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Effects of Integrative Memorial and Cognitive Processes on the Correspondence of Eyewitness Accuracy and Confidence

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Reported correlations between accuracy and certainty of eyewitness identifications are sometimes positive, but equally often nil. Examination of theory and research in eyewitness, cognitive, and social psychology suggests that these discrepancies are due to differential instigation of integrative memorial and cognitive processes across eyewitness situations. These processes occur unconsciously and therefore may alter either memory or confidence independently of each other. As a result, accuracy-confidence correspondence should be inversely related to the extensiveness of reconstructive memory processes (which change memory but not confidence) and/or suggestive social influences (which change confidence but not memory). Non-correspondence is expected when memory is altered by inconsistent information, a criminal stereotype, or a descriptive label of the suspect; or when confidence is altered by factors that promote commitment to testimony or trust in facial memory. It is suggested that police and lawyers avoid behaviors that facilitate these effects and that, along with jurors and possibly even witnesses, they be informed that confidence is often a poor index of accuracy.

INTRODUCTION

With increasing frequency, empirical studies of eyewitness memory have examined the relationship between the accuracy of an eyewitness identification and the confidence with which it is made. In a careful review of 25 such studies, Deffenbacher (1980) found that the reported accuracy–confidence correlations are divided almost equally into those that are significantly positive (though mostly modest) and those that are nil or negative. This distribution renders it highly improbable that there is a

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generally robust relationship between the two variables, since this assumption would imply that nearly half the relevant studies contain methodological or measurement artifacts that mask the relationship. Indeed, there is little consistent evidence for even one of the most reasonable artifactual causes of low accuracy–confidence correspondence—the possibility suggested by Deffenbacher that laboratory-study subject-witnesses cluster at low levels of confidence, thus restricting the range of one critical variable. Leippe, Wells, and Ostrom (1978) found that both accurate and inaccurate witnesses (who were equally confident on the average) were spread over the entire range of a 10-point confidence scale. And in a study that found only a small (but significant) accuracy–confidence correlation of +.29 (Wells, Lindsay, & Ferguson, 1979), subject-witnesses made an average confidence rating of 6.6 on a 9-point scale. Thus, at present, it seems reasonable to regard the accuracy–confidence relationship as indeed unreliable, or at least highly dependent on factors that have yet to be clearly identified by empirical research.

Should this conclusion hold in future research, it should rank among the most important, and perhaps surprising, outcomes to yet emerge from the growing empirical literature on eyewitness testimony. As Deffenbacher observed in his discussion of eyewitness confidence, the U.S. judiciary considers confidence a key criterion for evaluating witness credibility (*Neil vs. Biggers,* 1972) and we now have empirical evidence (Wells, Lindsay, & Ferguson, 1979) that jurors are profoundly influenced by the outward confidence of witnesses. Thus, in light of current research, instances of judges and jurors discounting the accurate but uncertain witness or, worse, being firmly persuaded by the confident but inaccurate witness, are probably common courtroom happenings. On a more optimistic note, however, a firm understanding of the accumulating data on the accuracy–confidence relationship may lead to important insights about those criminal justice procedures that distort witness confidence or promote its misuse in the courts, and, in turn, to recommendations about how these system variables (Wells, 1978) might be changed. Later in this paper, some such practical implications of research on confidence and accuracy will be advanced. First, however, we must examine why we ordinarily might expect accuracy and confidence to correspond and why, in fact, they often do not.

WHY MIGHT WE EXPECT MEMORY ACCURACY AND CONFIDENCE TO BE CORRELATED?

Contemporary models of memory are replete with concepts that imply that people should be more certain of their memory for information that is well learned. For example, some theories (e.g., Wickelgren, 1970) assume that accurate memory is a function of the strength of a memory trace, which itself depends on the amount of experience with the memory item. Strong memory traces are further presumed to be more readily accessible and less apt to be confused with other traces. Thus, well-learned material is retrieved not only more accurately, but with greater speed and clarity. These latter characteristics may help people "sense" the likely accuracy of their specific memories. Another view is that accurate recognition memory is a positive function of the number of attributes of the stimulus that have been encoded

and retained in a memorial representation of the stimulus (cf. Bower, 1967). Here, one could argue, the variable that determines recognition, in this case the number of encoded attributes that match the actual stimulus, also should help individuals discern the probability that their recognition decisions are correct.

On the empirical side, numerous experiments have found that confidence judgments about whether or not a verbal item (e.g., a nonsense syllable) appeared in a previously presented list are sensitive to the probability that the item was in fact presented (cf. Murdock, 1974). Thus, some theory and some research findings converge on the conclusion that people can detect just how good their memory for specific information is.

WHY MIGHT WE EXPECT NO CORRESPONDENCE BETWEEN ACCURACY AND CONFIDENCE?

Why then do the data cast ominous doubt on this conclusion in the forensically interesting case of recognition of a criminal's face? The position taken here is that the eyewitness memory situation (as well as perhaps the majority of real-life memory experiences) differs from the idealized pictures of memory outlined above on a crucial dimension; namely, the extent to which reconstructive memorial and cognitive processes play a role in the formation and retrieval of a stored representation of a face, a situation, etc. Memory for complex objects and events involves the integration of sensory information with preexisting ideas and memories, as well as with other pieces of related information that may be introduced later in time. As one memory researcher has put it, "much that is encoded into memory is a distillation of what has been experienced, modified, selected, and rephrased by our cognitive systems, using existing cognitive structures" (Morris, 1978, p. 71). In recognizing the potential for memory alteration via reconstructive, integrative processes, however, it is important to note also that these processes vary in magnitude or influence across different memory tasks. Memory tasks involved in traditional studies of item recognition, for example, usually engage reconstructive processes to a minimal degree. The subject, aware that memory will be measured later, is presented with a list of fairly simple items such as words or nonsense syllables, shown one at a time. After this list is presented, a test phase begins in which the subject is presented with more items, and asked to judge whether each appeared in the original list. In this "warned" memory situation, subjects are compelled to use whatever strategies they can muster to memorize the items and keep them separate in memory. The retention interval is brief, reducing the opportunity for constructive processes to operate. And the memory items and experimental context are so unusual as to make it unlikely that much integration with existing memory structures will occur. In short, this situation involves more *reproductive* memory than reconstructive memory (Murdock, 1974). It may be contrasted with the eyewitness situation where there is no warning of a future memory test, the retention interval is long and may provide much additional relevant and possibly inconsistent input, and the stimulus item (e.g., a face) is similar to innumerable others encountered on a daily basis.

As many have argued [see Loftus, Miller, & Burns (1978), for example],

reconstructive processes may commonly cause inaccuracies in eyewitness memory. But there is more to this influence. A major premise advanced here is that, *as reconstructive processes become more extensive, the accuracy–confidence relationship should become correspondingly smaller.* The reason for this is that, while people may have a veridical feeling about how accessible or "strong" their memorial representations of objects are, they are not likely to be *conscious* of the transformations that these representations may have gone through during encoding, storage, and retrieval. This anti-introspectionist assumption seems well represented in cognitive psychology. Neisser (1967), for example, has proposed that "the constructive processes [of encoding perceptual sensations] themselves never appear in consciousness, their products do," a fate that "seems to fit the higher mental processes as well" (p. 301). More recently, Nisbett and Wilson (1977) have concluded that "recent research has made it increasingly clear that there is almost no conscious awareness of perceptual and memorial processes" (p. 232). It would seem, by implication, that if people are unaware of whether and to what extent there have been internally produced alterations of their memory, they should be poor judges of the accuracy of their recollections if indeed such alterations occurred.

Social psychologists have taken the unconsciousness-of-mental-processes idea a step further by showing that people are often unaware that an *external* stimulus has importantly influenced their thinking and behavior (cf. Nisbett & Wilson, 1977). This implies that eyewitnesses might not recognize that subtle social stimuli, such as leading questions from a police interrogator, may have distorted their memory for the transgressor's face. It also implies that eyewitnesses might not be cognizant of social variables (such as pressure that induces commitment to an identification) that bolster their confidence but do not improve accuracy of memory. Hence, a second premise can be advanced: Whereas we have seen that memory can be altered independently of consciousness and thus confidence, it may also be the case that, via unconscious integration of social imputs, confidence can be altered independently of memory. *As social influences increase, the correspondence of accuracy and confidence should decrease.*

We have seen, then, that people potentially can predict the likelihood that their memories are accurate, in that subjective feelings about the "strength" or "immediacy" of a memorial image may correspond to how well the image was learned. However, since memorial and cognitive organization and integration are normally beyond conscious awareness, and since even a reconstructed, altered image may remain subjectively "strong," this correspondence will decrease as the trace-altering effects of reconstructive memory processes accumulate. Conversely, correspondence also will decrease whenever the memory trace remains relatively *constant* but changes in subjective memory strength or confidence are brought about by unconscious integration of new cognitive inputs.

UNCONSCIOUS INTEGRATIVE PROCESSES AND THE "OPTIMALITY" OF INFORMATION-PROCESSING CONDITIONS

In terms of the factors that influence accuracy–confidence correspondence, these hypotheses are very similar to Deffenbacher's *optimality* hypothesis. This hypothesis

states that the more optimal the information-processing conditions at the witnessing, intervening, and identification stages of an eyewitness saga, the greater the accuracy–confidence correspondence. That is, according to Deffenbacher, when conditions are conducive to forming and holding a clear, accurate memory, the accuracy–confidence relationship will be correspondingly high. In essence, many of the conditions that define *low* conduciveness or optimality for Deffenbacher can be viewed as conditions that foster reconstructive, trace-altering memory processes (e.g., inconsistent information during the retention interval, low familiarity with the target). Other conditions enhance the likelihood that a subtle, reconstruction-produced distortion of memory will actually contribute to a false, yet confidently offered, identification (e.g., high similarity of target and foils in the identification test). And still other of Deffenbacher's low optimality conditions may promote unwarranted and unconscious cognitive reevaluations of the certainty of memory (e.g., biased testing instructions, the making of an identification despite awareness that it was *not* a forced-choice test).

By recasting the optimality conceptualization in this fashion, some important benefits accrue. First, the focus on integrative memorial and cognitive processes allows us to define more explicitly just what makes certain aspects of the eyewitness experience nonoptimal. Second, and perhaps more important in the present context, the present conceptualization attempts to explain *how* optimality affects the accuracy–confidence relationship. The effects of optimality on accuracy are rather intuitively clear, but Deffenbacher's hypothesis, unlike the present ones, offers little insight into why confidence should not be influenced in a parallel fashion. Finally, by locating the causes of low accuracy–confidence correspondence in the integrative nature of memory and cognition, practical implications for dealing with eyewitnesses emerge. The following sections review some of the factors that may influence accuracy–confidence correspondence according to this formulation.

FACTORS THAT AFFECT MEMORY BUT NOT NECESSARILY CONFIDENCE

Conditions of Witnessing. Much has been written about the potential for inaccurate memory due to nonoptimal witnessing conditions. Low perceived crime seriousness (Leippe, Wells, & Ostrom, 1978), low situational arousal (Johnson & Scott, Note 1), and short duration of observing the target (Loftus, 1972) all have been found to be associated with poor recognition accuracy. The essential point for this discussion is that witnessing conditions may affect recognition accuracy but not necessarily confidence. Leippe, Wells, and Ostrom (1978), for example, found no effect for crime seriousness on either subject-witnesses' certainty in their lineup identifications or their certainty that the actual target was the transgressor (whether they identified him or not), even though crime seriousness had a significant effect on recognition accuracy. Such noncorrespondence is especially likely given that most witnesses seldom if ever have observed crimes previously. As a result, they have little past experience with similar memory problems that might otherwise guide their estimates of their memory accuracy. This is in sharp contrast to the typical laboratory experiment in which subjects proceed through a series of highly similar memory tasks.

Because witnesses may not be cognizant of observation conditions that cause memory inaccuracies, they may overestimate their memory accuracy. It should also be noted, though, that *underestimation* of memory accuracy may result from low-optimal witnessing conditions as well. To the extent that a person is somehow generally aware of the fallibility of memory and its sources (say through a personal incident of flawed memory), the experience of low-optimal conditions may promote uncertainty independently of any effects on memory itself.

Inconsistent Information during the Retention Interval. More germane to the present thesis are the numerous postwitnessing opportunities for witnesses to encounter additional information and then integrate it with the original memories of the crime and criminal. Witnesses who ultimately testify in court almost invariably are interrogated by the police or prosecuting lawyers and also are apt to discuss the crime with other witnesses, perhaps at the scene of the finished crime. Especially if the information gained from these social interactions is inconsistent or misleading, the result of its incorporation may be unconscious distortion of the memory trace. The findings of Loftus, Miller, and Burns (1978) provide a convincing illustration of this effect. After watching a 30-slide sequence depicting an auto accident, subjects responded to a questionnaire on which a critical question offered either consistent information (the presence of a stop sign was implied and in fact a stop sign had been present at a key intersection), misleading information (the incorrect presence of a yield sign was implied), or no information (no sign was mentioned). On a subsequent recognition test, subjects were asked to choose between two slides: one showing a stop sign (correct), the other a yield sign (incorrect). While consistent information improved recognition relative to the no-information control, misleading information hindered recognition. More importantly for our purpose, Loftus et al. found that accuracy was generally positively correlated with confidence, *except* in the misleading information conditions. In fact, when the questionnaire containing the misleading information was administered one week after witnessing, inaccurate subjects were actually more confident than accurate subjects!

Labeling. One encoding strategy that a witness to a crime might use is to verbally label the criminal's face with a descriptive adjective (e.g., "attractive," "rugged"). Chance and Goldstein (1976), in fact, found that subjects who were told to use this strategy showed slightly better recognition than subjects not told to attach a label. As Clifford and Bull (1978) have pointed out, however, labeling might improve *or* hinder recognition memory in eyewitness situations. A label may lead to incorrect recognition if witnesses have such a brief look at the transgressor that they remember almost nothing about the transgressor besides a general descriptive label. At the extreme (i.e., a label but absolutely no other memory of the face), this phenomenon has been demonstrated by Doob and Kirshenbaum (1973). By having female subjects rate the attractiveness of each member of a male lineup, these researchers found that the actual suspect was rated as the most good-looking. Subsequently, another group of female subjects was shown the lineup and asked who they would choose if they could remember only that the suspect was "rather good-looking." The suspect was chosen five times more often than would be expected by chance.

A verbal label might also distort recognition memory if it is adopted subsequent to witnessing, such as if a cowitness mentions that the suspect was good-looking. It

presently is not known if witnesses can detect reliance on a label and alter their memory confidence accordingly. However, to the extent that verbal information does become inseparably integrated with visual information, the potential for an unconscious effect of labels is clearly there. More research is certainly needed on labeling and the possible awareness of the witness.

Stereotypes. Social psychologists have long known that people readily form stereotypes — sets of beliefs about the behavior or attributes of an identifiable group of people (e.g., racial, ethnic, or occupational groups) formed by overgeneralizing from knowledge or beliefs about some members of the group. Stereotypes probably result from a real need to simplify and organize social information into manageable proportions (cf. Bem, 1979). Both intuition and recent empirical evidence (cf. Clifford & Bull, 1978; Shoemaker, South, & Lowe, 1973) suggest that many people have stereotypes about criminals (e.g., a conception about what the typical murderer or burglar looks like). If so, as noted by Shoemaker et al. (1973), "stereotypic conceptions of what a particular suspect 'should' look like, or does not look like, could influence the selection of 'the one who did it' by an eyewitness to a crime, particularly when that eyewitness did not have a good, clear look at the offender" (p. 432). Clearly a stereotype is just the kind of existing cognitive structure through which perceptual information about the criminal may be unconsciously modified.

Some insight into the memorial significance of stereotypes can be gleaned from an experiment by Franks and Bransford (1971). From a base or prototypical geometric pattern (the "prototype"), these researchers composed a large set of patterns by transforming the prototype according to systematic rules. Subjects were then exposed to and asked to reproduce a number of the patterns which differed in their "transformational distance" from the prototype (i.e., in the number of transformations of the prototype involved in creating the specific stimulus pattern). Later, subjects were given a recognition task, which included confidence judgments, in which they were exposed to patterns previously seen, patterns not previously seen, and the prototype pattern itself—which had not been presented in the earlier task. Two major findings emerged. First, recognition confidence ratings were inversely related to the transformational distance between the pattern and the prototype—the closer the pattern to the prototype, the higher subjects' recognition confidence. Second, subjects recognized the not-previously-seen prototype with greater probability and confidence than they recognized previously seen transformed patterns! Franks & Bransford interpret these results as evidence that memory representations of visual stimuli are composed of both an abstract prototype and specific transformations. For the eyewitness case, this implies that any fairly close-fitting stereotype about criminal facial characteristics (analogous to a prototype) will be integrated with specific visual information in the formation and storage of the memorial representation of the suspect. In some cases, then, confident recognition at an identification test, *unbeknownst to the witness,* might result mainly from a match with the witness's criminal stereotype.

The memory-altering effects of stereotypes, as well as of the other factors we have just examined, are especially facilitated by witnesses' likely lack of prior familiarity with the witnessed transgressor. Low familiarity should be associated with an absence of existing memorial structures that otherwise might be capable of placing constraints on the reconstructive, distorting processes.

FACTORS THAT AFFECT CONFIDENCE BUT NOT NECESSARILY MEMORY

The preceding section has outlined several ways in which eyewitness memory can become distorted unconsciously and therefore without a corresponding impact on confidence. As noted earlier, there are also aspects of the eyewitness experience that may promote cognitive processes that facilitate changes in confidence without changing memory accuracy.

Non-Forced-Choice Recognition Tests. Most of the item recognition studies in which confidence ratings are sensitive to memory accuracy use forced-choice recognition tests. That is, subjects are not allowed to simply say "I don't know," and consequently must guess when they *really* do not know. It is not surprising that, under such conditions, low confidence ratings accompany guesses, nor is it surprising that confidence in guesses is lower than confidence in choices that subjects *feel* are correct. Such a state of affairs, of course, should contribute to a high accuracy–confidence correlation. For practical and ethical reasons, however, eyewitnesses to a crime are always, in principle, given the option of deciding on "none of the above" (i.e., stating that they recognize none of lineup members or mugshots as the witnessed transgressor). This should mitigate against finding a strong accuracy–confidence relationship, if only because false identifications will be made only by those inaccurate witnesses who have enough confidence in their memory to actually make a choice. In other words, the decision to forego the "none of the above" choice is made only by witnesses who are relatively confident, whether they are accurate or inaccurate. This type of self-selection effect on the accuracy–confidence relationship was demonstrated recently by Malpass and Devine (in press), who found that those subject-witnesses to a staged crime who chose not to make an identification were considerably less confident that the "vandal is in the lineup" than were either accurate or inaccurate choosers.

Unfortunately, the implications of non-forced-choice identification tests are not restricted to the tendency for only self-acceptably confident witnesses to make an identification at all. The act of identification is a social behavior that may have important cognitive consequences. One such consequence involves *commitment.* Social psychologists (e.g., Brehm & Cohen, 1962; Kiesler, 1971) have frequently observed that public, verbal commitment to a position generally strengthens one's belief in that position and promotes resistance to discrepant information, particularly if the commitment is voluntary (e.g., as in a *non-forced*-choice test). This suggests that eyewitnesses who publicly commit themselves to a lineup choice will express an elevated level of confidence (though certainly not of accuracy) and possibly become less receptive to the idea that they might be mistaken.

Another psychological consequence of making an identification while cognizant of a no-choice option is what Bem (1972) has labeled *self-perception.* Bem has argued that when internal feelings or attitudes are weak or ambiguous, people will infer their feelings from their knowledge of how they have behaved. Put more forcefully, self-perception theory argues that perceptions of one's own behavior can *create* an emotion or an attitude. Given the dynamic, integrative nature of the memory process, attitude about one's memory accuracy (i.e., confidence) undoubtedly can be ambiguous when one is confronted with an eyewitness identification test. From a self-perception perspective, an attitude of confidence will be formed as a result of making an iden-

tification. Eyewitnesses should report a positive sense of confidence in memory *after* they make an identification, as if they were saying to themselves, "I really must be sure that was the person, since I was willing to choose that person." This kind of postbehavioral explanation for one's identification also might be predicted from Nisbett and Wilson's (1977) analysis of self-awareness of the true causes of behavior. As we saw earlier, these writers have argued that people are usually unaware of what and how social stimuli have influenced their thinking and behavior. A further proposal of Nisbett and Wilson is that the verbal explanations that people do offer for their behavior are based on *a priori,* implicit causal theories that have been learned through enculturation (e.g., Why did you enjoy the party? Because all of my friends were there). It requires little stretch of the imagination to assume that, in some cases, eyewitnesses may believe in their identifications because they also believe that "people claim that a face is familiar because they actually remember that face." Application of this naive causal theory is especially likely if, as will be discussed later, people generally feel that human memory for faces is trustworthy.

Biased Testing Instructions. Either overtly or through the subtle wording of instructions, the administrator of an identification test may communicate to witnesses that the suspect is actually in the lineup. This additional information clearly could have the effect of inflating witnesses' confidence in their recognition. Malpass and Devine (in press) tested this notion by exposing observers of a staged vandalism to either unbiased or explicitly biased instructions. Both witnesses' confidence in their identification and the total number of witnesses who made an identification were greater when the instructions were biased. In addition, the increase in number of people willing to make an identification led to a substantial increase in the number of false identifications. In part at least, this latter finding probably means that for some inaccurate witnesses, the confidence-enhancing effect of the biased instructions made the difference between making and not making a positive identification.

Interrogation. When police solicit a report from an eyewitness, they almost invariably ask questions, particularly on any details the witness does not provide in a free or spontaneous narrative of what was seen. Such interrogation regarding missing details can lead to valuable additional information, but, because the details being sought are not salient enough to have been freely mentioned, the chances are that the witness has both poor and uncertain memory for them. The dynamics of this social interchange may have significant effects on confidence. Clifford and Bull (1978), for instance, have described the witness response to interrogation as follows:

> under interrogative report he will be asked questions to which he has no relevant memory, but because he is being asked by an authority figure an answer is likely to be given; also, by the very fact of being asked a question the implication is that he ought to know the answer, and is considered capable of giving it. When an answer has been given, however uncertainly and haltingly, it becomes a "fact" and the witness leaves all doubt behind and accepts his output as the outcome of genuine recall, and this is especially the case if the interrogator seems pleased with the answer and goes on to ask further, consecutive, or follow-up, questions. (p. 156)

This socially induced noncorrespondence between accuracy and confidence regarding the questioned detail, in fact, may represent only one of several potential effects of interrogation on accuracy–confidence correspondence. It is also possible that reconstructing the witnessed episode through interrogation may cause un-

conscious alterations of memory for the *entire* episode, and thus reduce correspondence in the case of other testimony-relevant memories. In addition, each response to a police officer's question, in effect, is a verbal commitment. Thus interrogation may have an upward spiraling effect on confidence in one's overall testimony.

Finally, one certain outcome of interrogation is that witnesses are compelled to think about what they witnessed and about their confidence in their memories. Recent research by Tesser (1978) and his colleagues (e.g., Tesser & Leone, 1977) suggests that such continued focused thinking may have effects on confidence. Tesser has found that post-stimulus-exposure thought about a stimulus such as an artwork or a person leads to a *polarization* of attitude about that stimulus. A mildly favorable attitude becomes more favorable, while a mildly negative attitude becomes more negative. Tesser proposes that thought involves tendencies to (a) generate cognitions about the stimulus or related objects that are evaluatively consistent with initial attitude and (b) make existing cognitions or memories more mutually consistent. Though application of these ideas to the memory-confidence issue can be only in the form of conjecture, it would seem that the somewhat certain witness should become more certain (i.e., polarize this particular attitude) the more he or she thinks about the matter. Consistent aspects of memory should be more readily retrieved than inconsistent aspects, and attempts at "logically" piecing together the details of what was witnessed should be strongly influenced by pressures toward consistency. Just the opposite effect on confidence might occur if the witness is initially somewhat uncertain.

Parenthetically, the implications of the thought polarization process for empirical eyewitness studies might be noted. Typically in eyewitness studies, a confidence judgment is solicited *after* the subject-witness makes an identification. This provides an opportunity for elaborative thought about the face or person that was chosen, which might in turn polarize confidence through the process we have just examined. Perhaps witnesses' preidentification predictions of accuracy would show a somewhat closer correspondence to recognition accuracy than postidentification confidence judgments.

Implicit Beliefs that Facial Memory Is Good. In a recent article, Wells, Lindsay, and Ferguson (1979) have argued that people generally have strong faith in the trustworthiness of their facial recognitions. This faith develops because we seldom experience any disconfirming feedback once we decide that someone "looks familiar." If the person is indeed familiar, we may confirm it through subsequent interaction with that person. On the other hand, we may be reluctant to approach the individual with anything but a vague gesture of recognition. Since propriety compels most people to reciprocate such a gesture, we are apt to walk away confident that we do indeed know that person, even if we do not. If it is true that people come to trust their person memory through numerous experiences like this, it follows that eyewitnesses should be predisposed to trust even relatively vague feelings of recognition. And this predisposition may be compounded by what seems to be a pervasive popular belief, often encouraged by interrogating police officers and prosecuting attorneys, that memory for everything is permanent and complete, if only it can be retrieved [see Loftus & Loftus (1980) for a critical discussion of this belief].

OTHER FACTORS THAT MAY AFFECT MEMORY OR CONFIDENCE—BUT NOT NECESSARILY SIMULTANEOUSLY

High Similarity of Suspect and Foils in the Lineup. It is generally thought that the nonsuspect members of a lineup (the foils or distractors) should closely resemble the suspect, on the assumption that this helps protect the innocent suspect from mistaken identification (Wells, Leippe, & Ostrom, 1979). It would seem that either accuracy or confidence could be independently altered when the similarity is very high. On the one hand, the confidence of an accurate witness could be shaken by the difficulty of the task. On the other hand, high similarity provides a greater opportunity for a distorted memory to be misapplied. For instance, similarity increases the chances that one of the foils will correspond more closely than the suspect to a confidently held facial memory trace.

Dissimilar Condition of Suspect at Encoding and Test. When the suspect is put into different clothes, given a shave, or otherwise changed in appearance for the identification test, effects similar to those of foil-suspect similarity may occur, for the same reasons. Confidence might be decreased or distorted memory misapplied to a false identification.

CONCLUSIONS AND IMPLICATIONS

A major goal of this discussion has been to outline a theoretical framework that can explain why eyewitness confidence, in many cases, fails to predict memory accuracy, whereas in other cases it is predictive. To be sure, many of the ideas expressed here, however tenable, are nonetheless untested as of yet. Still, it can now be seen that two features of human memory and cognition—their unconscious operation and their dynamic, integrative nature—define a system that seems indeed capable of altering memory and confidence in orthogonal directions, especially in the context of powerful and rich social situations. More definitive conclusions about this perspective on the accuracy–confidence issue should be possible through research that explicitly tests the twin hypotheses that accuracy–confidence correspondence is inversely related to the extensiveness of reconstructive memory processes and/or suggestive social influences. This can be accomplished by examining the accuracy–confidence *correlation* across systematically manipulated levels of the presumably influential variables explored above.

Deffenbacher (1980) concludes his analysis of the accuracy–confidence relationship with the recommendation that the judicial system cease to rely on confidence as an index of eyewitness accuracy, since most real eyewitness cases involve low-optimality information-processing conditions. Such absolute advice seems premature, especially since few existing studies have made accuracy–confidence correspondence their *primary* focus. Though the existing data give reason for pessimism about reliance on confidence, more research, particularly of the sort just described, is clearly needed. As argued in the following paragraphs, some aspects of optimality in actual eyewitness cases may be controllable by the criminal justice system itself. If so, confidence data may yet be useful in some ways.

Numerous writers (cf. Deffenbacher, 1980; Wells, 1978) have recommended that psychologists campaign outside the courtroom for changes in judicial guidelines concerning eyewitness testimony, rather than relying solely on their roles as expert witnesses for specific criminal cases. We can agree wholeheartedly with this appeal. Indeed, the present view of the accuracy–confidence relationship suggests a number of recommendations about how the criminal justice system might better deal with eyewitness testimony in general and certainty of testimony in particular.

The "Processing" of Witnesses. The most obvious recommendation is that police officers, lawyers, and judges should be made aware of how *their own behavior* might cause distortions of witness memory and/or confidence. These agents of the criminal justice system, for example, should be encouraged to avoid leading questions, suggestive interrogations, and the use of stereotypic labels whenever possible. Police officers might be trained to obtain free, narrative reports from eyewitnesses before they ask specific questions based on missing details or, as is so often the case, on inconsistent testimony they have gathered from other witnesses to the same crime. In fact, whenever possible, each witness should probably be interviewed by a different police officer who has not yet been exposed to any witness statements about the crime.

Confidence-bolstering procedures should also be a target of change. Though we have seen that the very act of a positive identification commits witnesses to their memory, police officers and lawyers probably engage in numerous behaviors that promote a commitment–confidence spiral. For the police, repeated questions of the "you are absolutely sure?" variety may have this effect, as might biased instructions at the identification test. An even more profound confidence effect probably occurs when prosecuting lawyers routinely "prime" witnesses for courtroom testimony through reassurance that memory can be trusted and through actually training witnesses to give jurors a "picture of confidence" when under cross-examination.

Finally, there is little doubt that police officers cue on witness confidence during interrogation, and are therefore likely to pursue testimony from confident witnesses, while discarding nonconfident witnesses. After all, nonconfident witnesses are not only likely to be inaccurate according to popular belief, they also are unlikely to be convincing in a court of law (even when duly "primed"). The often low correlation between accuracy and confidence suggests that the police should change their beliefs and pay more attention to uncertain but willing witnesses. If memory and confidence are truly unrelated, uncertain witnesses are just as likely to be accurate as are confident witnesses. Put more starkly, errors of disbelieving or ignoring accurate, uncertain witnesses are at least as probable as errors of believing faulty, certain witnesses.

Jurors' Perceptions of Confidence. The recent evidence that jurors are profoundly influenced by witness confidence (cf. Wells et al., 1979) suggests a misuse of witness confidence that can be reduced by informing jurors that confidence can be misleading. Presently, psychologists attempt to do this by serving as expert witnesses in specific cases. Yet there are severe limitations to such catch-as-catch-can expert testimony. As Deffenbacher (1980) noted, most judges do not allow expert testimony to be admitted as evidence. We might add that, since expert testimony usually is made on behalf of the defense, it runs the risk of making jurors in a specific case *too skeptical* of eyewitness testimony. A more effective and broadly applicable method of educating jurors would be a standardized information package about the psychology of eyewitness testimony that could be presented to juries as part of a routine pretrial

proceeding. In other words, perhaps psychologists, with the help of legal experts, should develop and promote the adoption of a *universal* form of expert testimony that assists jurors in *realistically* weighing their impressions of witness confidence, witnessing conditions, and so on.[1] This would represent a profound *system* change of the sort that Wells (1978) has advocated. The task would require careful research in which various presentations of eyewitness-relevant psychological principles and findings are evaluated in terms of how well they produce a *calibration* of jurors' belief in the accuracy of witnesses with the actual accuracy of the witnesses. The final version ideally should maximize the match between witness accuracy and jurors' belief in that accuracy.

Witnesses' Sense of Confidence. Earlier, it was argued that memory accuracy and confidence may fail to correspond because witnesses, like other people, do not receive much feedback about their facial recognition abilities. This implies that eyewitnesses might gain some insight into the likely accuracy of their identification if, following their identification, they are given practice and feedback on some standard facial recognition task. Following this learning experience, they could be asked for a confidence estimate about their previous eyewitness identification. This is indeed a speculative idea. Yet eyewitness researchers have nothing to lose and much to gain by examining the effects of feedback training on the accuracy–confidence relationship.

The thoughtful reader may well wonder whether some of the foregoing suggestions, if implemented, will not do justice a disfavor by reducing the ability of the criminal justice system to gather and forcefully use eyewitness testimony for prosecution and conviction. Such a cost may well be more or less inherent in any change in the way eyewitness testimony is treated. But this and other costs must be weighed against the possibly greater costs and injustices that presently exist. Eyewitness research certainly should be directed at a cost/benefit analysis of any new criminal justice practice. Right now, however, one recommendation can be made unequivocally: All agents of the criminal justice system should be aware of the psychological and social factors associated with eyewitness testimony.

REFERENCE NOTES

1. Johnson, C., & Scott, B. *Eyewitness testimony and suspect identification as a function of arousal, sex of witness, and scheduling of interrogation.* Paper presented at the annual convention of the American Psychological Association, Washington, D.C., 1976.

REFERENCES

Bem, D. J. Self-perception theory. In L. Berkowitz (Ed.), *Advances in experimental social psychology,* Vol. 6. New York: Academic Press, 1972.

Bem, D. J. Psychology and society. In E. R. Hilgard, R. L. Atkinson, & R. C. Atkinson, *Introduction to psychology,* 7th edition. New York: Harcourt, Brace, Jovanovich, 1979.

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[1]The author expresses his thanks to Gary Wells for suggesting this intriguing idea.

Bower, G. H. A multicomponent theory of the memory trace. In K. W. Spence & J. T. Spence (Eds.), *The psychology of learning and motivation: Advances in theory and research*, Vol. 1. New York: Academic Press, 1967.

Brehm, J. W., & Cohen, A. R. *Explorations in cognitive dissonance*. New York: Wiley, 1962.

Chance, J., & Goldstein, A. G. Recognition of faces and verbal labels. *Bulletin of the Psychonomic Society*, 1976, **7**, 384–387.

Clifford, B. R., & Bull, R. *The psychology of person identification*. London: Routledge & Kegan Paul, 1978.

Deffenbacher, K. A. Eyewitness accuracy and confidence: Can we infer anything about their relationship? This issue, *Law and Human Behavior*, 1980, **4**, 243–260.

Doob, A. N., & Kirshenbaum, H. M. Bias in police lineups—Partial remembering. *Journal of Police Science and Administration*, 1973, **1**, 287–293.

Franks, J. J., & Bransford, J. D. Abstraction of visual patterns. *Journal of Experimental Psychology*, 1971, **90**, 65–74.

Kiesler, C. A. (Ed.) *The psychology of commitment: Experiments linking behavior to belief*. New York: Academic Press, 1971.

Leippe, M. R., Wells, G. L., & Ostrom, T. M. Crime seriousness as a determinant of accuracy in eyewitness identification, *Journal of Applied Psychology*, 1978, **63**, 345–351.

Loftus, E. F., & Loftus, G. R. On the permanence of stored information in the human brain. *American Psychologist*, 1980, **35**, 409–420.

Loftus, E. F., Miller, D. G., & Burns, H. J. Semantic integration of verbal information into a visual memory. *Journal of Experimental Psychology: Human Learning and Memory*, 1978, **4**, 19–31.

Loftus, G. R. Eye fixations and recognition memory. *Cognitive Psychology*, 1972, **3**, 525–557.

Malpass, R. S., & Devine, P. G. Eyewitness identification: Lineup instructions and the absence of the offender. *Journal of Applied Psychology* (in press).

Morris, P. Encoding and retrieval. In M. M. Gruneberg & P. Morris (Eds.), *Aspects of memory*. London: Methuen, 1978.

Murdock, B. B., Jr. *Human memory: Theory and data*. Hillsdale, New Jersey: Erlbaum, 1974.

Neil vs. Biggers. 409 U.S. 188 (1972).

Neisser, U. *Cognitive psychology*. New York: Appleton-Century-Crofts, 1967.

Nisbett, R. E., & Wilson, T. D. Telling more than we can know: Verbal reports on mental processes. *Psychological Review*, 1977, **84**, 231–259.

Shoemaker, D. J., South, D. R., & Lowe, J. Facial stereotypes of deviants and judgments of guilt or innocence. *Social Forces*, 1973, **51**, 427–433.

Tesser, A. Self-generated attitude change. In L. Berkowitz (Ed.), *Advances in experimental social psychology*, Vol. 11. New York: Academic Press, 1978.

Tesser, A., & Leone, C. Cognitive schemas and thought as determinants of attitude change. *Journal of Experimental Social Psychology*, 1977, **13**, 340–356.

Wells, G. L. Applied eyewitness-testimony research: System variables and estimator variables. *Journal of Personality and Social Psychology*, 1978, **36**, 1546–1557.

Wells, G. L., Leippe, M. R., & Ostrom, T. M. Guidelines for empirically assessing the fairness of a lineup. *Law and Human Behavior*, 1979, **3**, 285–293.

Wells, G. L., Lindsay, R. C. L., & Ferguson, T. J. Accuracy, confidence, and juror perceptions in eyewitness identification. *Journal of Applied Psychology*, 1979, **64**, 440–448.

Wickelgren, W. A. Multitrace strength theory. In D. A. Norman (Ed.), *Models of human memory*. New York: Academic Press, 1970.