

Sex, race, age, and beauty as factors in recognition of faces*

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Three hundred Ss, black and white, male and female, at four age levels were tested for their recognition of 12 photographed faces: black, white, male, female, child, adolescent, and adult. Females recognized female faces more frequently than the male faces, while male Ss recognized the male and female faces with equal facility. Whites recognized the white faces more frequently than the black faces, while black Ss recognized the black and white faces with equal facility. Incorrect identifications of 24 faces not actually seen before were treated separately. Male faces and black faces were misidentified more than white faces and female faces. The number of false identifications of faces decreased as Ss increased in age. Perceived beauty in a face facilitated recognition. There was evidence of large differences in memorability among individual faces.

To many uninitiated observers all babies tend to look alike, as do most Orientals. Experience with a group usually leads the observer to make the many fine discriminations possible until he ultimately discovers that the group is composed of individuals with infinitely variable and memorable facial characteristics. Recognition of faces is a complex perceptual achievement with practical applications ranging from identification of criminals to social success at cocktail parties.

In the recent literature there are few studies in this area. Howells (1938) reported that women were superior to men and sales personnel superior to farmers. He found a correlation of 0.27 with IQ of the S. Seeleman (1940) found that among white Ss, unfavorable attitudes toward Negroes were related to poor memory for black faces. Goldstein and Chance (1965) report that 9-year-old children found it easier to recognize younger faces than those of the same age or older, but that other age groups of children were not affected by the age of the photographed face. Malpass and Kravitz (1969), working with black and white college students, found that white faces were recognized more frequently than were black faces, but that there was a significant interaction between race of the S and race of the stimulus. Ss having more experience with the opposite race recognized faces of that race more frequently than more racially segregated Ss.

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Malpass and Kravitz concluded that experience with persons of a given race was related to ability to recognize faces of that race.

The present study was concerned with the ability of individuals, black and white, male and female, children, adolescents, and adults from racially segregated and racially integrated backgrounds, to recognize a wide range of facial types. The relation of perceived attractiveness of faces to their recognizability was investigated as were differences in recognizability between individual faces.

METHOD

Subjects

Three hundred Ss, consisting of 80 individuals at each of three age levels—7, 12, and 17 years—and a group of 60 adults whose mean age was 36, were interviewed individually. In each of the first three age groups there were 40 black children and 40 white children. Within these groups, half lived in racially segregated communities and attended unracial schools, while the other half lived in racially integrated urban neighborhoods and attended integrated schools. The adult group consisted of 40 white adults and 20 black adults from the same communities and neighborhoods as the younger Ss. Equal numbers of males and females were included in each S group.

Stimulus Material

The photographic portraits used were selected at random from high school year books and school portraits of grade school children and their teachers. Highly unusual facial expressions, hair styles, or clothing, or persons with eyeglasses, were screened. Black and white faces of both sexes were represented at three age levels, 7-year-old children, 13-year-old

adolescents, and adults in their 30s and 40s. The portraits, each about 1 in. square, were arranged randomly on an 8 x 11 in. card in a matrix containing 24 faces, presenting two faces from each of the 12 age-sex-race categories. Two such composites were made. Twelve of the faces, one from each category, were common to both cards and each card had 12 additional faces not appearing on the other card. The consequence of this arrangement of stimuli was that the stimulus sample for recognition included six portraits of males, of females, of blacks, and of whites, and four portraits at each age level. The sample of portraits subject to misidentification was doubled for each category of portrait since 12 different faces appeared in the two matrices.

Procedure

Before testing, Ss were assigned randomly to one of two orders, and to either the male or female examiner. The S was told that we were studying beauty, that we were interested in which faces he thought were pretty or handsome or beautiful, and that we were trying to discover what sorts of faces were attractive to different kinds of people and whether or not a person's ideas of beauty changed with age. The S was not told that he would be asked to recall any of the faces. The S was then shown one of the two group pictures. He was requested to look at all the faces and to pick which, if any, he considered pretty, handsome, or beautiful. The S was allowed to pick as many faces as he wished, with as much time as he needed. If the S acted hastily, he was gently encouraged to examine all the faces carefully.

The S was then given, as an intervening task, a series of 16 groups of six faces to look at, judge, and finally rate for beauty. This procedure provided data for a separate study of the perception of beauty in faces, but served for the present study as a simulation of the real-world experience of seeing many faces before encountering the need to recall a previously seen face. The S was then shown the second matrix of portraits containing 12 faces seen previously and 12 new faces. S was asked which of the faces had been shown before.

RESULTS

Results for correct recognitions and incorrect identifications were analyzed separately. For the sake of clarity, the results are presented in four general areas: (1) the effects and interactions of sex of the face and age and sex of the S on recognition and misidentification of faces; (2) the effect and interaction of race of face

Table 1
Memory for Faces of the Same and Other Sex and the Same and Other Race

Type of Face	Percent Correct Recognition	Percent Incorrect Identification	Percent "Attractive" Faces Correctly Recognized
		Male Ss	
Male Faces	36	13	57
Female Faces	37	7	56
		Female Ss	
Male Faces	33	14	53
Female Faces	43	10	57
		Black Ss	
Black Faces	39	19	51
White Faces	40	11	57
		White Ss	
Black Faces	27	12	40
White Faces	45	8	64

and race of the S on recognition and misidentification; (3) the relation between perceived beauty of the face and recognition; and (4) differences between individual faces. Generalizations concerning the facial variables are limited because of the small sample of portraits used.

Effects of Sex and Age on Recognition

Percent correct recognition of the male and female faces by male and female Ss at different ages was analyzed in a three-way ANOVA with two repeated measures (Winer, 1962, p. 328). Each cell of the 2 by 2 by 4 (sex of face and sex of S and age of S) analysis contained the proportion of correct recognitions for each of the six faces used. Both black and white Ss were included. While female Ss (N = 150) recognized more faces than did male Ss (N = 150), and while the female faces (N = 6) were recognized more frequently than the male faces (N = 6), neither sex of S nor sex of face were significant main effects. The Sex of Face by Sex of S interaction was significant beyond the .01 level (F = 11.06, df = 1/10). This result is more easily understood by referring to the percent of correct recognitions of male and female faces presented in Table 1. Male Ss recognized the male and female faces with equal facility, while female Ss recognized the male faces less often than did males and recognized the female faces more often.

The age of S main effect was not statistically significant (F = 1.77, df = 3/30, p < .2). When male and female results are seen separately in Table 2, there is seen a slight improvement in recognition with age for males, while for females there is a slight decrease in correct recognitions with increasing age. This Age of S by Sex of S interaction was statistically significant (F = 8.64, df = 3/30, p < .01).

Sex and Age Effects in Misidentification of Faces

A three-way ANOVA with two repeated measures was done for incorrect identification of male and female faces by male and female Ss at four age levels. In Table 1 it can be seen that both male and female Ss falsely identified male faces more frequently than female faces, and that females made slightly more errors in identification than did male Ss. In the ANOVA, for misidentifications, however, the main effects of sex of face and sex of S were not statistically significant, nor was the interaction of these two variables.

Age of S was a highly significant variable (F = 24.88, df = 3/30, p < .01). For both male and female Ss the tendency was for fewer false identifications with increasing age. Although male and female Ss were similar in their performance at age levels of 12, 17, and adult, the 7-year-old girls made many more errors in identification than did 7-year-old boys. This is largely the basis of the significant Age of S by Sex of S interaction (F = 3.45, df = 3/30, p < .05).

Race Variables in Recognition and False Identification
Recognition of black and white

faces by black and white Ss was evaluated in a two-way ANOVA with one repeated measure. Equal numbers of male and female Ss at four age levels were included. While neither of the main effects reached statistical significance, the interaction of Race of Face by Race of S was significant at the .01 level (F = 14.95, df = 1/10). Black Ss recognized black and white faces almost equally well, but white Ss demonstrated poorer recognition of black faces and better recognition of white faces, as seen in Table 1. The data on misidentification indicates that both black and white Ss made more false identifications of black faces than of white faces. The two-way ANOVA on the misidentification data revealed the main effect of race of face to approach significance (F = 4.27, df = 1/10, p < .10).

Half of our Ss lived in racially integrated neighborhoods and half in unracial communities. The data of two of the S groups, the 12-year-olds and the 17-year-olds, whose level of integration or segregation would be most precisely defined in terms of school population, were combined and analyzed in terms of the differences in recognition of black and white faces relative to the racial environment of the S. These data are presented in Table 3.

For black adolescents, racial environment seemed to have no measurable effect on recognition ability. Both integrated and segregated black adolescents recognized black and white faces with equal facility. Black faces were incorrectly identified more often than white faces. This was true for both integrated and segregated black adolescents. Both these results repeat the overall pattern noted in this study for black Ss of all ages. For white adolescents, however, racial segregation or integration was related to recognition ability. While both integrated and segregated white Ss recognized more white faces than black faces, the segregated white adolescents recognized significantly more white faces than did Ss from

Table 2
Memory for Male and Female Faces by Male and Female Ss at Different Ages

Type of Face	Percent Correct Recognition				Percent Incorrect Identification			
	Age of S							
	7	12	17	A	7	12	17	A
	Male Ss							
Male Faces	34	32	36	44	19	15	10	8
Female Faces	33	38	35	41	13	8	4	8
All Faces	34	35	36	42	16	12	7	8
	Female Ss							
Male Faces	41	34	27	30	26	10	12	10
Female Faces	50	50	33	29	19	12	6	4
All Faces	46	42	30	30	22	11	9	7

Table 3

Memory for Black and White Faces by Segregated and Integrated Black and White Ss

Type of Face	Percent Correct Recognition	Percent Incorrect Identification	Percent Correct Recognition	Percent Incorrect Identification
	Integrated Black Ss		Segregated Black Ss	
Black Faces	38	13	40	13
White Faces	38	5	41	9
	Integrated White Ss		Segregated White Ss	
Black Faces	22	8	25	14
White Faces	34	9	48	4

racially integrated schools ($Z = 3.07$, $p < .01$). Predictably, segregated white adolescents made more false identifications of black faces than of white faces. The incorrect identifications of the integrated white Ss, however, were equally divided between black and white faces, an exception to the otherwise consistent finding of more false identification of black than of white faces.

Effect of Perceived Beauty on Recognition of Faces

The initial task presented to each S was to choose from the first matrix of faces any which he considered pretty, handsome, or beautiful. Table 1 indicates the percentage of correct recognitions of faces by Ss who reported those faces attractive in comparison to the percentage of correct recognition of all Ss. In every case, a higher percentage of Ss who perceived beauty in a face were subsequently able to recognize the face.

Range of Recognizability of Various Faces

For each portrait the total number of correct identifications possible was 300. The most frequently recognized face, that of the 7-year-old white girl was recognized by slightly more than half the Ss. The face least frequently recognized, that of the 12-year-old black male, was recognized by only 17% of the Ss. The mean number of Ss correctly recognizing a picture was 113, and the range was from 51 to 156. For 22 of the 24 faces which could be misidentified, the range was from 4 to 25 false identifications out of a possible 150. The two notable exceptions were a 12-year-old black male face, which was falsely identified by 40 Ss, and an adult black male face, which was falsely identified by 47 Ss.

Although earlier work (Howells, 1938) led us to expect that females would be better at recognizing faces than males, we found females superior only in the case of the female faces. This result might be specific to the six female faces in our sample, but this seems unlikely in view of the range of age and the race difference in both our Ss and our photos. Possibly female Ss

are more attentive to female faces because of the emphasis placed on attractive female facial characteristics. The results for incorrect identifications showed few differences between male and female faces. This finding is not inconsistent with the hypothesis of sensitivity of females to female faces since, for faces not previously seen and consequently not scrutinized, no sex of S difference would be expected.

While percent correct recognition did not change with age, holding around 40%, performance improved steadily by virtue of a decreasing false alarm rate up to the adult level. The percent correct recognition and incorrect identification is most likely quite specific to the instructions and testing conditions used, but the trend of performance related to age of S is probably a widely generalizable finding. The most obvious interpretation is that younger Ss guess more than older. Another explanation is that younger Ss may have less ability to recall the circumstances under which a face was seen and consequently confused the faces shown them in the matrix with faces seen prior to the interview or with faces in the interpolated series. If young children are less capable of making the fine discriminations which differentiate faces, the probability of such confusion would be increased. Thus, at least three factors may contribute to performance in recognition or misidentification of faces: willingness to guess, ability to make discriminations, and recall of the circumstances of the prior perception.

The effect of race on recognition of faces is interpretable in the light of differences between the black and the white experience in the United States at the time that we did the testing (summer and autumn of 1969). American blacks, in their work and via television and movies, are virtually assured of exposure to whites. For a majority of whites the situation is reversed. These differences in exposure rates could account in part at least for the results obtained. If those details of physiognomy which provide the most salient discriminanda between black faces are different from those between

white faces, blacks would have had ample opportunity to learn the discriminanda for both racial types, while whites would have not. The smaller difference in recognition efficiency between black and white faces found for the integrated white adolescent Ss as compared to the segregated whites is consistent with this interpretation. It remains for future research to establish that there are in fact differences in the discriminanda, be they specific or more Gestalt-like, between racial types. An alternative explanation of these results might be made strictly in terms of motivational factors, considering the relative importance to the S groups of the ability to distinguish within the groups of faces in question.

The greater memorability of attractive faces is another result requiring further research to determine the relative weight of the various factors which may account for it. Simple explanation in terms of differences in exposure time are ruled out. Our Ss often spent more time scrutinizing faces of doubtful beauty, finally deciding that most of these were not really pretty or handsome, than they spent examining obviously (to them) attractive faces. Instructional set probably played a part in the results. While Ss did not expect to be asked later to recognize specific faces, they were set for an examination of their personal standards of beauty. While they generally spent less time looking at the attractive faces, they may have given them their more active attention, especially as Gestalten, which would enhance later recall of the face as a whole.

The differences in memorability of individual faces was a notable result of our study. Out of our sample of 12 faces, the most memorable was recognized three times as often as the least. Of the 24 which could be incorrectly identified, the most mistaken face was falsely identified 12 times as often as the least. When we arrayed these faces in the order of their memorability and asked 15 of our colleagues to identify the continua on which the faces were ordered, they could detect none. When told the basis of the ordering, 14 out of 15 correctly identified the high and low end of the array of faces ordered by hit frequency and 13 out of 15 did so for the faces ordered by false alarm frequency. At this point they were prepared to suggest that the well-remembered faces were less "ordinary" looking, while the more misidentified faces were more "ordinary," which suggests an interference theory of facial

memorability. More typical faces are more easily confused with previously seen faces. An interference theory would similarly account for the greater memorability of the more than typically attractive faces.

A final note of concern is directed to the finding that 2 of our 24 faces were misidentified by so many Ss. These faces did not remind our Ss of any well-known persons, which might account for our result. The social significance of the finding rests in the

possible consequences for persons who are atypically misidentifiable, say, for example, in a police line-up. It is interesting that the faces in question were both black males. The need for further investigation of this issue is apparent.

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