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Illusory Correlation and Group Impression Formation in Young and Older Adults

Sharon A. Mutter

Department of Psychology, Western Kentucky University, Bowling Green.

This study investigated whether a greater illusory correlation bias is present in older adults' memory and evaluative judgment for majority and minority social groups and, if so, whether this bias might be due to an age-related decline in the ability to engage in on-line processing of group–trait information. Young and older adults read desirable and undesirable trait adjectives about the members of 2 groups under either no-distraction or distraction conditions. Group A had twice as many members as Group B and, for both groups, desirable traits occurred twice as often as undesirable traits. Afterwards, participants completed group–trait memory and evaluative judgment tasks. Greater illusory correlation in memory and evaluative judgment after distraction suggested that diverting resources to competing tasks produced deficits in both memory for specific group–trait information and on-line group impression formation. Older adults' memory for specific group–trait information was disrupted more by distraction than was young adults' memory. However, there were no age differences in evaluative judgment after either distraction condition, suggesting that on-line impression formation activities remain intact in old age. These findings are interpreted within the framework of fuzzy trace theory.

CURRENT research in social cognition suggests that the detection and interpretation of relationships between social objects and events plays an important role in impression formation. A focal issue in this area is the question of why these processes sometimes result in biased impressions of individuals and groups. One of the more striking biases in impression formation was illustrated in a now classic study by Hamilton and Gifford (1976). In their study, young adults read statements about individuals in two "social" groups, A and B, who performed either desirable or undesirable behaviors. Group A was larger than Group B, desirable behaviors occurred more frequently than undesirable behaviors for both groups, and there was no relationship between group and behavior valence. Nonetheless, participants over-attributed undesirable behaviors to the minority group and evaluated this group less favorably than the majority group. Hamilton and Gifford suggested that this "illusory correlation effect"—the perception of a relationship between group and behavior when there was none—might account for the development of negative stereotypes of minority groups. Subsequent research has shown that illusory correlation in group impression formation occurs reliably in a variety of contexts (for reviews, see McGarty & de la Haye, 1997; Mullen & Johnson, 1990) and may be exacerbated under conditions that tax cognitive resources (Spears & Haslam, 1997; Stroessner, Hamilton, & Mackie, 1992). These findings raise an important question in the study of older adults' social judgment—namely, do the declines in cognitive resources associated with aging lead to stronger illusory correlation biases and the development of more negative minority group impressions?

There is little agreement on the underlying cognitive processes responsible for illusory correlation in group impression formation. Explanations tend to be divided on the issue of whether impressions of the groups are formed at the time an evaluative judgment is requested using information retrieved from memory or instead are made on-line at the time information about group members is received. The prevailing memory-based explanation for the illusory correlation effect has been proposed by Hamilton and his colleagues (e.g., Hamilton & Gifford, 1976; Stroessner, Hamilton, & Mackie, 1992) who suggest that the effect is due to a memory advantage for minority group undesirable behaviors. Specifically, the minority group undesirable behaviors (i.e., B−) occur less often during presentation and are thus distinctive relative to the three other group-behavior combinations (i.e., A+, A−, B+). These items may be immediately perceived as distinctive or they may be determined to be distinctive through retrospective processing (McConnell, Sherman, & Hamilton, 1994b), but in either case, they are processed more extensively, thereby increasing their availability in memory (cf. Tversky & Kahneman, 1973). This, in turn, produces biases and errors in recall and frequency judgments and, more significantly, overrepresentation of these items in memory-based evaluative judgment.

The contribution of on-line processes to the illusory correlation effect in group impression formation can be seen in the "differentiated meaning" approach of McGarty and Turner (1992). From this viewpoint, individuals seek to emphasize differences between social categories and minimize differences within these categories (cf. Tajfel, 1969). In the illusory correlation task, people make the rational assumption that because the two groups are distinguished by different labels, they must differ in some way and, therefore, their task is to determine how the groups differ on the evaluative dimension implicit in the group-behavior statements. This process of deriving differentiated meaning involves testing hypotheses concerning evaluative differences for the two groups. For example, individuals may engage in ongoing revision of hypotheses about the odds that desirable behaviors rather than undesirable behaviors prevail for the two groups (e.g., Group A is more desirable than undesirable; Group B is more desirable than undesirable) or of hypotheses that the two groups differ on the evaluative dimension (e.g., Group A members are good and Group B members are bad; Group B members are good and Group A members are bad; McGarty, Haslam, Turner, & Oakes, 1993). Illusory correlation occurs because evidence for the positivity of the majority group is more reliable than evidence for the positivity of the minority group (cf. Fiedler, 1991).

It has recently become apparent that the involvement of memory-based and on-line impression formation in the illusory correlation task may be determined in part by the encoding environment (e.g., McConnell, Sherman, & Hamilton, 1994a). For example, resource demands during encoding can influence the contribution of these processes to illusory correlation. Although research on this issue is sparse, there is some evidence that the relationship between resource demands and illusory correlation is curvilinear (for a review, see Spears & Haslam, 1997). When resource demands are low, the illusory correlation effect is attenuated because individuals are able to more effectively analyze the evaluative content of the group-behavior statements and integrate this information into an accurate impression of each group. In contrast, when resource demands are moderately high, illusory correlation is enhanced because on-line impression-formation processes produce less accurate representations for the groups (Spears & Haslam, 1997) and evaluative judgments may be influenced to a greater extent by the individual group-behavior statements that can be retrieved from memory (cf. McConnell et al., 1994a). Under very high demands for cognitive resources, on-line integration of evaluative information may be precluded altogether and memory for both majority and minority group behaviors may also be poor, thereby eliminating the illusory correlation effect (Spears & Haslam, 1997).

Evidence that the availability of cognitive resources during encoding can influence the magnitude of the illusory correlation effect is particularly relevant for the study of how adult aging affects impression formation. Concept identification studies have consistently shown that increasing age is associated with declines in reasoning and hypothesis testing skills (e.g., Arenberg, 1968; Hartley, 1981; Hayslip & Sterns, 1979; Hess & Slaughter, 1986; Sanford, 1973), and it has been suggested that these declines may stem from changes in more basic cognitive resources such as processing speed and working memory capacity (see Salthouse, 1991, for a review of this literature). If changes in these basic resources produce similar declines in on-line processing activities, older adults' impressions of social groups may be less accurate and more biased. Some evidence in support of this idea comes from research on age differences in person memory and impression formation. For example, consistency effects (i.e., better recall for behaviors that are inconsistent with attributed personality traits than for behaviors that are consistent with these traits; Hastie, 1980) have been observed for older adults when these behaviors are studied after an impression has already been formed, but not when an impression must be formed during study (Hess & Pullen, 1994). According to Hess and Pullen (1994), the burden of simultaneous impression formation and study of the individual behaviors may prevent older adults from engaging in extensive explanation-based processing for the trait-inconsistent information and thus reduce memory for these items. More recent studies have confirmed that memory for the specific behaviors associated with a person (e.g., Joe returned a woman's purse) as well as impression formation using specific trait information gleaned from these behaviors (e.g., Joe is honest) decline with age. On the other hand, these same studies have shown that evaluative impressions of the person (e.g., likability rating) remain intact (Hess, Follett, & McGee, 1998).

It is not clear, however, whether these findings for person memory and impression formation generalize to social groups. Integrating behavioral and trait information may be more demanding for a group than for a person, because both individual and group information must be considered (McConnell et al., 1994a). To our knowledge, only one study has investigated how adult aging affects group impression formation (i.e., Hess, Pullen, & McGee, 1996). In this study, participants were instructed to learn the shared characteristics of members of a fictitious group based on descriptions of individual group members that were generated from one of two types of prototypical groups. Descriptions generated from a coherent group prototype had either all desirable or all undesirable features, and descriptions generated from an arbitrary prototype had equal numbers of desirable, undesirable, and neutral features. The findings indicated that older adults had no difficulty acquiring the coherent group prototypes. Hess and his colleagues (Hess, Pullen, & McGee, 1996) suggested that this was because an evaluative impression of the group could be activated in a relatively automatic fashion in this condition. On the other hand, older adults had greater difficulty acquiring the arbitrary group prototype, and this was attributed to their inability to effectively use resource-demanding, hypothesis-testing strategies that involved attention to specific trait information and integration of this information into an organized representation of the group. Additional support for this idea was provided by the finding that independent measures reflecting the efficiency of controlled cognitive processes (digit symbol substitution, free recall) accounted for much of the age-related variance in performance for the arbitrary group prototype.

The goal of the present study was to ascertain whether larger illusory correlation biases are present in older adults' evaluative judgments for majority and minority social groups and, if so, whether these biases might also be due to an age-related decline in the ability to engage in resource-demanding, on-line processing of group–trait information. Young and older adults studied desirable and undesirable trait adjectives about the members of two social groups (A and B). Group A had twice as many members as Group B and, for both groups, desirable traits occurred twice as often as undesirable traits. Afterwards, participants were asked (a) to indicate which traits in a list composed of original and foil traits were attributed to Group A, Group B, or neither of the groups, (b) to estimate the number of desirable and undesirable traits associated with each group, and (c) to rate how much they liked each group. According to McConnell and his colleagues (McConnell et al., 1994a), on-line and memory-based impression formation produce different patterns of performance on these memory and judgment measures. On-line processing encourages active evaluation and integration of individual group–trait statements, so memory for these statements is generally accurate. Moreover, on-line processing increases the likelihood that accurate impressions of the majority and minority groups will be formed at encoding, so the illusory correlation bias is reduced or eliminated. And finally, on-line processing eliminates the necessity of basing evaluative judgments on the group–trait statements that can be retrieved from memory, so judgment may not be correlated with memory. In contrast, when memory-based impression formation occurs, memory for individual statements is poorer due to the less extensive processing of these statements at encoding, an illusory correlation bias favoring the majority group over the minority group is present in evaluative judgment, and memory and judgment are correlated. Therefore, if older adults have difficulty performing on-line hypothesis testing and integration of group–trait information, this should be revealed in a pattern of performance on the memory and evaluative judgment measures that is more characteristic of memory-based than on-line impression formation.

To gain a clearer picture of how age-related limitations in cognitive resources might affect group impression formation, the availability of these resources during encoding was manipulated. In a no-distraction condition, participants were allowed to focus solely on the presentation of group–trait statements, whereas in a distraction condition they were also required to perform a concurrent task. With no distraction, young adults should be able to engage in effective on-line group impression formation, and their memory and judgment performance should reveal a pattern that is characteristic of this type of processing. In contrast, performing the distracting concurrent task should limit their use of resources for effective on-line processing and, as a result, their performance should reflect primarily memory-based processes. If older adults suffer a general decline in the resources they can apply to on-line hypothesis testing and reasoning, their memory and judgment performance may reflect memory-based impression formation even without distraction. Thus, the performance of older participants in the no-distraction condition may resemble that of young participants in the distraction condition. The additional demands of the concurrent task may lead to further disruption in older adults' on-line processing and may also prevent them from extensively processing both majority and minority group–trait statements. This would produce the paradoxical finding of greater illusory correlation for the young participants than for the older participants in the distraction condition.

Methods

Participants and Design

Fifty young adults were recruited from psychology classes and given course credit for their participation; 55 older adults were recruited from the community and paid for their participation. Two young adults and 7 older adults were replaced due to a failure either to perform the concurrent task correctly (2 young, 5 older) or to complete the test booklets (2 older). The ages of the remaining 48 young participants (11 men, 37 women) ranged from 19 to 30 years, and the ages of the remaining 48 older participants (18 men, 30 women) ranged from 60 to 83 years. Additional information on participant characteristics (mean age, years of education, Wechsler Adult Intelligence Scale-Revised [WAIS-R; Wechsler, 1981] Information, Vocabulary, Digit Symbol, and Backward Digit Span subtest scores) is presented in Table 1. None of the participants reported histories of neurological or psychiatric illness, and none were taking medications known to affect cognitive functioning. All reported that they were in good health.

Within each age group, 24 participants were randomly assigned to one of two encoding conditions (no distraction vs. distraction). Two different study lists and two test orders (Order 1: trait recognition, frequency estimation, affective rating; Order 2: trait recognition, affective rating, frequency estimation) were counterbalanced across the participants in each encoding condition. Six participants were randomly assigned to each study list by test order combination. Additional within-subject variables were associated with the three tests of illusory correlation. For the trait-recognition test, the variables were social group (A vs. B) and trait valence (desirable vs. undesirable), and for the frequency estimation and affective rating tests, the variable was social group (A vs. B).

Materials

Study lists contained 48 group–trait adjective statements that provided information about a desirable or undesirable personality trait of a member of one of two social groups, A and B (e.g., Alex, a member of Group A, is polite; Gary, a member of Group B, is hostile). Forty-eight common male names were randomly assigned to the 36-member Group A and the 12-member Group B. An initial pool of trait adjectives was selected from the 1st (desirable traits) and 4th (undesirable traits) quartiles of Anderson's (1968) likeableness ratings for personality trait words using the following constraints: A word had to be between 4 and 10 letters in

Table 1. Participant Characteristics

	Young Adults		Older Adults	
Characteristic	*M*	*SD*	*M*	*SD*
No Distraction				
Age	22.42	2 3	69.37	3.7
Education	15.33	1 1	14.58	2.2
Vocabulary	45.37	8.0	54.12	9.6
Information	18.12	4.8	23.12	3.0
Digit Symbol	70.21	10.0	50.29	7.2
Backward Digit Span	6.92	1 9	6.42	1.3
Distraction				
Age	22.79	2 9	70.12	5.6
Education	14.42	2 2	15.71	2.5
Vocabulary	43.96	8 2	54.71	8.0
Information	17.29	4 3	23.62	3.5
Digit Symbol	69.83	9.7	43.87	7.8
Backward Digit Span	7.00	2.0	6.33	1.8

length, have a background frequency ranging from 4 to 100 occurrences per million (Francis & Kucera, 1982), and contain no hyphens or prefixes. Sixty-four desirable and 32 undesirable traits were randomly chosen from this pool of words to be used in the study lists.

A pilot study was conducted to determine whether older adults' desirability ratings for these traits would be similar to the ratings of the young adults used in the original norming study (Anderson, 1968). Ten older pilot participants, chosen from the same population as the experiment participants, were asked to rate the desirability of the traits. The rating scale and instructions for this task were identical to those used in Anderson's (1968) original study. Specifically, the rating scale ranged from 0 (least favorable or desirable) to 7 (most favorable or desirable), and participants were instructed to think of a person as being described by a trait and then rate the trait according to how much they would like the person. It was emphasized that they should make the ratings according to their own personal opinion. The older adults' mean desirability ratings for both the desirable ($M = 5.86$) and the undesirable ($M = 1.41$) trait words were somewhat higher than those of younger adults (desirable $M = 4.84$; undesirable $M = 1.00$), suggesting that their ratings were skewed toward the desirable end of the scale. However, the rank order correlation between the young and older adults' mean ratings for the trait adjectives was .85 ($p < .0001$), showing that the rated desirability of the traits within this set was highly consistent for the two age groups.

Two different study lists were constructed using these traits. For each list there were more members of Group A (36) than Group B (12), but for both groups desirable traits occurred twice as often as undesirable traits. Specifically, 24 desirable and 12 undesirable traits were paired with the members of Group A, and 8 desirable and 4 undesirable traits were paired with the members of Group B. These group–trait pairs were randomly arranged in the study lists. Mean word lengths, word frequencies, and desirability ratings were closely matched for the desirable and undesirable traits across the two lists. Half of the participants were given the first study list and the remaining half were given the second study list.

Illusory correlation in memory was measured using a trait-recognition test (e.g., Pryor, 1986), and illusory correlation in evaluative judgment was measured using trait frequency estimation and affective rating tasks. The trait-recognition test booklet was constructed by combining and randomly arranging the desirable and undesirable traits from the two study lists. Thus, for each participant, this booklet contained the 32 desirable and 16 undesirable traits originally presented with members of Group A or Group B as well as 32 new desirable and 16 new undesirable traits that had not been presented for study. The trait-frequency estimation and affective rating tasks were in separate booklets, and separate pages were provided for the estimates and ratings for each group. For the frequency estimation task, the number of statements originally describing a particular group was given at the top of the page along with instructions to indicate how many of the descriptions for that group were desirable and how many were undesirable. For the affective rating task, instructions appeared at the top of the page indicating that participants were to provide a rating for how much the members of a particular group were liked using a rating scale ranging from 1 (not at all) to 7 (very much).

Procedure

Participants were tested individually or in pairs in a session lasting approximately 1.5 hr. The study phase began after the participants completed consent procedures and a questionnaire on biographical information and health status. Young and older participants in the no-distraction encoding condition were given the following instructions:

> This experiment is about how people process and retain information about members of different groups. You will see a series of descriptions of different people. For example: Alex is sincere. The people in the statements will be identified by their membership in a particular group. Each person described is a member of one of two groups which, to keep things simple, will be referred to as Group A or Group B. Both groups are real, although the names of the group members have been changed. The descriptions of the group members were generated by people who know them very well. For this experiment, the group members and their descriptions were drawn at random from the actual group population. In the real world, Group B is smaller than Group A. Consequently, statements describing members of Group B occur less often than statements describing members of Group A.
>
> As each statement is presented, read it carefully. This is important because later on we will ask you some questions about these statements.

Young and older participants in the distraction encoding condition were given instructions containing the same first paragraph as the instructions for the no-distraction encoding condition, but the second paragraph was replaced with the following instructions:

> In the real world, we often receive information about people while we are doing other things. Therefore, in this experiment, you will be doing two different tasks as the statements about the group members are presented. One of your tasks will be to read each statement carefully. This is important because later on we will ask you some questions about these statements. The other task will be to count forward by 2 from a given number each time you see a new statement. You will be given a number to start from before the statement presentation begins. Each time you see a new statement, add 2 to the current value of the number. For example, if the initial number is 42, adding 2 when you see the first statement would give you the current value of 44. You must keep thinking about this number, then when you see the next statement, you add 2 to 44 to get the current value of 46 and so on. We are interested in how accurately you can do this task, so after all the statements have been presented you will be asked to record the final value

you have obtained. Please note, however, that both tasks are important. You should therefore read the statements carefully *and* count accurately.

Participants then received the list of group–trait statements presented individually on slides at an 8-second rate. Young and older participants in the distraction condition were given an odd 4-digit number for the cumulative addition task just before the presentation of the first statement. They were not allowed to write down this number or the intermediate results of their calculations.

After the presentation of the statements, participants in the no-distraction condition were given the trait-recognition test; those in the distraction condition recorded their final cumulative addition value and were then given this test. For the trait-recognition test, participants were informed that they would see a list of several personality traits, some of which had been attributed previously to a member of Group A or Group B and some of which had not been attributed to a member of a group. They were asked to indicate whether each trait was attributed to Group A, Group B, or neither group by placing an A, B, or N, respectively, next to the trait. After completing this test, participants received the trait-frequency estimation task and the affective rating task in counterbalanced order. For the trait-frequency estimation task, participants were told the total number of traits originally attributed to each group and were asked to estimate how many of these traits were desirable and undesirable. For the affective rating task, they were asked to rate how much they liked the members of each group. After completing the last illusory correlation task, participants were given a 5-min break and then received the WAIS-R (Wechsler, 1981) Vocabulary, Digit Symbol, Information, and Backward Digit Span subtests.

Scoring

Several dependent measures were obtained from each participants' data. Trait-recognition responses were coded as either hits (attribution of an original trait to the correct group), mismatch errors (attribution of an original trait to the wrong group), misses (attribution of an original trait to neither group), or false alarms (attribution of a new trait to a group). These responses were further coded into the categories A+ (desirable traits attributed to Group A), A− (undesirable traits attributed to Group A), B+ (desirable traits attributed to Group B), or B− (undesirable traits attributed to Group B). The proportion of responses in each of these categories was obtained by dividing the number of responses by the total number of possible responses in that category (e.g., 10 A+ hits would result in a proportion of 10/24 = .42; 5 B+ mismatch errors would result in a proportion of 5/8 = .62, and so forth). In addition, a signed phi coefficient was computed using the total numbers of original desirable and undesirable traits (i.e., hits + mismatch errors) assigned to Groups A and B, where phi =

$$\frac{(A^{+} \times B^{-}) - (B^{+} \times A^{-})}{\sqrt{(A^{+} + B^{-}) \times (A^{-} + B^{+}) \times (A^{+} + A^{-}) \times (B^{+} + B^{-})}}.$$

Phi coefficients that are significantly greater than zero indicate the presence of an illusory correlation bias. Frequency estimates for desirable Group A and Group B traits were used to compute the conditional probabilities $p(+/A)$ and $p(+/B)$. The actual value for both of these conditional probabilities based on the numbers of desirable and undesirable traits originally paired with Group A and Group B was .67. A signed phi coefficient was also computed using the frequency estimates for A+, A−, B+, and B− traits. Finally, a liking index was calculated by subtracting the affective rating for Group A from that for Group B. The lower the index, the less favorable the impression of Group B relative to that of Group A.

Results

Analyses were conducted for measures of intelligence (WAIS-R Vocabulary, Information, Backward Digit Span, and Digit Symbol subtest scores; Wechsler, 1981) and illusory correlation (trait-recognition, trait-frequency estimation, and affective rating tasks). All effects reported as significant reached a criterion of $p < .05$ or better. Strength of association was measured by partial η^2 unless otherwise noted.

Cumulative Addition Task

To ensure that participants who performed the concurrent cumulative addition task incorrectly were not included in the sample, those who missed the actual total by more than 100 were replaced (2 young and 5 older participants). Of the remaining participants, 8 of the 24 young participants and 7 of the 24 older participants reported the correct value. Altogether, 92% of the young participants (22) and 88% of the older participants (21) reported a value that missed the actual total by 50 or less.

Intelligence Measures

Adult aging generally leads to less decline in measures of crystallized intelligence (e.g., Information, Vocabulary) than in measures of fluid intelligence (e.g., Digit Span, Digit Symbol; Horn & Cattell, 1967). To determine whether age differences in intelligence scores were consistent across the two distraction conditions, a 2 (age: young vs. older) × 2 (encoding condition: no distraction vs. distraction) multivariate analysis of variance (MANOVA) was conducted for WAIS-R (Wechsler, 1981) Vocabulary, Information, Backward Digit Span, and Digit Symbol scores. These data are presented in Table 1. Age was the only significant effect in this analysis, $F(4,89) = 63.44$, $\eta^2 = .74$. Follow-up univariate tests indicated that older participants had higher Vocabulary, $F(1,92) = 31.59$, $MSe = 72.22$, $\eta^2 = .26$, and Information scores, $F(1,92) = 48.57$, $MSe = 15.87$, $\eta^2 = .35$, than young participants, whereas young participants had higher Digit Symbol scores, $F(1,92) = 164.01$, $MSe = 76.99$, $\eta^2 = .64$, than older participants. These data are therefore consistent with the typical pattern of age differences for measures of crystallized intelligence and fluid intelligence. More importantly, this pattern was consistent across the two distraction conditions.

Illusory Correlation Measures

Trait recognition.—Hits, mismatch errors, misses, and false alarms were entered into separate 2 (age: young vs. older) × 2 (encoding condition: no distraction vs. distraction) × 2 (social group: A vs. B) × 2 (trait valence: desirable vs. undesirable) analyses of variance (ANOVAs). The presence of a significant Group × Valence interaction provides evidence for the illusory correlation effect and the tests exploring the influence of age and distraction on this effect are of primary concern. Therefore, in the interest of brevity, only the tests of the main and interaction effects of age and encoding condition and the tests involving the Group × Valence interaction are presented here. (The full set of analyses may be obtained from the author upon request.)

Figure 1 shows the proportion of original desirable and undesirable traits correctly attributed to Groups A and B. Hit rates did not vary as a function of age, $F(1,92) = .21$, $MSe = .07$, $\eta^2 = .00$, or encoding condition, $F(1,92) = 1.30$, $\eta^2 = .01$, and there was no interaction between these two variables, $F(1,92) = 2.24$, $\eta^2 = .02$. As expected, the Group × Valence interaction was significant, $F(1,92) = 41.42$, $MSe = .10$, $\eta^2 = .31$, indicating that there were differences in the likelihood of correctly attributing desirable and undesirable traits to the majority and minority groups. The Encoding Condition × Group × Valence interaction was not significant, $F(1,92) = 1.39$, $MSe = .14$, $\eta^2 = .01$. However, there was a significant Age × Group × Valence interaction, $F(1,92) = 4.50$, $MSe = .10$, $\eta^2 = .05$, and a marginally significant Age × Encoding Condition × Group × Valence interaction, $F(1,92) = 3.43$, $MSe = .10$, $\eta^2 = .04$, $p < .07$.

Inspection of Figure 1 suggests that older participants' hit rates for undesirable Group A and Group B traits varied more as a function of encoding condition than did those of young participants. Because this observation has a direct bearing on the prediction that distraction would have a greater impact on older adults' memory for the group–trait statements, separate 2 (encoding condition) × 2 (group) × 2 (valence) ANOVAs were conducted for each age group. The Group × Valence interaction was significant in the hit rate data of both young, $F(1,46) = 9.53$, $MSe = .10$, $\eta^2 = .17$, and older participants, $F(1,46) = 35.78$, $MSe = .10$, $\eta^2 = .44$. For young participants, this effect did not vary as a function of encoding condition, $F(1,46) < 1.00$, $MSe = .10$, $\eta^2 = .00$. Analyses of hit rates for desirable and undesirable traits collapsed over the no-distraction and distraction conditions indicated that hit rates for A+ traits ($M = .53$) were higher than hit rates for B+ traits ($M = .30$), $F(1,47) = 23.12$, $MSe = .05$, $\eta^2 = .33$, but hit rates for A− ($M = .37$) and B− traits ($M = .43$) were not significantly different, $F(1,47) < 1.00$, $MSe = .09$, $\eta^2 = .02$. Thus, the likelihood of attributing the original traits to the correct group was greater for desirable traits paired with Group A than for desirable traits paired with Group B, but did not differ for undesirable traits paired with the two groups. This same advantage in memory for the Group A desirable traits was present in both encoding conditions, suggesting that distraction played an insignificant role in the young participants' ability to correctly attribute the original desirable and undesirable trait to the majority and minority groups.

A somewhat different pattern was observed in the hit rate data for the older participants. For these participants, the Group × Valence interaction varied as a function of encoding condition, $F(1,46) = 4.49$, $MSe = .10$, $\eta^2 = .09$. For older participants in the no-distraction condition, hit rates were higher for A+ ($M = .57$) than B+ ($M = .24$) traits, $F(1,23) = 19.96$, $MSe = .06$, $\eta^2 = .46$, but were similar for A− ($M = .49$) and B− ($M = .52$) traits, $F(1,23) < 1.00$, $MSe = .08$, $\eta^2 = .01$. Thus, the hit rates of these participants, like those of young adults, reveal a memory advantage for Group A desirable traits. For older adults in the distraction condition, hit rates were again higher for A+ ($M = .63$) than B+ ($M=.20$) traits, $F(1,23) = 52.20$, $MSe = .04$, $\eta^2 = .69$, but hit rates were also higher for B− ($M = .51$) than A− ($M = .20$) traits, $F(1,23 = 11.66$, $MSe = .10$, $\eta^2 = .34$. This finding suggests that distraction during encoding had a significant impact on older adults' memory for the group–trait statements. Like young adults, they made proportionally more correct attributions for original desirable traits paired with Group A, but unlike young adults, they also made proportionally more correct attributions for undesirable traits originally paired with Group B. Thus, after distraction, the older participants' showed a memory advantage for Group A desirable traits as well as Group B undesirable traits.

Figure 2 shows the proportions of original desirable and undesirable traits misattributed to Groups A and B. The overall proportion of mismatch errors did not vary as a

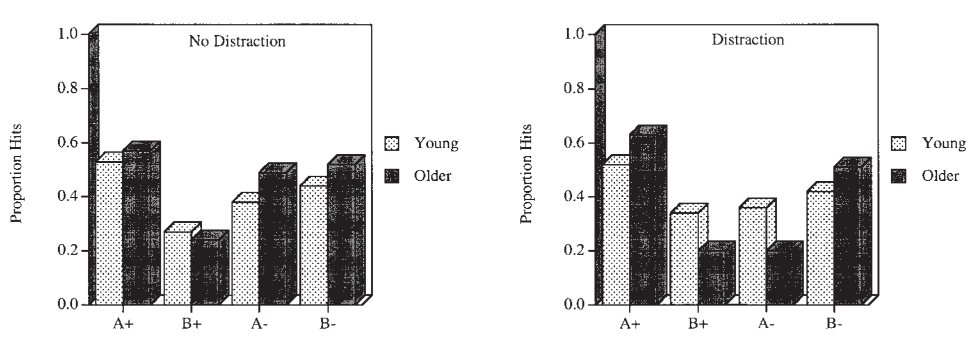

Figure 1. Mean proportion hits for young and older participants in the no-distraction and distraction encoding conditions.