 $p > .05$  and  $\lambda = .884$ ,  $p > .05$ , respectively).

*Motivational state.*—A repeated-measures multivariate analysis of vari-  
 ate was used to test for differences among the mean ratings of subject  
 matter on Scales 9 through 12. There was a significant main effect of sex

TABLE 3

MEANS AND STANDARD DEVIATIONS FOR RATINGS AS A FUNCTION OF SUBJECT MATTER

	Portrait		Landscape		Still Life		Behavior Depiction	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Complex								
Women	3.3	0.8	4.9	1.0	3.9	0.9	4.0	1.0
Men	3.5	0.8	5.0	1.0	3.9	0.9	4.1	0.8
Leasing								
Women	3.9	0.8	4.7	0.9	4.3	0.9	5.1	0.7
Men	4.1	0.7	4.4	1.0	4.3	1.0	4.6	0.9
Interesting								
Women	4.2	1.1	5.2	1.2	4.3	1.2	5.4	0.9
Men	4.2	0.9	4.7	1.1	4.1	1.3	4.8	1.0
Beautiful								
Women	3.9	0.9	4.7	0.9	4.1	0.9	5.2	0.8
Men	4.2	0.9	4.6	0.9	4.2	1.1	4.8	1.0
Powerful								
Women	4.0	0.8	4.5	1.0	3.9	1.0	4.7	1.0
Men	4.1	0.7	4.3	0.8	3.9	1.0	4.5	0.9
Active								
Women	3.4	0.8	4.5	0.9	3.3	1.1	4.7	1.0
Men	3.6	0.8	4.4	0.9	2.9	1.2	4.6	0.9
Balanced								
Women	4.9	0.7	4.7	1.1	4.4	1.1	5.3	0.9
Men	4.9	0.8	4.6	1.0	4.6	1.0	5.0	0.9
Indefinite								
Women	3.0	0.9	3.8	1.1	3.8	0.9	2.9	0.9
Men	2.9	0.9	3.8	0.8	3.6	0.8	2.8	0.8
Leisure								
Women	3.1	0.8	4.0	1.1	3.6	0.9	4.4	1.0
Men	3.2	0.9	3.7	1.2	3.3	1.2	3.8	1.0
Discomfort								
Women	2.8	0.8	2.3	0.9	2.6	0.8	2.2	0.6
Men	2.6	0.8	2.3	0.9	2.4	0.7	2.3	0.8
Sense								
Women	3.3	0.8	3.1	0.8	3.2	0.9	2.8	0.6
Men	3.4	0.8	3.3	0.9	3.1	0.8	3.1	0.9
Alert								
Women	3.9	0.9	4.5	1.1	4.2	1.2	4.5	1.0
Men	3.8	0.8	4.2	0.9	3.8	1.0	3.9	0.8

( $\lambda = .898$ ,  $p < .05$ ) and a significant interaction between sex and subject matter ( $\lambda = .915$ ,  $p < .05$ ). Significant univariate interactions were found for Scale 9, No pleasure–Extreme pleasure ( $F_{3,273} = 4.88$ ,  $p < .01$ ), Scale 11, Relaxed–Tense ( $F_{3,273} = 3.20$ ,  $p < .05$ ), and Scale 12, Drowsy–Alert ( $F_{3,273} = 2.71$ ,  $p < .05$ ). These interactions were analyzed further by comparing men's and women's ratings at each artistic period, again using the modified Bonferroni correction. [To maintain a familywise Type I error rate of .05 in this case, the Bonferroni procedure required that each of the pairwise comparisons be tested at .012.] On Scale 9, women rated the behavior depiction paintings as more pleasurable than did men ( $p < .01$ ). On Scale 11, none of the comparisons were significant. On Scale 12, women rated the behavior depiction paintings as more alerting than did men ( $p < .01$ ).

#### DISCUSSION

With regard to artistic style, women judged the content of Rococo and Impressionist paintings as more pleasing than did men, and Impressionist paintings evoked greater feelings of pleasure and relaxation among women than among men. These findings are consistent with those of Bernard (1972) and Cupchik and Gebotys (1988), who found that women tended to prefer representational art with soft, i.e., smooth, contours, such as that of the Impressionist and Rococo schools. Cupchik and Gebotys (1988) suggest that this preference may reflect an underlying sex difference in perceptual style. Women are thought to search "pictorially" across a broad field and with less depth. In contrast, men are thought to search "spatially" across a narrow field and with greater depth (see McGuinness, 1976). In contrast to those earlier studies, however, the present study did not show that men preferred modern art with sharply defined contours. Indeed, the sharply defined cubist still life by Picasso was rated more positively by women. The reason for this inconsistency is not clear, but it probably reflects the fact that both Bernard (1972) and Cupchik and Gebotys (1988) included abstract and expressionist paintings in their experiments, whereas all of the paintings in the present study, except for the Picasso, were representational. Additional research is required to resolve this issue.

With regard to subject matter, Behavior Depictions evoked more pleasure and alertness among women than among men. The question is whether this finding reflects some fundamental characteristic of any such depiction or whether it relates to the particular paintings used in this study. Of the eight behavior depictions used, seven contained children as subjects. After reviewing a variety of evidence, Berman (1980) concluded that women are more responsive to youth than are men. It seems plausible that the observed finding is related to this difference. A study by Cupchik and Gebotys (1990) suggests another interpretation. They found that women who were not art

students (like those in the present study) were more sensitive than men to the emotions aroused by paintings. The present finding makes sense if one assumes that emotional content tends to be more apparent in behavior depictions than in most other subject matter categories. Perhaps this sensitivity is related to a greater capacity for empathy among women (Eisenberg & Lennon, 1983).

These results and those of others suggest the following conclusions: (1) Men and women in college do react differently to paintings. The women prefer more than do men the Impressionist and Rococo styles with their softer contours. It has been suggested that this preference is related to a fundamental difference between men and women in perceptual style. (2) Although these college women were more pleased and alerted by depictions of behavior than were the men, this may not reflect greater general reactivity by women for this category of subject matter. It seems likely that the particular behavior depicted is of greatest importance. (3) The differences between the men's and women's reactions are shown both in their evaluative ratings of a painting's content and in their self-reported emotional state. In this case, the two classes of results tended to be mutually reinforcing.

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