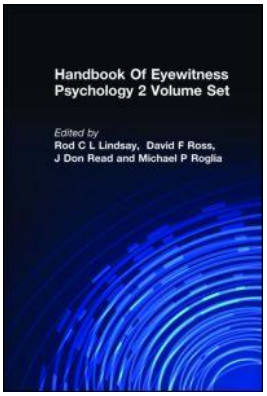

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Memory for People

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The Influence of Race on Eyewitness Memory

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The Influence of Race on Eyewitness Memory

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One Sunday morning in May of 2000, a 15-year-old Black youth named Brenton Butler was walking to a video store to apply for a job when he was picked up by police as a possible suspect in a brutal murder that had occurred earlier that morning. Taken back to the motel where the murder had taken place, Butler was positively identified by the murder victim's husband, James Stevens, who had observed the murder from close range just two and a half hours earlier. Although he had described the murderer as 20 to 25 years old, Stevens identified Butler as the man who had demanded his wife's purse and then shot her. When asked if he was certain about his identification, he remarked that he "wouldn't send an innocent man to jail"—yet subsequent events showed that this is precisely what happened (Hattenstone, 2002; Schoettler & Treen, 2000; Schoettler & Pinkham, 2002). The misidentification and subsequent confession that was coerced from Butler were later portrayed in an Academy Award–winning documentary titled *Murder on a Sunday Morning*. Unfortunately, incidents such as this, where an innocent person is arrested or incarcerated on the basis of a cross-racial identification, may be all too common in the justice system.

The *cross-race effect* (CRE), also known as the *own-race bias* or *other-race effect*, refers to the consistent finding that adults are able to recognize individuals of their own race better than faces of another, less familiar race. Although observations involving race and face recognition have been documented since the early twentieth century (Feingold, 1914; Brigham, 2002), the past 30 years have been rich with empirical studies demonstrating

the perils of witnesses attempting to identify perpetrators of another race. In a review of this research, Chance and Goldstein (1996, p. 171) observed, "The number of studies that have replicated the other-race effect is impressive. Few psychological findings are so easy to duplicate." Several surveys of research "experts" in this area have also documented wide endorsement of the CRE and its reliability (Kassin, Ellsworth, & Smith, 1989; Kassin, Tubb, Hosch, & Memon, 2001; Yarmey & Jones, 1983). In the most recent of these, Kassin and colleagues (2001) found that 90% of the experts surveyed felt that empirical evidence of the CRE was reliable enough to be presented in court.

This chapter reviews the available empirical literature on the CRE in both children and adults, reviewing the basic cognitive, social, and developmental processes believed to underlie the effect and presenting evidence of its practical influence on eyewitness identification. The parameters of the CRE are also discussed (i.e., the conditions under which the CRE is most likely to be observed), and recommendations are advanced regarding the collection of eyewitness evidence when the perpetrator is of a race or ethnic background different from that of the witness. Finally, avenues of future research in the cross-race domain are discussed.

EMPIRICAL FINDINGS ON THE CROSS-RACE EFFECT

Overall Findings: Meta-Analyses of the CRE

There have been several meta-analyses examining the CRE (Bothwell, Brigham, & Malpass, 1989; Anthony, Copper, & Mullen, 1992; Meissner & Brigham, 2001; Sporer, 2001). The largest of these, conducted by Meissner and Brigham (2001), analyzed data from almost 5,000 participants in 39 studies spread over the prior three decades. Focusing on signal detection measures of discrimination accuracy (i.e., the ability to distinguish between faces seen previously and novel faces), their analysis found a significant CRE that accounted for 15% of the variance across studies. With regard to the pattern of hits (i.e., correct identifications of previously seen faces) and false alarms (i.e., false identifications of novel faces), a "mirror effect" pattern emerged such that own-race faces were 1.40 times *more* likely to be correctly identified and 1.56 times *less* likely to be falsely identified than were other-race faces. The authors concluded that the CRE was a robust phenomenon that should be considered to have practical importance in eyewitness identifications.

The CRE across Racial Groups

Black and White Participants. In general, the CRE is a finding that has been most often researched and demonstrated with Black and White participants. Over 85% of the participants in the meta-analysis conducted by Meissner and Brigham (2001) were from one of these two racial groups. In a moderator analysis of their data, Meissner and Brigham observed that White participants were significantly more likely to demonstrate a CRE than were Black participants. Given that the majority of studies included in the

meta-analysis had been conducted in North America, the authors speculated that this pattern might be due to the "majority" race status of White participants who had participated in the studies, and the associated lower level of interracial contact experienced by these participants.

Although the majority of cross-race studies have been conducted in the United States and Canada, research with Black and White participants in parts of Africa and the United Kingdom has demonstrated that the CRE is not limited to individuals in North America (see Chiroro & Valentine, 1995; Wright, Boyd, & Tredoux, 2001; 2003). For example, using an eyewitness field study methodology, Wright and colleagues (2001) observed a significant CRE in Black and White participants from both England and South Africa. Not surprisingly, these studies have also indicated that the degree of interracial contact between group members can moderate the size of the CRE observed.

Hispanic Participants. Only a few published studies have tested the CRE within the Hispanic population. In 1988, Platz and Hosch conducted a field study examining the performance of Mexican American, Black, and White convenience store workers in identifying customers who had interacted with them earlier in the day. A Mexican American, Black, or White customer (or "confederate") went into the store and asked for directions or made a fairly involved purchase from the clerk. Two hours after that transaction, a pair of students posing as law office interns asked the clerk for help in identifying the individual with the use of a series of lineup photos. Platz and Hosch found a significant CRE for all three of the racial groups, with clerks of each group better recognizing confederates who were of their own race than people from either of the other two races.

The performance of several racial groups (including Whites, Blacks, Latinos, and Asians) in recognizing both White and Black faces was examined by Teitelbaum and Geiselman (1997). Overall, Latino participants in their sample performed significantly better on White faces than on Black faces. In relation to the racial groups corresponding to the facial stimuli (i.e., White or Black faces), Latino participants performed no differently than White participants on White faces, but significantly more poorly than Black participants on Black faces. Given that the participants in this study were students in Los Angeles, California, the authors speculated that the Latino participants may have been perceived as less of a minority than Black participants, and that this may have encouraged social exchanges with Whites, leading to the development of perceptual skills that improved their performance in differentiating White faces.

Most recently, MacLin, MacLin, and Malpass (2001) provided a more direct test of the CRE in Hispanic participants, using a standard recognition paradigm with photographs of Hispanic and Black faces. Across two experiments, the authors found a significant CRE, with Hispanic participants showing better recognition for Hispanic faces than for Black faces. The authors also varied several factors believed to moderate the CRE, including encoding time (Experiment 1), retention interval (Experiment 1), arousal at encoding (Experiment 2), and attentional demands at encoding (Experiment 2). Of these manipulations, only the presence of attentional demands at encoding appeared to moderate the CRE, such that performance was impaired for own-race faces when attentional

demand was great, but not for other-race faces. Nevertheless, participants demonstrated superior recognition for own-race faces under both attentional demand conditions.

Asian Participants. A handful of studies have examined the prevalence of the CRE with Asian faces as stimuli. In several of the earlier studies (Chance, Goldstein, & McBride, 1975; Goldstein & Chance, 1981; Chance, Turner, & Goldstein, 1982), the inclusion of Japanese facial stimuli was intended to allow for some control of the amount of contact that the White participants had with another racial group. Chance, Goldstein, and McBride (1975) showed pictures of Black, White or Japanese faces to White and Black participants and then tested for their recognition memory of these faces. Findings showed a CRE, with each racial group performing better with faces of its own race. The poorest levels of recognition were for the Japanese faces by Blacks and by Whites, who performed similarly. The second in the series of these studies (Goldstein & Chance, 1980) focused only on the facial recognition of White children in first through sixth grades and found no evidence of a CRE, whereas the third study, which included adults, found that children over the age of 11, as well as adults, showed a CRE with Japanese faces (Chance et al., 1982).

Other studies have investigated the presence of the CRE in Asian participants. Luce (1974), for example, showed Black, White, Japanese, or Chinese faces to Black, White, Japanese, and Chinese participants. He found that all four of these groups showed a CRE in facial recognition. Ng and Lindsay (1994) tested the ability of Asian (mostly Chinese) and White participants to recognize both Asian and White faces. They found a significant CRE in both false-alarm rates and measures of overall accuracy (d'), but not in hits. One interesting facet of this study was that it was conducted in Canada and Singapore, and the overall pattern of results was the same in the two countries. Thus, although the amount of contact with people of another racial group would have been different, the poorer recognition of other-race faces was present in both situations.

Sangrigoli and colleagues further investigated the issue of exposure and the CRE with Asian participants. Sangrigoli, Pallier, Argenti, Ventureyra, and de Schonen (2005) compared the facial recognition by adult Koreans who had been adopted by Caucasian families at an early age to facial recognition by adult Koreans who had been raised in Korea, and to facial recognition by adult Caucasians. The authors found that the Caucasian and adopted Korean participants exhibited a similar bias in face recognition, such that both groups were better at recognizing Caucasian faces than Asian faces. In contrast, the nonadopted Korean participants were better at recognizing Asian faces than Caucasian faces.

Other Ethnic Groups. Research on the CRE has also involved other ethnic groups. Sporer (2001), for example, reported a program of research involving Turks and Germans. Using a facial recognition paradigm, Sporer found that Germans exhibited a CRE when shown German and Turk faces, whereas Turks who were shown the same stimuli did not. Weimann, Fishman, and Rattner (1988) examined the CRE in samples of Arabs and Israeli Jews and found that whereas Arabs showed a CRE in correct identifications, Jews

appeared to show a CRE in response criterion, such that they produced both more hits and more false alarms in response to Arab faces. Similar results, particularly in hit responses, were obtained by the authors in a follow-up study (Rattner, Weimann, & Fishman, 1990).

The CRE as a Function of Encoding Time and Retention Interval

In general, encoding time has been shown to influence individuals' ability to recognize previously viewed faces, such that minimizing encoding time generally reduces hits while increasing false alarms (cf. Reynolds & Pezdek, 1992). In their meta-analysis of the CRE, Meissner and Brigham (2001) observed that encoding time also appears to moderate the strength of the CRE such that, across studies, longer encoding times generally produced a decrease in the magnitude of the CRE in discrimination accuracy. This decrease appeared largely on false-alarm responses. Interestingly, a previous meta-analysis of the CRE conducted by Anthony et al. (1992) also found a moderating effect of encoding time—however, their analysis showed that the pattern observed by Meissner and Brigham held for Black participants, but was reversed for White participants (i.e., such that longer exposure times led to an *increase* in the CRE).

The only published study to vary encoding time within the CRE paradigm was conducted by MacLin et al. (2001). Using a 0.5-second versus a 5.0-second manipulation, MacLin et al. observed the expected main effect of encoding time on discrimination accuracy; however, their results failed to indicate a significant interaction between encoding time and the CRE (although the pattern of results was consistent with the predicted direction of a larger CRE in the 0.5-second encoding condition). The only other study to comment on the influence of encoding time in the CRE was that by Valentine and Bruce (1986), who conducted pilot work and found that extending the encoding time for other-race faces to 5 seconds equated participants' performance with that of own-race faces presented for 2 seconds. Taken together, it appears that encoding time does moderate the CRE, but that this effect may be small and difficult to detect in a single study. Further research in this area appears warranted.

The length of the retention interval between study and test has also been shown to influence recognition memory for faces (cf. Shepherd, Gibling, & Ellis, 1991). Retention interval appears to influence the magnitude of the CRE as well, particularly through false identifications. As noted by Meissner and Brigham (2001) in their moderator analysis across studies, longer retention intervals have been shown to increase the likelihood of false identifications for other-race faces to a greater extent than for own-race faces. However, two studies examining the relationship between retention interval and the CRE have failed to find this interaction (Barkowitz & Brigham, 1982; MacLin et al., 2001). Barkowitz and Brigham (1982) utilized a 2-day versus 7-day delay and found both a significant CRE and a main effect of retention interval, particularly with regard to participants' response criterion. Although they failed to obtain a significant interaction between delay and the CRE, the authors nonetheless noted, "The detrimental effects of time delay might be expected to be especially strong in cross-race identifications since

the present study indicated that subjects of both races responded to other-race photos on the basis of a more lax criterion than they responded to same-race photos" (p. 264).

The CRE in Face Recognition versus Eyewitness Lineup Paradigms

Research on the CRE tends to utilize one of two paradigms: a facial recognition paradigm or an eyewitness lineup paradigm. The facial recognition paradigm, which is rooted in basic cognitive/memory research, involves presenting participants with a series of faces during a study phase and then testing recognition by presenting a second series of faces during a test phase. The faces presented during the test phase include some of those viewed during the study phase, as well as new faces not presented previously. This recognition framework is the most frequently utilized paradigm in the literature, in part because it allows for the calculation of signal detection theory measures of discrimination measures and response criterion (see Green & Swets, 1966). This paradigm, however, has been criticized for its lack of real-world applicability (see Lindsay & Wells, 1983). As a result, researchers concerned with the ecological validity of a facial recognition paradigm applied to the legal system have suggested the use of an eyewitness lineup paradigm, in which participants become "witnesses" to an event and a perpetrator. More specifically, participants are shown an event (either live or via film or videotape), including a target person or "perpetrator," and are subsequently asked to perform a lineup identification task in which the target person may or may not be present. In their meta-analysis across studies, Meissner and Brigham (2001) found that the CRE was observed reliably in both correct identifications and false identifications, regardless of the type of paradigm that was utilized.

The CRE in Facial Descriptions and Memory for Voice

Despite the fact that an eyewitness is likely to encode much more than simply a static face, little research has been directed at investigating the influence of the CRE on other aspects of the witness's experience, including his/her ability to verbally describe the suspect's face or to recognize the suspect's voice. The existing research suggests, however, that race may play only a minimal role in these areas. For example, Ellis, Deregowski, and Shepherd (1975) had 12 Black African and 12 White Scottish teenagers each describe a set of four faces (two faces of each race). Although they found that Black participants described more features than White participants did, and that Black faces elicited mention of a greater number of features than did White faces, they did not find a clear CRE in the verbal descriptions produced by participants. It is interesting to note, however, that participants of each race did utilize certain facial features more frequently. For example, Black participants mentioned aspects of hair position, eye size, whites of eyes, eyebrows, ears, and chin, whereas White participants more often reported iris color, hair color, and hair texture. Although Ellis and colleagues did not assess descriptions for accuracy or discriminability, they did note that White participants often reported rather

"redundant" descriptions of Black faces (e.g., "he has black skin, black, kinky hair and brown eyes") that would likely be indiscriminant upon later assessment (p. 123).

In his review of the voice identification literature, Yarmey (1995) noted that several studies have demonstrated that individuals are less accurate in identifying voices of an unfamiliar accent or racial background. For example, Thompson (1987) found that English speakers' recognition of voice was significantly impaired when the voice sample was in English but contained a notable Spanish accent or when the voice sample was in Spanish (see also Goggin, Thompson, Strube, & Simental, 1991). A research study conducted by Doty (1998) involving cross-national voice recognition found similar results, such that participants were better able to recognize voices from their own country (even if those voices were of a different race) than they were able to recognize voices from other countries.

The CRE in Children versus Adults

Although much of the research on the CRE has involved adult participants, researchers have also attempted to understand the extent to which the CRE is present in children. The first researchers to examine the CRE specifically in children were Cross, Cross, and Daly (1971), who studied the recognition memory of Black and White participants in three age groups (ages 7, 12, and 17). The authors found an overall CRE but did not provide enough additional information to break the effect down by age or race of participant. In another early study, Feinman and Entwisle (1976) also found a significant CRE for children (first, second, third, and sixth graders), with the White children showing a larger effect than Black children (consistent with what is often seen in adults; cf. Meissner & Brigham, 2001). In addition, Feinman and Entwisle also reported that the accuracy of children's recognition increased with age, although age failed to interact with the CRE.

Other studies have found a CRE at some ages but not at others. Thus, when Chance, Turner, and Goldstein (1982) looked at children in grades one through eight, as well as a comparison group of college students, they found a CRE that interacted with age, such that larger effects were observed as age increased. Unfortunately, research with children has not always found this developmental interaction or the CRE. For example, a study by Goldstein and Chance (1980) examined White children in first through sixth grades who viewed faces of White and Japanese individuals and were later tested for their recognition of these individuals. Although the authors found an overall increase in accuracy across age, there was neither a CRE nor an interaction between the CRE and age.

Several more recent studies have also found mixed results. Pezdek, Blandon-Gitlin, and Moore (2003) found evidence of the CRE in children. Using several modified videotaped lineups, Pezdek and colleagues found that overall accuracy increased with age, but the magnitude of the CRE did not vary with age. Lee and Goodman (2000) examined the ability of Asian and White children ages 5 to 6, 9 to 10, 12 to 13, as well as undergraduates, to recognize Asian, White, and Black faces. The researchers found that the size of the CRE varied at different ages and across different races. In particular, they found no evidence of the CRE in either the youngest (age 5 to 6) or the oldest (undergraduate) age groups. (This was somewhat surprising, given that the oldest group would

have been expected to perform similarly to adults in previous studies.) However, White children in the 9 to 10 and 12 to 13 age groups and Asian children in the 12 to 13 age group did display a significant CRE. The authors speculated that the unusual pattern could have occurred because of a cohort effect caused by the increasingly multicultural area (southern California) where the study had been conducted. In contrast to these findings, another recent study of Whites and Blacks in the Southeast (Bennett & Brigham, 2005) found evidence of a CRE in Whites at each of four grade levels (grades 2, 6, 10, and college), but not in Black respondents at any grade level.

Efforts to explain these inconsistencies have focused on the developmental aspects of facial processing. In particular, research has shown that children's facial recognition performance tends to increase with age, except for a small "dip" between the ages of 10 and 12 (e.g., Carey et al., 1980). Several researchers have argued that, before the age of 10, children encode and recognize faces via a featural encoding strategy (also known as piecemeal encoding) that focuses on isolated, salient features of individual faces (Carey, 1981; Carey et al., 1980; Chung & Thomson, 1995; Thomson, 1986; 1989). Older children, in contrast, utilize configural information relative to the global appearance of a face (also known as holistic encoding), which takes into consideration the relationship between various facial features. For featural encoding, as age and experience increase, children are able to scan faces in a more systematic and organized manner, thereby encoding more features that are relevant. The dip in performance around ages 10 to 12 could be due to difficulties in making the shift from the earlier featural encoding strategy to the utilization of configural information. From this perspective, the dip may represent a "growth error" or an "intermediate effect." Studies of the development of expertise in complex tasks, such as making medical diagnoses, have found similar temporary plateaus or dips in performance that are associated with acquiring new skills or knowledge (Patel, Arocha, & Kaufman, 1994; Schmidt & Boshuizen, 1993).

In contrast, other researchers have argued that there is not an age-related shift from one strategy to the other. Such studies indicate that young children do not engage in a qualitatively different kind of process for recognizing faces than do older children and adults (e.g., Baenninger, 1994); rather, older children and adults are simply able to encode more information of all types than are younger children (Flin, 1985; Flin & Dziurawiec, 1989; Thomson, 1986). Several reviews of this research have concluded that the most parsimonious explanation of the accumulated findings is that the manner of encoding facial information does not change with age; older children simply encode more facial information of all types, both featural and configural (Baenninger, 1994; Chung & Thomson, 1995; Flin & Dziurawiec, 1989).

One finding in the face memory literature has involved research on the face inversion effect—the phenomenon that inverted (upside-down) photos of faces are identified more poorly than inverted photos of other objects (e.g., houses, cars, etc.) (see Yin, 1969). Researchers have used this effect to investigate configural and featural processing. It has been argued that inverted faces are encoded in a featural manner, whereas upright faces are encoded with regard to their configural properties (Diamond & Carey, 1986). Research on the inversion effect in children has shown that children do not show as large an inversion effect as adults, perhaps because of their reliance on featural processing. Sangrigoli and de Shonen (2004a; 2004b) found that whereas young children

(age 3) showed neither the CRE nor an inversion effect, older children (age 4 and 5) showed both the CRE and an inversion effect. Furthermore, these effects interacted such that older children were better able to recognize upright faces of their own race and inverted faces of another race. Sangrigoli and de Shonen concluded that the CRE may begin to develop some time during early childhood, perhaps between 3 and 4 years of age.

The CRE in Elderly Adults

Little work has been conducted on older adults and the CRE. Eyewitness memory research has generally shown that older adults perform worse than younger adults on identification tasks (see Memon, Bartlett, Rose, & Gray, 2003). The only study to examine the CRE in older adults was conducted by Brigham and Williamson (1979). The authors had older adults (age 60 to 84) and younger adults (college students) take part in a recognition paradigm in which they viewed a series of own- and other-race faces and later attempt to recognize these individuals from a series of novel faces. Brigham and Williamson found that although the older adults performed significantly more poorly than the younger adults, they showed the same pattern of CRE as the younger participants.

The Diagnostic Value of Confidence in the CRE

In general, people tend to be less confident overall when making other-race identifications than when making same-race identifications (cf. Smith, Stinson, & Prosser, 2004). Research examining the utility of confidence as a postdictor of eyewitness identification accuracy has generally demonstrated a weak positive relationship (see meta-analyses by Bothwell, Deffenbacher, & Brigham, 1987; Sporer, Penrod, Read, & Cutler, 1995). Yet there appear to be some conditions in which a stronger relationship may exist. For example, when conditions vary widely across witnesses, greater confidence has been shown to be associated with greater identification accuracy (cf. Lindsay, Nilsen, & Read, 2000). Furthermore, initial judgments made with very high confidence under unbiased conditions have been shown to be quite diagnostic of witness accuracy (Juslin, Olsson, & Winman, 1996). Research suggests that the confidence-accuracy relationship is significantly *weaker* for other-race than for own-race identifications (Wright, Boyd, & Tredoux, 2001). Meissner, Brigham, and Butz (2005) found that individuals experienced a greater proportion of *false recollections* for other-race faces—namely, incorrect identifications made with high confidence. An awareness of this differential rate of false recollections and the lack of diagnosticity for other-race confidence ratings would seem to be useful for those who must evaluate a disputed cross-racial identification.

COGNITIVE AND SOCIAL PROCESSES THAT MAY AFFECT THE CRE

Given the prevalence of the CRE in eyewitness identifications, what cognitive, perceptual, or social processes might be responsible for the phenomenon? Several possibilities

have been suggested in recent years, including: (1) that individuals may have *less contact* with members of other races, resulting in an inability to recognize other-race faces; (2) that individuals may pay *less attention* to other-race persons and may "*cognitively disregard*" them, resulting in a *categorization response* that leads to poor encoding; (3) that individuals may focus their attention on *characteristics that are less useful* for distinguishing among other-race persons than for distinguishing among same-race persons; (4) that individuals may use a *different cognitive processes* for evaluating other-race faces than for same-race faces (e.g., shallower processing or a featural strategy); and/or (5) that individuals may have a *representational system that is optimized for the encoding of own-race faces rather than other-race faces*, thereby leading to the CRE. These possible mechanisms are reviewed below.

The Role of Interracial Contact and Attitudes in the CRE

Many theorists have asserted that the amount of contact one has with members of a group will affect recognition ability, such that more experience and contact should lead to better recognition. One of the earliest theorists to mention the possible involvement of contact in the CRE was Feingold (1914), who asserted "all other things being equal, individuals of a given race are distinguishable from each other in proportion to our familiarity, to our contact with the race as a whole" (p. 50). This theory seemed fairly promising with regard to the CRE and was proposed by several other researchers within the area (e.g., Brigham & Malpass, 1985; Chance & Goldstein, 1996; Ng & Lindsay, 1994).

A number of studies with adults have attempted to identify the role of contact in the CRE, with varying levels of success. Some studies have found a smaller CRE in individuals who reported more interracial contact (Brigham, Maass, Snyder, & Spaulding, 1982; Carroo, 1986, 1987; Cross, Cross, & Daly, 1971; Lavrakas, Buri, & Mayzner, 1976). For example, an eyewitness field study conducted by Brigham and colleagues (1982) indicated that self-reported interracial experience was significantly related to cross-racial identification accuracy for White convenience store clerks. Other studies, however, have not found any relationship between contact and the CRE (Brigham & Barkowitz, 1978; Malpass & Kravitz, 1969; Ng & Lindsay, 1994; Swope, 1994), and still other studies have yielded mixed results (Chiroro & Valentine, 1995; Platz & Hosch, 1988). In their meta-analysis of the CRE, Meissner and Brigham (2001) identified 29 studies that measured self-reported interracial contact and found that it accounted for "a small but reliable" amount of variability, approximately 2%. Interestingly, a moderator analysis of this relationship showed that the influence of interracial contact on the CRE has increased over the years, such that more recent studies have yielded larger correlations (see Meissner & Brigham, 2001). This effect over time may be due to a cohort effect, in which individuals have had more opportunity for interracial contact in recent years, or to improvements in the precision of estimating interracial contact in more recent studies.

Rather than using questionnaires to assess contact, other researchers have attempted to study groups that are presumed to have limited contact with one another. Chance, Goldstein, and McBride (1975) found that Japanese faces (as compared with Black or White faces) were most poorly recognized by both White and Black participants, presumably because these participants had the least amount of contact with Japanese individuals. A study by Galper (1973) found that White students in a Black studies class displayed less of a CRE than did other White students in a psychology class, and a study by Li, Dunning, and Malpass (1998) found that White individuals who said they frequently watched NBA basketball showed less of a CRE than individuals who rated themselves as basketball novices (see also MacLin, Van Sickler, MacLin, & Li, 2004). Shepherd, Deregowski, and Ellis (1974) used African and European participants who had little or no contact with other-race individuals and found a significant CRE for both races, leading them to conclude that "the results are consistent with the hypothesis that people learn to discriminate among faces of the members of their own group as a result of frequent experience with them" (p. 210). Several other investigators have found similar results with African and British participants (Chiroro & Valentine, 1995; Wright, Boyd, & Tredoux, 2001).

The contact perspective suggests that positive attitudes toward other racial groups, which hypothetically should be associated with greater levels of (positive) intergroup contact, should be positively correlated with ability to recognize members of that group (see Meissner & Brigham, 2001). Furthermore, one could speculate that negative intergroup attitudes could motivate one to avoid contact with members of the disliked group, or to limit contact to very superficial interactions, thereby constraining the opportunity to develop expertise in distinguishing between other-race faces (Chance & Goldstein, 1996). In addition, one could speculate that negative attitudes toward another race could lead people to cease processing a face once it has been categorized as belonging to the disliked group (Brigham & Malpass, 1985). However, several studies that directly measured racial attitudes in adults have failed to find a relationship between attitudes and the CRE, casting doubt upon this explanation (Brigham & Barkowitz, 1978; Lavrakas et al., 1976; Platz & Hosch, 1988; Slone, Brigham, & Meissner, 2000). Across studies, Meissner and Brigham (2001) found that racial attitudes were not significantly related to the CRE.

As noted earlier, several studies have found the predicted relationship between negative attitudes toward a group and less self-reported contact with members of the disliked group (e.g., Brigham, 1993; Slone et al., 2000), as more prejudiced Whites and African Americans generally reported less interracial contact, both in the past and in present-day interactions, than did less-prejudiced persons. Reflecting these findings, the Meissner and Brigham (2001) meta-analysis found that racial attitudes and amount of interracial contact were significantly related to one another, suggesting that perhaps racial attitudes can play an *indirect* role in the CRE by influencing the amount and quality of contact that people have with other-race individuals.

Overall, it appears that although contact plays a small role in the CRE, it may be the *quality* of the contact, rather than the quality, that is related to the CRE. Although attitudes do not appear to have a direct effect on the size of the CRE, there is evidence that

attitudes may indirectly influence the CRE by influencing both the quantity and quality of contact with members of other races.

Differential Attention and "Cognitive Disregard" for Other-Race Faces

Many observers have noted how in-group members may behave as if out-group members are "invisible" to them, perhaps by a process that Rodin (1987) labeled "cognitive disregard." She proposed that people conserve their cognitive resources by using a strategy in which some strangers (e.g., out-group members) are recognized and categorized only at a superficial level and no individual or individuating information is sought or stored. Rodin (1987) proposed that people may try to conserve their resources by paying more attention to those individuals who are part of their in-group. If this is the case, then we would expect that out-group members might be categorized and later recognized at a very superficial level. Although the labels of in-group versus out-group are not limited to distinctions of race, in the case of the CRE this theory would assume that people would pay more attention to individuals of their own race, as they might feel on some level that recognizing those people would be of the most importance to them.

Research on the CRE has found that when encoding faces of another race, individuals appear to focus upon "race" as a preeminent feature. Levin (1996, 2000) termed this a "facilitated classification process" in which individuals automatically categorize faces in a race-specific manner and ignore other individuating information (quite consistent with Rodin's [1987] notion of cognitive disregard). If this occurs, Levin suggested that it should interfere with later recognition of other-race faces and result in a tendency to respond "seen before" at recognition. In support of this theory, Levin has found that participants who performed more poorly when attempting to recognize Black faces were paradoxically quick to detect or classify them as racial out-group members. Utilizing a set of "ambiguous race faces," MacLin and Malpass (2001, 2003) similarly demonstrated that racial categorization may drive the perceptual encoding process and thereby hinder the encoding (and subsequent recognition) of other-race faces.

How does contact enter into the equation? Levin (2000) asserted, "The failure of the contact hypothesis [*note that the Meissner and Brigham (2001) meta-analytic results indicate that* failure *is too strong a term*] is mysterious because at some level it *has* to be true unless one points to an innate inability to accurately code CR [other-race] faces." Perhaps, as Levin (1996, 2000), MacLin and Malpass (2001, 2003), and others (e.g., Shepard, 1981; Valentine, Chiroro, & Dixon, 1995) have suggested, recognition of other-race faces will be improved only by contact that involves processing those faces with the *goal* of individuation—a notion quite related to that of "social utility" put forth by Malpass (1990). As a result, Levin pointed out that a categorization response should only operate when the other race is a numerical minority in the population (e.g., Blacks in the United States). Meissner and Brigham's (2001) meta-analysis provided some support for this prediction, as the magnitude of the CRE, as measured by false alarms or by a measure of discrimination (d' or A'), was found to be significantly greater for White perceivers than for Black perceivers or other "minority" groups.

Encoding of Features That Are Less Diagnostic for Other-Race Faces

An alternative reason for the CRE is that the phenomenon might result from attention being paid to facial features that are useful and informative for faces of one's own race but are relatively uninformative for distinguishing among persons of another race. If certain facial features or characteristics are useful in aiding one to discriminate between members of one's own race, one might continue to focus on those features when evaluating other-race faces, even if a different set of features might be more informative. In support of this hypothesis, Ellis, Deregowski, and Shepherd (1975) found that British Whites and African Blacks tended to focus on somewhat different characteristics when describing faces. Consistent with this study, Shepherd and Deregowski (1981) found that White participants considered several characteristics of hair (color, texture, and length) that did not seem to be as important to the Black participants, who were more likely to consider nose breadth and skin tone.

In an early expression of the idea that encoding systems can be more useful for some sets of faces (e.g., same-race faces) than other sets, Goldstein and Chance (1980) and Chance, Turner, and Goldstein (1982) proposed that developmental differences in the CRE could be explained by schema theory. According to the theory, schemas develop through experience and interactions with stimuli, in this case faces. The "schemata function by producing expectations, by determining which aspects of the stimuli will be attended to, by reducing necessity for conscious, voluntary processing to a minimum, by making attending and encoding automatic yet accurate and exceptionally quick" (Goldstein & Chance, 1980, p. 48). Facial processing is assumed to improve as the frequency of exposure to a specific class of stimuli increases; however, facial rigidity may also occur, which is a reduction of flexibility due to overlearning of a class of stimuli (Goldstein & Chance, 1980). Schema theory predicts that schemas develop with age and aid recognition of faces of the familiar class. Therefore, as children get older and have more experience with faces, they become increasingly tuned to faces of their own race and are better able to discriminate between members of that class. They are also less able to discriminate between members of other, less familiar, classes. Therefore the difference between own- and other-race recognition ability should increase with age.

Differential Cognitive Processing of Own- and Other-Race Faces

An early candidate for a cognitive process that might affect the CRE was differential *depth of processing*. Researchers proposed that same-race faces would be cognitively processed at a deeper level, leading to better subsequent recognition (Chance & Goldstein, 1981); however, research findings have not generally supported the depth-of-processing hypothesis. Several studies that attempted to manipulate depth of processing, via instructions to make superficial (e.g., size of facial features; racial classification) or deep (e.g., friendliness or intelligence) judgments, did not find that deeper-processing instructions significantly affected the CRE (Chance & Goldstein, 1981; Devine & Malpass, 1985;

Sporer, 1991). The most consistent finding appears to be that shallow-processing instructions impair memory for all faces, regardless of race (Chance & Goldstein, 1996).

It is possible, however, that individuals might use different encoding processes when viewing own- and other-race faces. In a series of studies, Diamond and Carey (1986) showed that the previously discussed inversion effect was not unique to faces, but rather occurred when participants had a great deal of experience with the stimulus materials. In particular, inversion appeared to disrupt the effectiveness with which individuals were able to encode stimuli that were highly familiar to them. Diamond and Carey believed that this effect stemmed from experienced participants' reliance upon *configural* (or relational) properties of the stimulus. Novice participants, on the other hand, relied upon only the *featural* (or isolated) aspects of the face that were less influenced by inversion. A number of subsequent studies have supported this general configural-featural hypothesis (see Farah, Wilson, Drain, & Tanaka, 1998).

The notion that expertise leads to configural processing has also been applied to the CRE. Rhodes, Brake, Taylor, and Tan (1989) proposed that greater experience with own-race faces would lead to a larger inversion effect, because of an increased reliance upon configural information. The encoding of other-race faces, on the other hand, should not be as inhibited by inversion, because of a focus on featural aspects. As hypothesized, Rhodes and colleagues observed that own-race faces were significantly more susceptible to inversion than were other-race faces for measures of both reaction time and accuracy (see also Fallshore & Schooler, 1995; MacLin et al., 2004). It should be noted, however, that other studies have failed to observe this interaction of inversion with the CRE (Buckhout & Regan, 1988; Burgess, 1988).

Different Representational Systems for Own- and Other-Race Faces

A final possibility, one quite related to the two previous theories, concerns the way that own- and other-race faces may be stored in memory. Valentine's (1991) "multidimensional face space model" is an "exemplar-based" model that assumes that specific faces are stored as category exemplars. The model proposes that both own- and other-race faces are encoded as locations (points, nodes) in a multidimensional space, and that these representations are distributed from a central exemplar with respect to their typical or distinctive aspects. Familiar individual faces are represented as points, and face categories (such as race) are represented as different clusters or "clouds" of points (Levin, 1996). When one is identifying a previously seen face, the nearest and therefore most active node will be chosen as the correct one for that face. This model generally accounts quite well for the empirical recognition findings without involving the storage and abstraction of a face-related norm.

Because "the dimensions of the space are *based on experience with faces of predominantly one race*, the feature dimensions underlying the multidimensional space will be those that are appropriate for discriminating one particular race of faces" (Valentine, 1991, p. 190, italics added). Representations of other-race faces are more densely clus-

tered in the multidimensional space because the dimensions of the space are most appropriate for own-race faces. Recognition is thus impaired for other-race faces because an other-race face activates many neighboring nodes in the dense cluster of representations for other-race faces (Byatt & Rhodes, 1998; Valentine & Endo, 1992). There are two minimum requirements for the type of contact that would be necessary to learn the statistical structure of a new group of other-race faces. First, one must have a need to recognize other-race individuals, and second, "contact must require the individual to recognize a sufficient number of other-race faces to *enable* the statistical structure of the population of other-race faces in the face space to be abstracted and to *require* that the structure is abstracted in order to be able to recognize the necessary individuals" (Valentine et al., 1995, p. 87, italics in original).

Sporer's (2001) In-Group/Out-Group Model

In his In-Group/Out-Group Model (IOM) of the CRE, Sporer (2001) attempted to bring together these varied social-cognitive explanations. Sporer's IOM assumes that a default or automatic process occurs when an individual encounters an own-race (or in-group) face, such that encoding involves deeper level processing with the individual focused upon relevant, configural properties, or dimensions of the face that are useful for distinguishing it from other, similar faces in memory (consistent with Valentine's, 1991, face space model). In contrast, when an individual encounters an other-race (or out-group) face, racial characteristics first signal an automatic categorization response. This categorization response may then be linked to other cues to cognitively disregard such faces and may result in attentional processes being allocated elsewhere. This categorization may also signal that less effort should be extended in the encoding process, thereby leading to shallow (or feature-based) encoding of the face, and may signal stereotyping processes that lead to improper inferences regarding salient characteristics of the face in memory. Given the greater homogeneity in the representation of other-race faces resulting from the lack of distinctiveness effects, Sporer's IOM also predicts an effect on response bias such that individuals will be more liberal in responding to other race faces (consistent with the general empirical literature; see Meissner & Brigham, 2001). The model also proposes to account for other in-group/out-group phenomena in the facial memory literature, such as the effects of age (Wright & Stroud, 2002) and gender (Slone et al., 2000).

RECOMMENDATIONS FOR COLLECTING CROSS-RACIAL EYEWITNESS EVIDENCE

In the late 1990s, a subcommittee formed by the American Psychology-Law Society proposed a set of recommendations to be used in eyewitness identification procedures (Wells et al., 1998). Although these recommendations do not specifically deal with cross-race situations, they can be considered a starting point for the best possible outcome in all eyewitness procedures. Wells and colleagues presented four rules that they felt would

decrease the risk of false identifications. First, a *double-blind* procedure should be used when eyewitness identifications are conducted, in which the lineup administrator is unaware of the position or presence of the suspect in the lineup. This would prevent any influence (intentional or not) that the administrator might have on the choice of the eyewitness. Second, eyewitnesses should be given *unbiased instructions* that warn that the suspect *may or may not* be part of the lineup. Including this simple instruction may serve to decrease the number of false identifications made by eyewitnesses. Of course, false identifications are most prominent in the CRE, and any lineup instructions that might heighten the criterion of other-race witnesses may reduce the possibility of bias at identification.

Third, Wells et al. (1998) suggested that the suspect in the lineup should *not stand out in any way* from the other individuals used as foils (or distractors). In practice this means that the suspect should not have his or her picture taken from a different angle, or be the only one wearing a prison jumpsuit, or the only person with a certain hairstyle named in the description. Potential lineups can be tested by showing them to mock witnesses who have read the description of the suspect but did not witness the crime. In a well-constructed lineup the suspect will not be identified by the mock witness at more than chance levels (see Brigham, Meissner, & Wasserman, 1999, for more information on this procedure).

Research by Brigham and Ready (1985) demonstrated that the CRE effect also shows up in the construction of lineups. Blacks and Whites in their study were given a target photo and asked to go through a stack of facial photos (of persons of the same race as the target person) until they had picked out five photos that were "similar in appearance" to the target photo. This is the same task that a lineup constructor might carry out in selecting foils for a photo lineup. Both Blacks and Whites went through more photos when looking at own-race persons—that is, they had a stricter criterion for "similarity" than when viewing photos of other-race persons. Hence, the lineups that would result would be fairer (higher similarity between suspect/target person and foils) when the lineup constructor was of the same race as the lineup members. Several other studies have demonstrated similar effects of race on the assessment of lineup "fairness" (Brigham, Ready, & Spier, 1990; Lindsay, Ross, Smith, & Flanigan, 1999). Taken together, we recommend that lineups be constructed and assessed by investigators who are of the same race as the suspect.

The fourth recommendation put forth by Wells et al. (1998) was that the eyewitness should be asked about his or her *confidence* in the identification choice (either a positive identification or a nonidentification). Although confidence has been shown to be only minimally related to accuracy (e.g., see Bothwell, Deffenbacher, & Brigham, 1987), it is often very influential at trial. Between the initial identification and trial an eyewitness may experience an inflation of confidence, sometimes referred to as "confidence hardening," which can be due to many factors, such as learning about other evidence, being prepped by prosecution attorneys, wanting to be forceful on the witness stand, and so forth. It would thus be useful to have a statement of the initial confidence level reported by the eyewitness. Given the research, discussed previously, regarding the nondiagnostic

nature of confidence in other-race identifications (Meissner et al., 2005; Smith et al., 2004; Wright et al., 2001), we recommend additional caution in relying upon postidentification confidence statements provided by other-race witnesses.

One final issue that appears particularly pertinent to cross-racial identification situations regards the initial *person description* that is provided by the witness. Although no differences in the accuracy of own- versus other-race descriptions has been shown, research has shown that own-race observers are particularly sensitive to characteristics that differentiate between members of their own race, such as skin tone and hair styles for African Americans (Shepherd & Deregowski, 1981). Therefore, it would seem desirable for the initial descriptions to be garnered by an investigator who is of the same race as the perpetrator, because this individual would be better able to inquire about characteristics that are particularly diagnostic in differentiating between persons of the perpetrator's (and investigator's) race.

IMPORTANT REMAINING RESEARCH QUESTIONS

In our view, there are two major areas where a host of important research questions remain. The first area concerns the origin of the CRE and its developmental course through childhood. The second critical area is whether the CRE is reduced or eliminated by practice or training.

As reviewed above, only a handful of studies have investigated the CRE in childhood, and even these few studies have yielded inconsistent results. One can make different predictions about this issue, depending on whether the CRE is seen as biologically based or as resulting from experience (e.g., cross-racial contact). Some scientists have proposed that face recognition is a unique perceptual/cognitive process involving a face-specific "module" in the brain (see Brigham, 2002, for a brief review). A module has been defined as a mandatory, domain-specific, hardwired input system that performs innately determined operations (Fodor, 1983). There are two ways in which modularity can be conceived: as the existence of a specific part of the brain (a processing system) that processes faces in a way similar to that of other systems (specificity), or in terms of a process of recognizing faces that is qualitatively different from recognizing other stimuli (uniqueness) (Hay & Young, 1982). These concepts are theoretically independent of one another, and both have been invoked as evidence for modularity (Tanaka & Gauthier, 1997). From this perspective, face recognition is seen as "special," a unique process mediated by a separate face-specific module in the brain that is biologically endowed and relatively unaffected by experience. If one accepts the modularity position, a logical extension could posit that such modules may be *race-specific*, just as they are species-specific. From this perspective, the CRE could be seen as a natural outcome of a race-specific face-recognition module that is present throughout life.

In contrast, the skill (or expertise) hypothesis asserts that the recognition of faces is not a unique process, but rather occurs in the same way as recognition of other objects. Both hypotheses assert that face recognition will improve through childhood, but for

different reasons. The modularity hypothesis attributes improvement largely to the maturation of the face-recognition module, whereas the skill position attributes improvement with age to extensive experience with faces. Forensically, these theories have different implications for face recognition (e.g., identifications from lineups) of children. If face recognition is an innate skill, then perhaps the experiences of the child are not relevant to the likelihood that the child can make an accurate identification decision. In contrast, if face recognition is a learned skill, then the amount of experience that the child has had in recognizing faces of strangers could be seen as important for determining how much confidence one should have in the accuracy of the child's identification decision.

If the second position is more accurate, and contact/experience plays a key role in face-recognition ability, then an important question is: How and when does this effect become strong? Will very young children who have had little experience with recognizing strangers' faces (of either race) show no CRE in face recognition? That is, might the overall contribution of experience to creating the cognitive conditions for the CRE in recognition memory be less in these younger children, who have fewer experiences overall? Alternatively, if the CRE is biologically based (e.g., a race-based face-recognition module), or if it can be created by very early experiences with same-race faces (e.g., parents, siblings), might the CRE be stronger in very young children who as yet have had virtually no experience in distinguishing between other-race faces?

Several interesting research questions remain concerning the development of the CRE in children: (1) Is there an own-race bias in children's recognition memory for faces of adults? (2) Does the magnitude of the CRE differ for children of different ages? (3) Is the magnitude of the CRE in children related to the degree of contact/experiences with other-race persons? (4) Is the CRE of comparable magnitude among children from different ethnic groups or in different societies? (5) Do children of mixed racial ancestry show the CRE for both, one, or neither race?

Several different patterns for the development of the CRE can be postulated. If the CRE is present early in childhood, perhaps because of a face/race-specific module, and remains consistent into adulthood, then no age-related changes in magnitude would be visible. In contrast, if the CRE develops as a consequence of differential contact/experience with own- and other-race individuals, then there would be no CRE in early childhood, but it would develop later on, as more experiences accrue with own- than with other-race people. Finally, one could posit that both of these effects occur, producing a relatively small CRE effect in early childhood that grows in size with age. These developmental trends might be made more complex by a leveling off or decrease in performance at ages 10–14 due to the dip in performance at this age that has been observed in some previous studies. So, although the CRE has been a consistent finding with adults (Meissner & Brigham, 2001), there is simply not enough evidence with children's memory for other-race faces to come to conclusions as to its appearance in children or the origins of the effect in general.

One thing that is not known, for children or for adults, is whether there is a CRE for *descriptions*, as well as for identifications. If a child is describing a person of his or her own race, is that description more likely to be accurate than might a description of an other-

race person? This might seem to be a logical extension of the other-race effect in recognition memory, but it may not be so simple. Description memory, unlike recognition memory, may benefit from featural encoding processing. And, as noted, there is some reason to believe that cognitive processing of other-race faces is more likely to involve featural processing than is the processing of same-race faces (cf. Fallshore & Schooler, 1995). If so, this could produce *better* descriptions of other-race faces than of same-race faces, because descriptions mainly involve features. This is purely conjecture at this point, because not much pertinent research addressing this possibility has been carried out. One preliminary study on this issue found no evidence of a CRE in descriptions given by White or Black adult perceivers (Dore, Brigham, & Buck, 2004).

The second major issue is whether adults can be trained to become better at other-race identifications. There are a number of mechanisms by which training or experience could improve memory performance by improving their cognitive strategies or by acquiring relevant knowledge (Kuhn, 1992). More specifically, these include improving processing efficiency, improving encoding and representation, improving strategy selection and regulation, improving the execution of strategies, improving processing capacity, and increasing domain-specific knowledge (Klahr, 1992; Poole & Lamb, 1998). A handful of studies in the 1970s and early 1980s investigated training adults in cross-race recognition, with mixed results. Elliott, Wills, and Goldstein (1973) found that Whites trained on a paired associates task with White and Japanese faces showed improved performance on Japanese faces immediately after training. Goldstein and Chance (1985) used a similar training technique and found that improved performance for Japanese faces persisted up to 5 months after the training. Other training studies, however, found that training had no effect on memory for other-race faces (Malpass, 1981; Woodhead, Baddeley, & Simmonds, 1979) or found that the effects of training were inconsistent and temporary (Lavrakas, Buri, & Mayzner, 1976; Malpass, Lavigueur, & Weldon, 1973). Hence, it is unclear at this juncture whether or not systematic training can reduce or eliminate the CRE, and the temporal nature of any change that occurs is also unclear. Indeed, it appears that investigators in the past two decades have not even found this to be an interesting empirical question, given the paucity of recent published studies.

Given that there have been no published studies of training with children, we (Brigham, Bennett, & Butz, 2005) carried out a series of studies designed to provide participants with experience in distinguishing between other-race faces in a user-friendly, game-like situation. Our goal was to see if this can improve their ability to make cross-race identifications and thereby reduce or eliminate the CRE. We developed a modification of a memory game that provides practice in making distinctions between faces as well as immediate feedback on accuracy. In each game, participants view a 4 by 5 grid of 20 face-down cards on a computer screen, with a head-and-shoulders photo of an adult on the other side of each. The participant turns over any two cards by mouse clicks; if there is a match (i.e., the identical photos, or two different photos of the same person) the selected cards disappear from the board; otherwise they are turned face-down again. The participant's task is to remember where the various types of cards are for future trials and to remove all the cards in as few trials as possible. Each participant plays the game six times, either with sets of same-race faces, with six sets of other-race faces, with

nonface objects, or a control game is played that does not involve face memory (pinball). After a short distractor task, all get a standard face recognition memory task in which they see 24 faces (of the same race as in the memory game, but none of the same persons). After a short break, they are shown 48 new faces, which include different photos of the 24 seen previously. Their task is to say whether each face is new or old (seen previously).

Prior to using this new paradigm with children, we conducted two initial studies with college students, Blacks and Whites. The first study, involving 42 Blacks and 55 Whites, was designed as above, and in the second study, 25 Blacks and 59 Whites had the additional task of verbalizing the reasons for their card choice in each trial of the last three memory games. As predicted, in both studies we found a significant three-way interaction [race of participant X race of face (indicative of the CRE) X training condition] on both mean accuracy scores (*A′*) and on a measure of response criterion. However, examination of the means indicated that it was *not* the cross-race training that accounted for the effect. Rather, the own-race training produced a more liberal response criterion (i.e., responding "seen before" in the recognition task) for own-race faces, similar to what is typically seen for other-race faces. Because this produced too many "seen before" responses, it led to poorer recognition scores for own-race faces. Hence, the CRE was not present for those in the own-race training conditions in either study, but it was still present for those in the other-race training conditions, as well as those in the control conditions. Verbalization had no significant impact on accuracy or response criterion.

These findings are provocative, indicating that the memory game paradigm can affect subsequent memory performance, in terms of both accuracy and response criterion. However, the direction of this effect was not as predicted, at least when college students were studied. Studies are currently under way that employ this paradigm with children of both races in grades 2, 6, and 10, to see whether the training may affect them differently. Our preliminary results illustrate the complexity of this area, and the possible effect of training is an issue about which much remains to be discovered.

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