Chapter 17
THE DISCRIMINATION OF DECEPTIVE, MISTaken, AND TRUTHFUL WITNESS TESTIMONY

Stephen Porter, John C. Yuille and Angela R. Birt

If and when convincing evidence is produced that reasonably reliable scientific methods of exposing falsehoods either in or out of the courtroom are available, these methods should be promptly utilized by the legal profession.

William Wicker (1953)

As legal scholar William Wicker observed four decades ago, an important agenda in the criminal justice system is to decide whether a witness is telling the truth about a crime. In most criminal trials within an adversarial justice system, there are contradictions between the testimonial histories of different witnesses, especially reports given by complainants and defendants. Deception is very difficult to identify, however, even for law enforcement professionals with considerable investigative experience (e.g., Ekman & O'Sullivan, 1991). Although intentional lying on the stand is a salient concern with witnesses, it is not the only one. Courts have long recognized that witnesses sometimes relate a sincere but mistaken recollection of an alleged crime. For nearly a century, research has demonstrated that aspects of memory can be susceptible to the effects of misleading information (Bartol & Bartol, 1999; Yuille, Dayen, Porter, & Marxsen, 1995). Since the early 1970s, the post-event misinformation paradigm has been used to establish beyond a doubt that eyewitness memory is malleable (e.g., Schacter, 1996, 1999). Recent research has shown that some individuals can even come to hold confident memories for entire events that never occurred (see Loftus, 1997a, 1997b, 1997c). Thus, legal decisions often come down to the question of a witness' credibility: is the testimony based on deceit, mistaken recollection, or truth? This chapter describes recent work by Canadian researchers that illuminates the nature of deceptive and mistaken testimony and has created a novel approach with which to discriminate them from accurate witness accounts.

The detection of deception
Deception plays an important role in the social interactions of most animal species (Trivers, 1985) and humans are no exception, employing
Deception is particularly prevalent and consequential in forensic contexts (e.g., Ekman, 1992; Porter & Yuille, 1995, 1996). Offenders, complainants, and other witnesses all have occasion to lie about alleged criminal incidents. Certain types of criminal offenders, such as psychopaths, habitually employ manipulation, lying, and malingering, arguably to a pathological degree (e.g., Hare, 1998; Hare, Forth, & Hart, 1989; Hare & Hervé, 1999; Porter, Birt, Hervé, & Yuille, in press). In addition, it is clear that complainants have fabricated a criminal victimization in many cases (e.g., Yuille, Tynio, & Marxen, 1995). For example, in Nova Scotia, Canada, nearly two hundred individuals are currently under investigation for fabricating child abuse incidents and defrauding millions of dollars from government programs.

In addition to deception being a common occurrence in legal settings, its detection is notoriously difficult. Previous research indicates that, on the whole, neither laypersons nor professionals in forensic settings are able to identify deceptive reports at levels greater than chance. Ekman and O'Sullivan (1991) showed that customs officials, policemen, trial court judges, FBI agents, CIA agents, forensic psychiatrists, and other professional groups were no better than chance at judging the truthfulness of videotaped deceptive statements. Their poor performance in these judgments may have resulted from focusing on the wrong cues or failing to notice cues that are indicative of deception. Poor performance may also have been due to decision-making based on inaccurate myths or training in deception detection. Kassin and Fong (1999) found that participants trained in traditional police detection methods made less accurate judgments of videotaped deceptive speakers than those with no training. Thus, most people, even those who require the skill in investigative settings, cannot detect lies accurately. Further, popular techniques for identifying deception such as the polygraph have serious shortcomings that limit their utility (e.g., Iacono & Patrick, 1999). Recently, it has been argued that verbal cues to deception have been under-researched (Porter & Yuille, 1995, 1996; Porter, Yuille, & Lehman, 1999), despite their promising validity (e.g., Zuckerman & Drives, 1985). Accumulating anecdotal and empirical evidence suggests that attention to verbal cues may contribute to the identification of deceit. In a study of lying in an interrogation context (Porter & Yuille, 1996), we found that deceptive testimonials could be identified based on their level of detail, coherence, and how often the speaker admitted to not recalling something about the incident in question. In our present research, a primary objective was to investigate the validity of a novel approach using verbal clues to deception when participants were lying about fabricated emotional events.

The identification of implanted memories

False memories are by no means rare occurrences in most of us.

William James (1890).

Occasionally, a witness or complainant reports that he/she “recovered” memories for a crime after a long period of forgetting or “repression” (e.g., Loftus, 1993). The judicial response to reports of recovered memories has been inconsistent (Porter et al., 1999; Porter et al., in press). In some cases, reports of recovered memories have been viewed as unreliable (e.g., Jane Doe et al. v. Joseph Mustel, 1996), whereas many courts have accepted such evidence in convicting defendants (e.g., R. v. Francus, 1994). Beginning in the late 1980s, social scientists have engaged in a heated debate over the validity of recovered memories (e.g., Lindsay & Read, 1994; Read, 1999). A key issue in the recovered memory debate has been whether people can mistakenly remember entire traumatic experiences. Some researchers have argued that at least some “recovered” memories may actually be false memories implanted during a police investigation or psychotherapy (e.g., Loftus, 1997a). It is clear that the use of leading and misleading questioning during police interviews has resulted in inaccurate reports (e.g., Ceci & Bruck, 1993; Marxen, Yuille, & Nisbet, 1993). Similarly, suggestive methods used in psychotherapy (e.g., guided imagery, hypnosis) are associated with elevated suggestibility and memory distortion. Poole, Lindsay, Memon, and Bull (1993) surveyed North American and British clinicians and found that 25% of respondents reported using techniques focusing on memory recovery; some also reported high rates of memory recovery. Loftus and Pickrell (1995) provided the first empirical demonstration of mistaken “recovered” memories. They successfully misled a quarter of twenty-four-year-olds into believing that they had been lost and rescued at age five. In a study by Hyman, Husband, and Billings (1993), participants were presented with brief descriptions of childhood events outlined by their parents plus two false events contrived by experimenters. In the first experiment, 20% of participants came to remember information about the false events over two interviews. With an additional interview, the number of participants who incorporated false information into their memories increased to 25%. Still, many researchers and clinicians remain unconvinced about the validity of implanted memories for more
emotional childhood events. Addressing this issue, Pezdek and Roe (1997) found that they were unable to implant memories in children for an intrusive event more akin to sexual abuse—a rectal enema. Pezdek, Finger, and Hodge (1997) attempted to implant a memory for a Catholic ceremony or a Jewish ceremony in both Catholic and Jewish high school students. As predicted, they were successful in implanting memories only for plausible events. In sum, although a small number of studies have demonstrated that false memories can occur, there is much controversy over the types of events that can be implanted (e.g., Porter & Marxsen, 1998). In particular, the generalizability of existing implanted memory studies is unclear (e.g., Berliner & McDougall, 1997). The possibility of false memories for emotional incidents, a central concern in the memory debate, has yet to be addressed.

If implanted memories for emotional incidents can occur, an important issue to pursue would be whether they could be discriminated from real memories (e.g., Payne, Neutsch, Lampinen, & Lynn, 1997; Pezdek & Taylor, in press). Professional organizations contend that the identification of implanted memories is a difficult task in the absence of corroborative evidence (American Psychological Association, 1996; Canadian Psychological Association, 1996). There is some empirical evidence to support this position. When Ceci, Crotteau-Huffman, Smith, and Loftus (1994) provided videotapes of children relating either implanted or real memories to psychologists who specialized in interviewing children, the participants were unable to discriminate them. They concluded that, "repeatedly thinking about a fictitious event can lead some preschool children to produce vivid, detailed reports that professionals are unable to discern from their reports of actual events" (p. 103). Next, Leichtman and Ceci (1995) showed such videos to more than a thousand researchers and clinicians who worked with children. Again, participants failed to detect when real experiences were being described, although many expressed high confidence in their judgments (Ceci, 1995). Although this has not been replicated with adult reports, implanted memories may be equally difficult to identify. However, content analyses of real and mistaken memories in adults have revealed a number of unique phenomenological and qualitative features of implanted memories for non-emotional events (Lampinen, Neutsch, & Payne, 1998). These differences could serve as useful cues to identifying distortion in testimony. In fact, two lines of research, reality monitoring and Statement Validity Analysis, indicate that the content of accounts for events not experienced may differ from the content of real memories (see Memon, Vrij, & Bull, 1998). Johnson and colleagues proposed the model of reality monitoring to investigate subjective differences in memories and imagined experiences (e.g., Johnson & Raye, 1981). Research investigating this model indicates that actual memories are associated with a higher degree of external sensory information whereas imagined experiences are associated with more internally-generated subjective and cognitive details (e.g., Schoedel, Gerhard, & Loftus, 1986). Statement Validity Analysis was devised for the assessment of potentially deceptive reports by children (e.g., Hottowitz, 1991; Porter & Yuille, 1995). Research on this approach suggests that reports of fabricated experiences differ qualitatively and systematically from reports based on real experiences (e.g., Ruby & Brigham, 1997), but its utility has not been examined with implanted memories.

In our research, criteria derived from these two approaches were examined and selected as potential discriminators of deceitful, implanted, and real memories. Other novel criteria were selected and, collectively, the approach was called the Memory Assessment Procedure or MAP (Porter et al., 1999; Porter & Birt, in press). Based on a thorough literature review (Porter, 1998), the assessment technique included the most promising criteria for discriminating reports of true and false experiences. The MAP provided an examination of both phenomenological and content characteristics of the witness reports. Phenomenological criteria concerned subjective, personally experienced features of the memories that required participants to think about their memories and judge them according to specific qualities, including vividness/ clarity, stress, and confidence. By contrast, content criteria were concerned with more objective, presentation-specific, features of the memories such as amount of detail and coherence of the memory account (see Porter et al., 1999 for a detailed description of the MAP).

In sum, the continuing controversy over recovered memories compelled us to conduct a large-scale investigation of whether highly emotional incidents could be implanted in memory and whether lies, implanted memories, and truthful reports could be differentiated based on their qualitative features.

In our recent research (Porter et al., 1999; Porter, Birt, Yuille, & Lehman, 2000), we employed a misleading interview approach to encourage participants to "recover" a memory for an emotional event which had not actually occurred. A within-subjects design was used to examine whether there would be different verbal patterns and phenomenological features when a person is lying, relating a mistaken event, or telling the truth.
METHOD

Participants
Undergraduate participants were recruited to take part in research "examining how well people can recall emotional childhood events," in exchange for monetary payment. Following the application of exclusionary criteria, 77 participants were eligible for continuing participation. Parents were initially contacted with a detailed questionnaire inquiring about the participants' childhood experiences and were asked about six emotional events that their child may have experienced between the ages of four and 10 years. The event categories were selected to be of a negative emotional tone (highly stressful to a child, but non-criminal) and required that the participant was the central "victim" in the event. The events were: a serious medical procedure, getting lost, getting seriously harmed by another child, a serious animal attack, a serious indoor accident, and a serious outdoor accident. Three events were then selected for use in the interviews, one of which had actually occurred. From the remaining non-experienced events, an event was randomly selected to be the subject of an implanted memory and another was for a fabricated witness report. The ages, locations, and a plausible set of information clues were contrived from the information provided on the parental questionnaires. All participants and their parents were asked to refrain from discussing any childhood events until the end of the study.

Procedure
The recovered memory interviews. The interview format included a free narrative phase, a general questions phase to clarify details offered in the free narrative, and a specific questions phase inquiring specifically about degree of stress at the time of the event, level of confidence that the event occurred, memory perspective, and other subjective aspects of the memory image. The interviews were conducted by eight research assistants who had been extensively trained in the highly scripted interview procedure. In the first interview, the titles of one real and one false event were presented to the participant. The participant was informed that each event had occurred according to his/her parents, and had been randomly selected from the parental questionnaire. The interviewer then introduced the first event and asked the participant to explain what had happened. For each event, the interviewer provided four details: age, location, time of year, and people present—information supposedly provided by the parents. The purpose of the first interview was to give the participants an opportunity to make an initial attempt to remember the real and false events. Failure to recall the false event (as expected) resulted in encouragement by the interviewer to take time and focus on recovering it. Next, the participant was informed that one purpose of the study was to test the effectiveness of various memory retrieval techniques. The interviewer slowly repeated the event information to bring the participant "mentally back to the scene of the event." Guided imagery instructions were used to help participants generate images for the false event. At the end of this interview, the participant was encouraged to take a few minutes each night to try to recover the memory and write down any thoughts pertaining to it. The main purpose of the second and third interviews, one and two weeks later, was to further facilitate the creation of a false memory by repeating the memory retrieval process. The second purpose of the final interview was to have participants lie about an event. Following the final discussion of the false event, the interviewer exited the room for fifteen minutes after asking the participant to read a note of written instructions. In the note, participants were instructed to fabricate a believable account of an emotional childhood incident that had not occurred. Again, participants were provided with the event category and the four details. They were told that the interviewer would be unaware that they would be lying and were offered a monetary incentive for successfully convincing a judge that the report was truthful. Upon returning, the interviewer proceeded with an interview about the event.

RESULTS

Proportions of participants who recalled the truthful and false childhood events
Most participants (88.3%) immediately recalled the real event. Overall, 26% of participants "recovered" a complete memory for the false event and another 30% exhibited a partial false memory. Thus, while 44.2% participants did not "recover" any false information, more than half experienced memory distortion, either partly or completely. For the implanted memories, the frequencies with which the different emotional events were falsely remembered were as follows: serious animal attack (35%), getting seriously hurt by another child (25%), serious indoor accident (20%), getting lost (15%), and serious medical procedure (5%). In 35% of the implanted
memories, the memory distortion first appeared in the initial interview. In half the cases, distortion first emerged in the second interview, and in 13% of the cases memory distortion was not evident until the third interview. There was no significant difference in likelihood of distortion occurring in any particular interview, χ²(2) = 3.70, p > .05. Looking at the implanted memory cases only, it is important to note that the real event had been presented first in 70% of the cases. The real event had been presented first in 52.2% of the partial memory cases but in only 46.9% of the cases of no memory distortion. Therefore, although not statistically significant, there was a trend for susceptibility to implanted memories to increase if the real event had been discussed first: χ²(1) = 3.20, p = .073.

Content analysis comparing real, implanted, and fabricated memories
A multivariate analysis of variance (MANOVA) examined whether there were phenomenological/subjective or content differences in real, implanted, and fabricated memories (in participants who reported all three types of memories). The MANOVA was significant, Hotelling’s T² = 1.69; F(20, 56) = 2.36, p = .006. Table 1 shows the mean scores and standard deviations for the various dependent measures. Univariate tests were significant on five criteria: Stress, F(2, 38) = 6.73, p = .003; Vividness/Clearness, F(2, 38) = 14.46; p < .0001; Confidence, F(2, 38) = 9.11, p = .001; Coherence, F(2, 38) = 4.05, p = .025; and Amount of Detail, F(2, 38) = 4.50, p = .018.

| Table 1: Comparison of True, Implanted, and Fabricated Reports (N = 20) |
|---------------------------------|----------------|----------------|----------------|
| MAP Criteria                    | True Memories (M and SD) | Implanted Memories (M and SD) | Fabricated Memories (M and SD) |
| Vividness/Clearness             | 4.85 (1.42) | 3.20 (1.32) | 4.85 (1.35) |
| Stress Rating**                 | 4.65 (1.73) | 4.40 (1.73) | 5.80 (1.01) |
| Sensory Components              | 2.10 (1.02) | 2.00 (1.02) | 2.40 (1.23) |
| Confidence***                   | 4.60 (1.14) | 4.80 (1.99) | 5.90 (1.17) |
| We-experiencing Mental Experience| 3.85 (4.25) | 3.20 (4.25) | 3.10 (3.93) |
| Alarming Lack of Memory         | 4.45 (4.80) | 5.65 (2.83) | 3.20 (2.26) |
| Number of Details***            | 78.65 (59.46) | 61.63 (44.32) | 96.23 (61.35) |
| Relatability                    | 5.15 (1.42) | 4.50 (1.24) | 4.95 (1.04) |
| Repeated Details                | 15.25 (16.31) | 12.50 (12.74) | 16.65 (24.08) |
| Reasons for Lack of Memory      | 20 (5.27) | 60 (17.78) | .70 (5.66) |
| Coherence*                      | 4.85 (1.33) | 3.90 (1.12) | 4.75 (1.48) |

***p < .0001 **p < .005 *p < .01 p < .05

Note: Table 1 has been reproduced from Porter, Yule, & Lehmur (1999) with permission from Plenum Publishing.

Stress ratings. Each participant was asked to rate how stressful the event in question was for each of the real, created (if experienced), and fabricated memories according to a 7-point Likert scale. As shown in Table 1, participants gave significantly higher mean stress ratings when fabricating a memory for an emotional childhood event than when relating either a real memory (p = .04) or an implanted memory (p = .0003). However, the latter two memories accounted did not differ (p > .05).

Vividness/Clearness ratings. Each participant was asked to indicate, on a 7-point scale, how vivid and clear higher memory was for each of the childhood events. As depicted in Table 1, participants gave higher mean ratings on vividness for fabricated memories than for implanted memories (p = .0004). They also gave higher vividness ratings for real than implanted memories (p = .0001), but the ratings did not differ for real and fabricated memories (p > .05). Thus, memories for both fabricated and real events were rated similarly, but were rated as more vivid than implanted memories.

Confidence ratings. Participants were asked to indicate on a 7-point scale how confident they were that each event reported actually occurred. As can be seen in Table 1, participants gave significantly higher mean confidence ratings for real than implanted memories (p = .002). They also gave significantly higher mean confidence ratings for fabricated than implanted memories (p = .01), but did not differ in their confidence ratings for real and fabricated memories (p > .05).

Coherence. Coherence refers to how well a memory report hangs together and follows a logical sequence with a beginning, middle, and end, reported in that order. That is, it reflects how logical and sensible the memory report is to the listener or coder. Coders rated real memories as significantly more coherent than implanted memories (p = .024). Further, they rated fabricated memories as more coherent than implanted memories (p = .026), but did not rate real and fabricated memories differently (p > .05) (see Table 1).

Amount of Detail. The total number of details was calculated for each memory report. As shown in Table 1, fabricated memories contained significantly more details than implanted memories (p = .019) and marginally more details than real memories (p = .07). Real and implanted memories did not differ in their number of details (p > .05), despite a trend for real memories to be more detailed.

Real and fabricated memories across the total sample (N = 75). A MANOVA comparing the content of the real and fabricated memory reports was significant, Hotelling’s T² = 0.88; F(11, 64) = 5.14, p < .0001.
DECEPTIVE, MISTaken, AND TRUTHFUL TESTIMONY

Follow-up univariate tests were conducted, and as Table 2 indicates, when relating a real experience, participants admitted lacking memory for the event more often than when fabricating, $F(1,74) = 4.69, p = 0.03$. When fabricating, participants rated the vividness level of the memory as higher than when relating a real event, $F(1,74) = 10.21, p = 0.002$. As in the original analysis, fabricated events were rated as more stressful than real experiences, $F(1,74) = 11.35, p = 0.001$. Finally, fabricated memories contained more repeated details than truthful memories, $F(1,74) = 7.56, p = 0.007$, even though there was no difference in the overall number of details. When fabricating an experience, participants rated their memories as 11.9% more vivid, 14.0% more stressful, and repeated details 24.4% more frequently than when relating a real experience. When relating a real experience, participants reported lacking memory 20.3% more often than when fabricating (see Table 2).

Memory perspective

Participants were asked which perspective/vantage point characterized each memory image. A "participant" perspective meant that participants re-experienced the event from their own eyes and could not see themselves in the memory, whereas an "observer" perspective indicated that they re-experienced the event like "watching a video" and could see themselves in the memory. Chi-square analyses indicated that neither memory type was significantly more likely to be experienced from either a participant or an observer perspective, with $x^2(1,20)$ ranging from 0.80 to 1.80. However, there was a pattern differentiating real memories from the other two types of memories. For real memories, 40% and 60% of participants recalled the event from a participant and observer perspective, respectively. For fabricated memories, 65% of participants recalled the event from a perspective. For implanted memories, 60% of participants recalled the event through a participant perspective.

Confidence and vividness

Although, overall, implanted memories had lower confidence ratings than real or fabricated memories, 75% of implanted memories had confidence ratings greater than 4 (moderate) and 20% gave a rating of 7 (absolutely certain). However, 75% and 70.7% of real memories were rated a 7 in the implanted memory sub-sample and entire sample, respectively. Forty percent and 57.3% of fabricated memories were rated a 7 in the implanted memory sub-sample and across the entire sample, respectively. For implanted memories, confidence was related to vividness ($r(20) = .70, p < 0.05$).

Overall, 85.3% participants indicated that they would be willing to wager money that the real event had occurred. However, only 30.7% would wager that the false event had occurred. Of the participants who had not experienced memory distortion, 87.5% would wager that the real event occurred. Eighty-seven percent of participants who had a partial false memory and 80% of those who had a complete false memory were willing to do so. Participants also were informed that one of two events (real or false) had not actually occurred and were asked to guess which. Overall, 92% guessed correctly that the false event was the event which had not occurred. The other 8% were unable to guess.

Individual differences in false memories

An important question that has arisen from the recovered memory debate is whether individual differences contribute to susceptibility to memory distortion. Research has consistently shown that under controlled laboratory conditions, many participants experience false memories while others are not susceptible to misinformation effects (e.g., Loftus, 1997a, 1997c). What differentiates those people who are susceptible to implanted memories and those who are not? We hypothesized that memory distortion would be influenced by characteristics of both interviewers and rememberers (Porter et al., 2000).

To examine the relationship between susceptibility to memory distortion with both dissociation and personality, we administered the Dissociative Experiences Scale (DES; Bernstein & Putnam, 1986) and the NEO-Five

Table 2: Comparison of True and Fabricated Memories Across the Entire Sample (N = 75)

<table>
<thead>
<tr>
<th>MAP Criteria</th>
<th>True Memories (M and SD)</th>
<th>Fabricated Memories (M and SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vividness/Clarity**</td>
<td>4.68 (1.86)</td>
<td>5.31 (1.11)</td>
</tr>
<tr>
<td>Stress Ratings**</td>
<td>4.64 (2.68)</td>
<td>5.63 (1.32)</td>
</tr>
<tr>
<td>Sensory Components</td>
<td>2.73 (1.11)</td>
<td>2.20 (0.97)</td>
</tr>
<tr>
<td>Confidence</td>
<td>6.37 (1.15)</td>
<td>6.35 (0.89)</td>
</tr>
<tr>
<td>Re-experiencing Mental Experience</td>
<td>3.84 (1.17)</td>
<td>3.97 (0.87)</td>
</tr>
<tr>
<td>Experiencing Lack of Memory*</td>
<td>4.87 (3.80)</td>
<td>3.98 (2.23)</td>
</tr>
<tr>
<td>Number of Details</td>
<td>83.18 (10.51)</td>
<td>92.29 (56.07)</td>
</tr>
<tr>
<td>Relevancy</td>
<td>5.04 (1.29)</td>
<td>4.68 (1.29)</td>
</tr>
<tr>
<td>Repeated Details**</td>
<td>14.07 (1.57)</td>
<td>18.60 (20.40)</td>
</tr>
<tr>
<td>Reasons for Lack of Memory</td>
<td>2.1 (1.47)</td>
<td>19.6 (1.46)</td>
</tr>
<tr>
<td>Coherence</td>
<td>4.57 (1.37)</td>
<td>4.63 (1.29)</td>
</tr>
</tbody>
</table>

Note. Table 2 has been reproduced from Porter, Yule, & Lehman (1999) with permission from Pion, Inc., Publishers.

*p < 0.05, **p < 0.01, ***p < 0.005, ****p < 0.0001.
Factor Inventory (NEO-FFI; Costa & McCrae, 1992) to the participants. Given that there were a number of different interviewers in this study, the impact of interviewer personality features (as measured by the NEO-FFI) was investigated also. Results demonstrated that participants who had experienced memory distortion were much more dissociative (according to DES scores) than their counterparts. The mean DES score of the memory distortion group ($M = 20.53$, $SD = 10.77$) was approximately twice as high as the no memory distortion group ($M = 10.44$, $SD = 7.54$), $t(45) = -3.19$, $p = .01$. Interestingly, neither age, gender, nor education influenced degree of susceptibility to false memories. However, susceptibility to memory distortion was related to extraversion, $F(2, 36) = 3.85$, $p = .05$. Participants who experienced a complete mistaken memory had significantly lower extraversion scores ($M = 49.08$, $SD = 13.46$) than those who experienced minor distortion ($M = 60.71$, $SD = 8.91$). There also was a trend for conscientiousness scores to differ, $F(2,35) = 3.27$, $p = .051$, with the no distortion group scoring the highest on this measure ($M = 53.25$, $SD = 12.01$). Further, participants' susceptibility level was higher ($F(2,43) = 3.08$, $p < .05$) with interviewers who scored high ($M = 2.10$, $SD = 0.53$) on extraversion than interviewers who scored low ($M = 1.40$, $SD = 0.70$). Overall, this pattern of findings indicates that a suggestive interaction between an extraverted interviewer and a more introverted, less conscientious, dissociative rememberer may be a recipe for memory distortion. These results support the view that memory distortion result from a social negotiation between interviewers and interviewees and that particular personality characteristics and interpersonal/situational dynamics contribute to their creation.

**DISCUSSION**

Deception and memory distortion are important concerns in the legal system. Our research sought to answer a critical question: can we tell whether a person is lying, mistaken, or truthful? First, we demonstrated that different types of incidents, which would have been highly emotional or traumatic had they occurred, can be mistakenly "recovered" as memories (Porter et al., 1999). Over repeated interviews, more than half of participants came to report that they experienced a stressful incident that actually had been contrived by the researchers. Some of these "recovered" memories were quite dramatic; for example, one participant experienced a false memory for falling on his head, getting a painful wound, and being sent to an emergency room. The high degree of memory distortion that resulted in this research was likely due to the multiple suggestive techniques employed by the well-trained interviewers. As well, participants were asked to repeatedly think about the false event each evening and make notes about any "recovered" information. Despite the fact that a large number of participants experienced memory distortion, it should be kept in mind that nearly half of them thoroughly resisted the misinformation provision. This indicates that memory distortion is not an inevitable consequence of misinformation provision.

After establishing that implanted memories for emotional incidents can occur, it was next shown that features of the false memories differed from those of real and fabricated memories. Implanted memories were less vivid and clear than real or fabricated memories. In turn, fabricated memories were more vivid than real memories. Second, although some implanted memories were recalled with a high degree of confidence, overall, participants were generally less confident in their false memories than in their real or fabricated memories. Confidence was high, and did not differ, for the real and fabricated memories. Third, fabricated events were rated as more stressful than both real and implanted events, which did not differ on this dimension. Fourth, the implanted memory reports were rated as less coherent than both the real and fabricated memories. The latter two memory types did not differ from each other on this measure, unlike previous findings (e.g., Porter & Yuille, 1996). Fifth, fabricated memories were rich in detail relative to the real and implanted memories. There was also a trend for real memories to contain more details than implanted memories. Interestingly, for most of the real memories, participants reported that they could see themselves in the memory image (i.e., observer perspective) whereas in both implanted and fabricated memories, a participant perspective dominated. Additional content differences were discovered in the real and fabricated memories over the whole sample. Fabricated memories had fewer admissions of lack of memory (see also Porter & Yuille, 1996) but more repeated details than real memories.

Overall, when discussing their memories for real experiences, the subjective ratings and memory content were generally of high quality, perhaps not surprisingly, given the emotional significance of the events being reported. These memories, usually based on events from ten to twenty years ago, had stood the test of time. On the other hand, compared to real memories, implanted memories had some good (e.g., relevance) and some poor content features (e.g., coherence), and generally poor subjective features, including lower vividness and confidence in the memories. (However, some of the implanted memories were rated with high confidence and vividness). Fabricated memories had high subjective ratings of vividness, stress, and
confidence. However, they also contained some poor qualities. Overall, the fabricated memories had an exaggerated, unrealistic, "over-the-top" quality.

Individual differences contributed to susceptibility to memory distortion (Porter et al., 2000). Susceptible individuals were far more disassociative and tended to score lower on measures of extraversion and conscientiousness than their counterparts. Interviewers who were more "successful" at implanting the memories were generally more extraverted than those who were less successful. These individual difference factors may be useful in clarifying the social nature of memory distortion. They might also be used in applied forensic settings to identify particularly suggestible individuals and suggestible social interactions/dynamics.

The implications of the current findings are considerable. Investigators and psychotherapists can benefit from the knowledge that even confidently held mistaken memories can be produced from suggestive interviewing. It is recommended that suggestive techniques such as guided imagery be avoided in practice (e.g., Courtois, 1997; Knapp & Vandecreek, 1997). In assessing the credibility of emotional memories, professionals may keep in mind the content criteria and individual differences identified here. We think that an important remaining empirical issue for psychology and law researchers to address is whether professionals in legal contexts be trained to use empirically-based clues to deception and implanted memories. Our ongoing program of research offers some promising findings relevant to this issue. For example, we recently found that the ability of a sample of Canadian parole officers to detect videotaped deceit increased substantially with two days of intensive training, from chance levels to a rate of accuracy over 70% (e.g., Porter, Woodworth, & Birt, in press). This indicates that research findings on deception can indeed facilitate investigative practice in forensic settings. Next, we plan to extend this type of research to the effect of training on the identification of implanted memories.

REFERENCES


Jennings, B. L., & Dyer, J. K. (1990). No. 102 Court of Appeals (Maryland 29).


DECEPTIVE, MISTAKEN, AND TRUTHFUL TESTIMONY


