

In S. J. Ceci, M. P. Toglia, & D. F. Ross (Eds.), Children's Eyewitness Memory. New York: Springer-Verlag. (1987).

6 Reality Monitoring and Suggestibility: Children's Ability to Discriminate Among Memories From Different Sources

D. STEPHEN LINDSAY and MARCIA K. JOHNSON

Throughout the relatively brief period since the invention of the modern Romantic concept of childhood in the nineteenth century (Aries, 1962, cited in Kessen, 1979), and throughout the even briefer history of the science of psychology, the idea of young children serving as eyewitnesses in courts of law has run counter to our notions of children's capabilities (Goodman, 1984). Now, in the mid-1980s, children's competency as eyewitnesses has become an important issue, as children more and more frequently are the victims of reported crimes and as psychologists become increasingly concerned with conducting research and constructing theory within "ecologically valid" contexts and constraints (e.g., Bahrick & Karis, 1982; Bronfenbrenner, 1977; Neisser, 1976, 1982, 1985).

Giving accurate testimony demands many cognitive abilities, any or all of which may develop with age. A partial list of such abilities includes perceiving and comprehending the initial event, retaining representations of one's perception of the event, understanding questions about the event, retrieving relevant information, and discriminating between memories of one's perception of the event itself and memories from other sources of information pertaining to the event. This chapter focuses on theories and evidence concerning the last of these: developments in children's abilities to discriminate the sources of their experiences and memories. Specifically, we are interested in two general classes of discriminations that can influence the accuracy of eyewitness testimony: (a) discriminations between memories of perceived and imagined events and (b) discriminations between different external sources of memories pertaining to the same event.

When a person witnesses an event, mulls it over in his or her mind, and hears other people talk about it, he or she stores information about the event from all three sources. If later asked to recall the event as it was witnessed, such a person must discriminate memories of the event itself from memories of his or her ruminations and from memories of what other people said about the event. Discriminating memories of largely externally derived experiences (e.g., the initial perception of the event) from memories of largely internal experiences (the ruminations) has been termed "reality monitoring" (Johnson & Raye, 1981). In this chapter, discriminating between memories derived from different external

sources (e.g., the initial perception of an event and what others said about it) will be termed “external-source monitoring” (Johnson, 1987).

In the following pages, we will first discuss some of the theoretical and empirical work that bears on the development of reality monitoring. Then we will turn to the development of external-source monitoring, focusing particularly on the role of source monitoring in suggestibility. We will present three major arguments: (a) developmental theory suggests that preschool-age children should be less accurate in their reality monitoring and external-source monitoring attributions than older children and adults; (b) eyewitnesses’ susceptibility to misleading suggestions, which is often described in terms of disruptions of memory for the original information, may instead be accounted for in terms of erroneous source monitoring attributions; and (c) the small number of empirical studies to date indicate that 6-year-old children show a deficit in some types of source attributions but not in others. We also indicate some potential directions for further work on children’s ability to discriminate among memories from different sources.

Reality Monitoring

Many philosophers (e.g., Hume, 1739/1962; James, 1890/1983; Locke, 1689/1965; Reid, 1764/1975) and psychologists (e.g., Cameron, 1963; Freud, 1895/1966, 1925/1961; Horowitz, 1978; Perky, 1910; Segal, 1970) have been interested in how people discriminate externally derived (perceptual) experiences from internal experiences. Locke (1689/1965) did not discuss this issue as a problem, but he may well have created it; for Locke, the word “idea” referred to both sensations and reflections. Hume (1739/1962) took exception to this lack of differentiation (“I [would] rather restore the word ‘idea’ to its original sense, from which Mr. Locke has perverted it.”) (p. 177), and argued that sensations and reflections are different phenomena. Hume suggested that the two are differentiated primarily in terms of their strength or vividness. James (1890/1983) made a similar argument, whereas other philosophers (e.g., Reid, 1764/1975) claimed that perceptions and images are qualitatively different from one another.

For the most part, interest has focused on “reality testing,” the process of distinguishing present perceptions from present imaginations and recollections. As Johnson and Raye (1981) argued, however, people face an analogous (but harder) problem when they retrieve memories of experiences. Johnson and Raye termed the processes involved in discriminating memories of perceptually derived experiences from memories of internal experiences “reality monitoring.”

Johnson and Raye proposed that there are characteristic differences between memories of externally derived events and memories of internally generated events, and that reality-monitoring decisions are made on the basis of a few general dimensions along which the two types of memories vary. Johnson and Raye argued that, in general, memories of externally derived experiences include more contextual information (the “where” and “when” of an event), more

sensory attributes, and more detail than memories of internal experiences. On the other hand, because perception is characteristically more "automatic" than thought or imagination (Hasher & Zacks, 1979; Posner & Snyder, 1975), Johnson and Raye suggested that memories of externally derived experiences usually include fewer indications of cognitive operations active at the time of the experience.

In the model Johnson and Raye proposed, most reality-monitoring decisions are made by a "fast-guess" procedure (e.g., Atkinson & Juola, 1973) on the basis of the characteristics mentioned above. That is, memories with lots of sensory vividness and semantic and contextual detail, and relatively few indications of cognitive operations, will tend to be classified as memories of perceived events. Memories that are not vivid and lack detail and contextual information, but include indications of many cognitive operations, will tend to be classified as memories of imagined events. Most of the time, we do not make such decisions consciously—we recall an experience from our past and "simply know" that it is a memory of an event that actually happened, or a memory of an event that we fantasized or thought about. If, however, a particular memory cannot confidently be classified as perceptual or imaginal by the fast-guess procedure, more extended reasoning processes may be performed. These include examination of the content of the memory and its relation to other knowledge and various biases based on the beliefs people have about memory phenomena (i.e., metamemory).

The studies of reality monitoring in adults have been reviewed elsewhere (e.g., Johnson, 1985, 1987; Johnson & Raye, 1981) and will only be mentioned briefly here. In general, the results have supported Johnson and Raye's model of reality monitoring. Memories of externally derived experiences do seem to have more sensory, spatial, and temporal information than memories of internal experiences, and people use the amount of such information associated with a memory when they make reality monitoring decisions (Johnson, 1985; Johnson, Raye, Foley, & Kim, 1982; Schooler, Gerhard, & Loftus, 1986; Suengas & Johnson, 1985, 1986). People have more difficulty discriminating between memories if both are of internal events or both are of externally derived events than if one is of an internal event and the other is of an externally derived event (Foley, Johnson, & Raye, 1983; Raye & Johnson, 1980). Confusions between memories of internal and externally derived events occur more frequently when the internal events are especially vivid (Johnson, Raye, Wang, & Taylor, 1979), share many sensory qualities with the externally derived events (Johnson, Foley, & Leach, in preparation), or involve relatively few cognitive operations (Johnson, Kahan, & Raye, 1984; Johnson, Raye, Foley, & Foley, 1981).

How good are children at reality monitoring? According to a long tradition of theorizing in child development, young children should be relatively poor at reality monitoring. In the following sections, we will briefly discuss the theories of Freud and Piaget as they relate to this issue, and attempt to summarize the views of more modern researchers. We have focused on Freud and Piaget both because of the tremendous impact they have had on developmental theory and because of

the direct relevance of their work to reality monitoring. We will also review and critique our research on the development of reality monitoring in children.

Freud

At a general level of analysis, Freudian theory (e.g., 1917/1964; 1933/1964; see Miller, 1983, for a helpful overview) describes development as the gradual emergence of the ego and “secondary-process” or rational/practical thought to dominance over and control of the id and “primary-process” or irrational/fantastical thought. The newborn is said to be ruled by the id, that is, by impatient gratification-seeking in accordance with the pleasure principle. According to Freud (e.g., 1911/1958), the first mental images are hallucinations of gratification, the products of primary-process thought. The id cannot directly distinguish between the subjective and the real, and, when its needs are not met in reality, it uses primary-process thinking to hallucinate fulfillment.

With the development of the ego and secondary-process thought, infants begin to be able to use reasoned, practical behaviors to satisfy their needs and desires. Through reality testing, the child eventually comes to abandon the pleasure principle and adhere to the reality principle. This is a gradual process, however, and throughout the first 6 or 7 years of life rational thought often fails to mediate successfully between the demands of the id and the constraints of reality. Further, young children are said to progress through a series of sexually charged conflicts concerning their bodies and their relationships with their parents. Consequently, the id and its fantasies were claimed to often dominate the mental life of the young child.

Although Freud (e.g., 1908/1959, pp. 143–144, 1917/1964, pp. 371–372) did not claim that preschool-age children believe their fantasies are real, he did suggest that their proclivity for fantasy reduces young children’s ability to be accurate and reliable (Freud, 1909/1955):

The untrustworthiness of the assertions of children is due to the predominance of their imagination, just as the untrustworthiness of the assertions of grown-up people is due to the predominance of their prejudices. (pp. 102-103)

One interpretation of Freud’s writings on this subject is that he believed that preschool-age children are aware of the unreality of their fantasies when they are engaged in them, but are prone to confuse memories of fantasies with memories of reality. That is, preschool-age children may have mastered reality *testing* but not reality *monitoring*.

Freud specifically discussed what is here referred to as reality monitoring in the context of his “seduction theory.” In the course of analysis, Freud’s patients frequently described traumatic sexual experiences that they recalled from their early childhood. Early in his career, Freud (1896/1962) believed that these reports were veridical and that he had uncovered the primary cause of neurotic disorders among Victorian women: A frighteningly high percentage of young

girls were sexually abused by adults—most often by their fathers. Freud named this the “seduction theory.”¹ Freud later decided that his patients’ reports were often memories of childhood fantasies, rather than memories of actual childhood experiences (e.g., Freud, 1906/1953, cited in footnote to Freud, 1933/1964, pp. 120–121). This new interpretation was extremely important for the development of psychoanalytic theory, in which the young child is invested with both sexual/aggressive drives and with a tendency to satisfy those desires through fantasy. Masson (1984) has criticized Freud’s decision to attribute his patients’ reports of sexual abuse to fantasy, as well as the psychoanalytic establishment’s continued avowal of that position. The controversial nature of this issue and its central importance in psychoanalytic theory is apparent in Anna Freud’s comment that “Keeping up the seduction theory would mean to abandon the . . . whole importance of phantasy life, conscious or unconscious phantasy. In fact, I think there would have been no psychoanalysis afterwards” (Masson, 1984, p. 59). Today, with some authorities estimating that as many as 25% of the women in this country were sexually abused as children (Finkelhor, 1984; Sedney & Brooks, 1984), it is no wonder that both seduction theory and psychoanalysis in general are being critically reevaluated. (See Malcolm, 1984, and Tavis, 1984, for reviews of Masson’s work.)

In summary, Freudian theory suggests that the mental life of the infant and preschool-age child is strongly influenced by wish-fulfilling fantasies, and that young children may confuse fantasized and actual experience. By extension, then, Freudian theory implies that young children should be more prone to erroneous reality-monitoring attributions than are older children and adults.

Piaget

Piaget’s work on developmental theory is vast and complex. We will discuss four areas within Piagetian theory that are particularly relevant to the issue of children’s reality monitoring: egocentrism, fantasy, mental imagery, and memory.

EGOCENTRISM

Piaget described development as a gradual process of decentration. Piaget (e.g., 1927/1977) maintained that the newborn has no sense of him- or herself as a particular object in a universe of other objects, and therefore cannot separate self from not-self. The infant is said to be “solipsistic” in the sense that, being unable to differentiate self and not-self, he or she unwittingly assimilates external reality to the self and projects his or her feelings and desires onto the world. With development and through acting on the environment and adjusting his or her actions to the characteristics of the things acted upon, the infant gradually

¹Freud’s name for this theory seems as ill-chosen as Piaget’s term “egocentrism.” Masson (1984, p. 34) argues that Freud did *not* mean to imply that children invite sexual abuse.

develops a world view in which the self and other objects are differentiated from one another.

Although the 2-year-old is not said to be “solipsistic,” Piaget claimed that the differentiation between self and not-self is still far from complete at the end of infancy. Piaget contended that preschool children are profoundly egocentric. While understanding that he or she is an object among a universe of objects, the 2- to 6-year-old child persists in projecting his or her thoughts, feelings, and desires onto external reality and, at the same time, objectifying his or her thoughts and feelings. Preschool-age children consequently have difficulty distinguishing internally generated and externally derived experiences: “So long as thought has not become conscious of itself, it is prey to perpetual confusions between objective and subjective” (Piaget, 1926/1983, p. 34).

FANTASY

Piaget (1937/1954; 1945/1962; Piaget & Inhelder, 1966/1969) did not concur with Freud’s claim that newborns hallucinate. For Piaget, the ability to mentally represent nonpresent objects develops only toward the end of infancy (1½ to 2 years) and remains rather limited until the age of 7 or 8 years. Hence the experience of the newborn, according to Piaget, is devoid of fantasy. It is only at the end of infancy, when the child gains representational skills and begins to engage in symbolic or pretend play, that fantasy becomes an important part of the child’s repertoire.

Piaget (1945/1962; Piaget & Inhelder, 1966/1969) viewed symbolic play as “pure assimilation” of reality to the needs and desires of the self. That is, in play the child assimilates reality to his or her schemata, without being constrained by the objective nature of the materials played with. Thus, a simple block of wood may be assimilated to a “toy car scheme.” Play is said to provide the child with new ways to exercise schemata and master reality (as in practice play), on the one hand, and to allow him or her to distort and refashion reality according to his or her desires, on the other. For Piaget, the distortion of reality is the hallmark of symbolic play. (See Bretherton, 1984, for a critique of Piaget’s approach to symbolic play.)

In terms of reality testing, the crucial question concerning children’s make-believe play is “Does the child believe that the pretense is real?” Piaget suggested that it is only until the age of 3 or 4 years that children genuinely believe in their pretend play, and even then it is not really a matter of positive belief: The 2- to 4-year-old child simply “does not consider whether its ludic [play] symbols are real or not” (1945/1962, p. 168). By the age of 3, the child has “detected a shade of difference between . . . what is true and what is simply imagined,” but “when he is in the presence of one it seems to him the only true one. . . . In consequence, these two planes, that of play and that of sensuous observation, are very different for the child from what they are for us, and, in particular, they are less distinct” (Piaget, 1924/1972, pp. 246–247). Thus, children were said to have difficulty separating fact and fantasy throughout the preoperational period:

The child's mind is full of these "ludistic" [pretend play] tendencies up to the age of 7-8, which means that before that age it is extremely difficult for him to distinguish between fabulation and truth. (p. 202)

IMAGERY

The child's perception of self-generated mental images is also relevant to the issue of reality testing and subsequent reality monitoring. Piaget argued that mental images are derived from "internalized imitations" rather than from perception. Imitation, the approximate copying of a model, is an important development in Piagetian theory. As in his treatment of play, Piaget approached imitation as an indication of developing representational and operational skills (see, e.g., Piaget, 1936/1953). When a child imitates a model, he or she accommodates schemes of action in order to fit his or her posture and movements to those of the model. The child gradually develops the ability to perform such "imitations" internally by manipulating figural mental representations, or symbols, that stand for the object.

Piaget classified perception, imitation, and imagery as "figurative" aspects of knowing, in contrast to "operative" aspects of knowing. Figurative thought is that which represents states or appearances (more or less accurate "pictures" of the world), whereas operational thought represents operations upon and transformations of reality. Piaget's primary interest, of course, was in the development of logicomathematical operations, and his main concern in discussing figurative thought was to argue that it is *not* the origin of operational intelligence. According to Piaget (e.g., Piaget & Inhelder, 1963/1969, 1966/1969), developments in figurative thought (e.g., mental imagery) are dependent on and follow from developments in operational thought. Thus, children's mental imagery, like their logical thought, remains quite limited until the development of "concrete operations" (fully internalized logical processes characterized by reversibility and closure) at around 7 years of age: "The mental images of the child at the preoperative level are almost exclusively static" (Piaget & Inhelder, 1966/1969, p. 71). If, as Piaget contends, children under age 7 are unable to freely manipulate mental images, it follows that they may be unable to engage in purely mental fantasies, unaided by actions and props. That is, it may be the case that children under 7 years cannot spontaneously fantasize complex scenarios without acting them out in some way.

As with play, the central issue regarding mental imagery in the present context concerns the child's ability to distinguish between image and reality. Although Piaget (1926/1983) suggested that the ability to distinguish the two develops quite early, he also contended that children are nonetheless prone to confuse image and reality until the development of formal operations (10 or 11 years).

Memory

Consistent with the general nature of his approach to cognitive development, Piaget (Piaget & Inhelder, 1968/1973) described memory as a dynamic process guided by intelligence rather than as a passive storehouse. Piaget theorized that

there are two distinct but interactive kinds of memory. “Memory in the broad sense” refers to the schemata of intelligence in general, whereas “memory in the strict sense” refers to the preservation of specific experiences. The nature of one’s memory for specific situations, objects, or actions is determined by the nature of the schemata involved in comprehending the initial information and in reconstructing the initial experience in memory. Thus, a given situation might be remembered differently by younger and older children because children of different ages would not have understood the situation in the same way. Likewise, a child’s memory for a given situation or event may change in interesting ways as the child develops and his or her schemata change.

For example, Piaget and Inhelder (1968/1973) found that some children’s reconstructions of an array of sticks ordered by increasing length were more accurate after a delay of several months than they were one week after the child initially viewed the array. Piaget and Inhelder argued that the improvement in the children’s reconstructions reflected the fact that they had developed a general understanding of seriation during the extended delay period. Although Piaget and Inhelder’s (1968/1973) demonstrations of memory improvements with long delays have not been consistently replicated (Liben, 1977), the general idea that memory and intelligence are interdependent is both intuitively appealing and well supported (e.g., Chi, 1978; Meacham, 1977).

Our claim that source monitoring is an active decision-making process performed during retrieval is compatible with Piaget’s approach to memory: One aspect of reconstructing a memory involves determining the source of the original experience. Indeed, Piaget (1945/1962, pp. 187–188) reported a very vivid, but false, memory of an attempt to kidnap him when he was a young child. It turned out that the memory was based on a story he had heard as a child, and the visual images of the event that he remembered were actually fantasy images based on the story.

Piaget’s approach to memory, in which memory “in the strict sense” is interdependent with world knowledge and ways of thinking, is also compatible with the idea that reality-monitoring changes with age. As we discussed above, Piaget (e.g., 1924/1972, 1926/1983, 1945/1962) argued that as children develop they come to differentiate fact and fantasy more clearly and consistently in their ongoing experience. If memory for specific events is determined by the intelligence that apprehends those events, it follows that memories of perceived and imagined events come to be more discriminable, and more consistently differentiated at recall, as the child develops. Thus, Piaget’s theory, by extension, implies that children under 7 or 8 years of age are more likely to make reality-monitoring errors than are older children. It also follows that a child who misattributes the origin of a memory at one age (e.g., mistakes a memory of a fantasy as a memory of an actual experience) may later attribute the memory to the correct source.

SUMMARY

According to Piaget, young children do not clearly and consistently differentiate between the subjective and the objective until the age of 7 or 8 years. Further,

Piaget maintained that the nature of the child's memories of specific events is determined by the nature of his or her developing understanding of the world. Based on these ideas, one would expect a developmental trend in reality monitoring: Young children should have more difficulty discriminating between memories of actual and imagined events.

Current Views

Although Freud's ideas about children raised considerable controversy, we are not aware of any rigorous empirical tests of his claims regarding hallucinatory satisfaction in infancy or sexual fantasies in early childhood. This is in large measure because these claims are inherently difficult to test. It is fair to say, however, that most modern researchers in cognitive development have rejected the notion of infantile hallucination (see Miller, 1983, pp. 153–158).

Whereas Freud's theories have resisted experimental study, Piaget's claims have precipitated a large number of empirical investigations. Many cognitive developmentalists today believe that Piaget exaggerated the egocentrism of children between 3 and 7 years of age (e.g., Donaldson, 1978; Flavell, 1977). There is evidence indicating that children as young as 3 years are, under some conditions, able to appreciate the differences between their perspective and that of another person (e.g., Maratsos, 1973; Marvin, Greenberg, & Mossler, 1976; Whitehurst & Sonnenschein, 1978). It is important to note, however, that young children do demonstrate egocentric thinking under some conditions (e.g., Gluck-berg, Krauss, & Higgins, 1975).² Thus, although it now appears that children are not as egocentric as Piaget suggested, they are still often said to be less able than adults to clearly and consistently separate separate subjective and objective aspects of their experiences.

From Sully (1895/1896) to Singer (1973), psychologists have described the preschooler as a being enchanted by fantasy and make-believe play. In the last two decades, the study of children's play has become a field in its own right. Much of this literature has concerned the development of social and communicative skills involved in shared play. Modern cognitive developmentalists have also emphasized the dynamic, creative role of make-believe play in the development of cognition. Bretherton (1984), for example, has argued that "the ability to create symbolic alternatives to reality and to play with that ability is as deeply a part of human experience as the ability to construct an adapted model of everyday reality" (p. 38). The consensus seems to be that fantasizing is a remarkable cognitive ability that gradually develops from around 18 months through at least the early school years. During that period, the content of symbolic play evolves from

²Earlier, we discussed Piagetian egocentrism in the general sense of the inability to separate the objective from the subjective. Most recent empirical work, however, has focused on developments in the ability to appreciate the differences between one's own perspective and that of another person. For Piaget (e.g., 1926/1983) the inability to take another's point of view was simply one aspect of egocentrism in the general sense.

enactments of everyday schemata (e.g., pretending to go to sleep) to far-flung flights of imaginative fancy.

Very little experimental research to date has focused specifically on children's ability to distinguish reality and fantasy. Those studies that have been published report developmental improvements in the ability to separate fact and fancy (Lottan, 1967; Morrison & Gardner, 1978; Scarlett & Wolf, 1979; Taylor & Howell, 1973; also see Winner & Gardner, 1979). Developmental trends have also been found in related work on the development of the ability to distinguish between the actual and apparent characteristics of stimuli (e.g., the color of a white piece of paper placed under a blue transparency) (e.g., Flavell, Flavell, & Green, 1983; Kohlberg, 1968). In general, the current view is that, between the ages of 3 and 6 or 7 years, children's grasp of the distinction between pretend and not-pretend develops from an implicit and tenuous separation to a consciously apprehended, but still violable, dichotomy (e.g., Bretherton, 1984; Scarlett & Wolf, 1979; Winner & Gardner, 1979). Even the 2-year-old never *really* attempts to eat a pretend cookie, yet considerably older children sometimes have trouble separating reality and pretense, especially when the content of the pretense is emotionally charged (Bretherton, 1984).

In summary, although both Freud's and Piaget's claims have been challenged, current research nonetheless suggests that young children should be more prone to failures of reality testing than older children or adults. Fantasy and make-believe appear to be important parts of the young child's mental life, and young children are said to be less likely than older children to clearly and consistently differentiate fact and fantasy.

Implications for Children's Reality Monitoring

The theoretical and empirical work reviewed above suggests that reality and fantasy commingle in children's minds more than in adults'. In this section, we will discuss the implications of these views for children's reality monitoring.

If children do not differentiate ongoing fact and fantasy as clearly as adults do, their memories of these two kinds of experiences might not differ from one another in the ways that adults' memories do (i.e., sensory vividness, contextual and semantic detail, cognitive operations). Thus, the characteristic differences that adults use to discriminate between memories of imagined and perceived events might not differentiate the two in children's memories, simply because the two kinds of experiences themselves do not differ along those dimensions.³ Alternatively, it might be that children's experiences (and their memories) of imagined and perceived events do characteristically differ along the same dimensions as

³This idea is consistent with Kosslyn's (1978) hypothesis that young children tend to think in images, whereas adults more often think in abstract propositions. Assuming that images are more similar to percepts than are propositions, it follows that the thoughts and percepts of young children should be more similar to one another (and hence less discriminable) than the thoughts and percepts of adults.

adults', but children do not know that these attributes provide reliable cues to the differentiation of actual and imagined events. That is, children may lack the metamemory assumptions that adults have. This idea is consistent both with the claim that children lack a conceptual grasp of the distinction between fantasy and reality and with the suggestion made by Flavell et al. (1983) that children are less prone than adults to reflect upon and evaluate their memories and are "less cognizant of and attentive to the source and nature of their [mental] representations" (p. 117).

If children do not have a conscious understanding of the distinction between actual and imagined events, they may simply not even think of dichotomizing their memories into those that refer to actual and to imaginal experiences. That is, it may be the case that preschool children do not actively believe that actual and imagined events are equally real, but, rather, that they do not actively draw the distinction between the two as sharply and consistently as older children and adults (cf. Sugarman, in press). There is evidence that children have some understanding of the distinction between fact and fantasy from a fairly young age (5 or 6 years) (e.g., Kohlberg, 1968). It is possible, however, that children might have some understanding of the distinction, but not know that it is pertinent, when one is asked to recall an event.

In our review of developmental theory, we have focused on children's ability to differentiate fact and fantasy in their ongoing experience. We should note, however, that even if preschool-age children differentiate actual and imagined events perfectly in their ongoing experience, they may nonetheless be prone to reality-monitoring failures. After all, adults who initially know the reality status of events sometimes make erroneous reality-monitoring attributions, and the factors that have been shown to increase the likelihood of reality-monitoring errors in adults (e.g., ease and vividness of imagining) may well be more characteristic of children's fantasy than of adults'.

Johnson and Raye (1981) hypothesized that when adults are unable to make reality-monitoring decisions solely on the basis of the attributes that characteristically differentiate memories of actual and imagined events, they use higher mental processes involving the semantic content of the memory and its relation to their general world knowledge to make the decision. Limitations in children's world knowledge or abstract reasoning skills may limit their ability to use this strategy. Johnson and Raye also proposed that adults use metamnemonic decision biases when making reality-monitoring decisions (e.g., the belief that memories of actual events are "stronger" than memories of imagined events). Young children may lack such metamnemonic knowledge.

In summary, there are a number of reasonable hypotheses that suggest that children should be more likely than adults to make erroneous reality-monitoring attributions. Coupled with the claim that children spend a great deal of their time immersed in fantasy (e.g., Winner & Gardner, 1979), these hypotheses suggest that children may make inaccurate reality-monitoring attributions quite often in their daily lives.

Empirical Investigations of Children's Reality Monitoring

Empirical investigations of children's reality monitoring have only recently begun. We have started with relatively constrained laboratory-type experiments and are gradually moving to broader, more realistic procedures. In this section, the published research on children's reality monitoring is summarized and critiqued, and some of our current projects are briefly discussed.

If people sometimes confuse memories of perceived and imagined experiences, then their estimates of the number of times a particular event occurred may be affected by the number of times that event was imagined as well as by the number of times it actually occurred. Johnson, Taylor, and Raye (1977) found support for this hypothesis with adult subjects: Estimates of the number of times an item had been presented increased with the number of times that item had been imagined. If children are more likely than adults to make reality-monitoring misattributions, their frequency estimates should be even more affected by the number of times an event was imagined. In the first published experiment concerning children's reality monitoring, Johnson, Raye, Hasher, & Chromiak (1979) asked 8-, 10-, and 12-year-old children and adults to look at pictures of common objects on some sets of trials and, on other sets of trials, to form mental images of some of the same pictures. Over the course of the procedure, each picture was shown once, twice, or three times and imagined once, three times, or not at all. Repetitions of items occurred across, not within, blocks of trials, and each picture was shown at least once before the subject was asked to form an image of it.

Following this acquisition phase, the subjects were shown each picture and asked to estimate how many times they had actually seen that picture during the experiment. Consistent with the earlier work with adults, the number of times an item was imaged affected subjects' estimates of how many times they had seen that item. Contrary to our expectations, however, no developmental trends appeared in the data: If anything, the children's frequency estimates were slightly *less* affected by the number of times the items were imaged.

There are two explanations for the lack of developmental trends in these data. First, it may be the case that reality monitoring simply does not develop beyond the age of 8 years. Second, the children's mental images of the items may have been less accurate or less detailed than those of the adults. In order for imaging trials to affect frequency estimates, each memory of an image must be accurate and vivid enough to be taken as a token of the type exemplified by the test stimulus. If children's images were less vivid or accurate, then they might show little evidence of reality-monitoring failures despite a general deficit in reality monitoring. Even if young children's spontaneous images are more vivid than adults', the images they form on demand in an experiment such as this might be less vivid or less accurate than adults, thus, a possible deficit in reality monitoring may have been masked by poor imagery.

Foley et al. (1983) used a different procedure and younger subjects to explore developmental changes in reality monitoring. In the first of two experiments,

6-, 9-, and 17-year-old subjects either said words and listened as another person said words (the Say-Listen condition) or said words and imagined themselves saying words (the Say-Think condition). Subsequently, subjects were given a surprise "identification-of-origin" test in which they were to indicate whether each test item was (a) a new word, (b) a word they had said, or (c) a word the other person had said (for subjects in the Say-Listen condition) or a word they had imagined themselves saying (for subjects in the Say-Think condition).

The reality-monitoring model proposed by Johnson and Raye (1981) suggests that it should be harder to determine whether a word was spoken or imagined (both self-generated) than to determine whether a word was spoken or heard (one self-generated and one other-generated). Saying and imagining saying a word share many common attributes, whereas hearing and saying a word are relatively distinct processes. The developmental literature suggests that young children should find it particularly difficult to discriminate between imagining saying and actually saying or hearing because young children are said to closely identify thought and speech (Piaget, 1926/1983). Because young children are said to have at least some grasp on the self-other distinction, developmental theory suggests that young children, like adults, should be more prone to confuse memories of saying and imagining saying than memories of saying and hearing. Finally, developmental theory also predicts that children in both conditions will perform more poorly than adults.

As predicted, subjects in the Say-Think condition made significantly more errors on the identification-of-origin test than did subjects in the Say-Listen condition. Moreover, the 6-year-olds in the Say-Think condition were significantly less accurate than the older subjects.⁴ These findings suggest that 6-year-old children are as accurate as older children and young adults when asked to remember whether a test item was a word they had said themselves or one they had heard another person say, but they do not perform as well as older children when the discrimination is between having said and having imagined saying a word.

The second experiment reported in Foley et al. (1983) demonstrated that this selective deficit was not because of a general problem with discriminating imagined events from actual events. In the Think-Listen condition of Experiment 2, 6-year-olds were as accurate as 9-year-olds when deciding whether a test item was a word they had imagined themselves saying or one they had heard another person say. Children's performance in another condition of the same experiment suggests that the selective deficit observed among the 6-year-old subjects in the Say-Think condition was not due to a generally greater difficulty with separating memories from the same origin-class (i.e., discriminating between memories of self-generated events or between memories of other-generated events). The 6-year-olds performed no differently than the 9-year-olds in a Listen-Listen

⁴The interpretation of these data is somewhat complicated by the unexpected performance of the 9-year-old children: The 9-year-olds in the Say-Think condition performed slightly better than those in the Say-Listen condition (although the difference was not significant).

condition, in which subjects were asked to identify which of two other people had said each test word, although both age groups performed more poorly than subjects in the Say-Listen condition. The reality-monitoring model predicts that Say-Listen judgments should be easier than Listen-Listen judgments because the former requires a distinction between memories from two different classes (internal vs. external), whereas the latter is a within-class (external) judgment, and subjects must rely on specific details of the memory (e.g., sound of speaker's voice) to make the differentiation. For present purposes, the important point is that the performances of 6- and 9-year-olds in the Listen-Listen condition did not differ from one another. Thus, it is not the case that 6-year-olds' difficulty with the Say-Think condition was due to a general difficulty with discriminating between memories of the same origin class.

Two other developmental trends were observed in the Foley et al. (1983) study when they examined how subjects classified new test items that were misidentified as old items (i.e., false positives). When both 9- and 17-year-old subjects in the Say-Listen condition erroneously classified an item that had not been used in the acquisition phase as an old item, they significantly more often decided that it had been spoken by the other person than by themselves. Apparently, these subjects were demonstrating a response bias based on metamemory: Memories for self-generated events are generally "stronger" than memories for other-generated events. When subjects decide that a new word is an old word, their memory of the item is likely to be weak and uncertain, and they appear to decide "It must have been you, because I'd remember it more clearly if I had said it" (Johnson & Raye, 1981, discussed earlier evidence of this decision-making bias among adult subjects). The 6-year-old children in the Foley et al. study did not consistently show this decision-making bias.

The second developmental trend that emerged in the false positive data also concerned a decision-making bias. When 17-year-olds in the Say-Think condition erroneously classified a new test item as a word that had been used in the acquisition phase, they tended to indicate that the item had been imagined rather than said. Again, this decision-making bias probably represents metamemory: Memories of self-generated actions are generally "stronger" than memories of thoughts. Neither the 6-year-olds nor the 9-year-olds displayed this decision-making bias.

To summarize the findings of Foley et al. (1983), 6-year-old children were as accurate as older children when asked to judge (a) whether they or another person said a word, (b) whether they imagined themselves saying or heard another person say a word, or (c) which of two people had said a word. On the other hand, 6-year-olds were less accurate than older children when they attempted to determine whether a test word was one they actually said or one they only imagined themselves saying. The study also provided evidence for the development of two decision-making biases: If a memory is weak, it is probably a memory of a word another person said (if one is deciding whether the word was said by oneself or by someone else) or a memory of a word one imagined saying (if one is deciding whether one said or imagined saying the word). The 6-year-olds in

these experiments did not consistently show either bias, and the 9-year-olds showed only the former, "It had to be you," bias. The 17-year-olds, on the other hand, evidenced both biases.

The studies reviewed thus far indicate that children are as accurate as adults at discriminating the origins of their memories, except when required to differentiate between having said a word and having imagined saying a word. That children should have particular difficulty discriminating between their own thoughts and their own actions is consistent with the idea that children have a tendency to confuse some kinds of imagined and actual events. Perhaps, however, this tendency is restricted to the task of discriminating thoughts and *words*. As mentioned above, Piaget posited a special relationship between thought and word among young children.

The findings of two experiments by Foley and Johnson (1985) indicate that children's tendency to confuse memories of doing with memories of imagining doing is not specific to words. In the first experiment, 6- and 9-year-old children and adults either (a) performed and watched another person perform simple actions (e.g., clapping, bending backward) (the Do-Watch condition), (b) watched two people perform simple actions (the Watch-Watch condition), or (c) performed and imagined themselves performing simple actions (the Do-Pretend condition). Children of both ages in the first two conditions scored as well as adults on an identification-of-origin test. Both 6- and 9-year-old children scored significantly more poorly than adults, however, when asked to determine whether they had actually performed or only imagined themselves performing an action.

Foley and Johnson (1985) also asked their subjects to simply recall the actions used in the acquisition phase. (This free-recall task was performed before the identification-of-origin task.) Earlier research (e.g., Johnson et al., 1981; Slamecka & Graf, 1978) demonstrated that adult subjects tend to recall more self-generated than other-generated words. Slamecka and Graf termed this phenomenon the "generation effect." Foley and Johnson (1985) found that the size of the generation effect increased with age. Indeed, the 6-year-old subjects did not evidence a generation effect at all. This finding is consistent with earlier findings (Foley et al., 1983; L. R. Johnson, Perlmutter, & Trabasso, 1979, Experiment 1; McFarland, Duncan, & Bruno, 1983) and is particularly interesting in light of the finding by Foley et al. (1983) that 6-year-old children do not use the "It had to be you, because I'd remember it more clearly if I had done it" decision bias. It may be that the reason 6-year-old children do not use this bias is simply that its premise is not valid: 6-year-olds' memories of self-generated actions may not be "stronger" than their memories of observed actions.

To summarize the work published to date, it appears that children as young as 6 years of age perform as well as adults when asked to determine the origin of a memory of an event, except when they must discriminate between memories of actions they imagined themselves doing and memories of actions they actually perform. The difficulty young children evidence when asked to separate memories of doing and imagining does not arise from a general tendency to confuse their imaginations with actual events. Nor does it reflect a general tendency

to confuse memories of events that belong to the same origin class (i.e., self- or other-generated). Rather, the deficit appears to be specific to confusions between self-generated behaviors and imaginings of self-generated behaviors.

Critique of the Reality-Monitoring Research

There are three major limitations of these studies as they relate to eyewitness testimony. The first is the artificial nature of the stimulus materials and procedures. Whereas eyewitnesses are called upon to recall the actions of people performing complex and meaningful behaviors within the context of a richly structured physical and social environment, the studies to date have focused on relatively simple and decontextualized events.

We are currently conducting and planning studies of reality monitoring involving naturally occurring events and more realistic stimuli, settings, and procedures. One such study, concerning adults' memories for their dreams and for dreamlike narratives, has already been published (Johnson et al., 1984). We are presently investigating adults' memory for perceived and imagined "mini-events," coherent sequences of actions such as wrapping a package (Suengas & Johnson, 1985, 1986), and we hope to extend this paradigm to children soon. In another current project, young children both hide and imagine themselves hiding an attractive toy in each of several differently furnished rooms. The child hides each toy in one place and imagines hiding it in another. Following a delay period, the child is simply asked to retrieve the hidden objects, and the locations the child searches are noted. We are finding, among other things, that 4- to 8-year-old children sometimes look for the toys in locations in which they only imagined hiding them. We are also conducting studies that include measures of the qualitative aspects of memories for actual and imagined events and self-report measures of subjects' insights into the characteristics of their memories and their cognitive styles. Few data on children have yet been gathered in any of these experiments, so they will not be discussed here. The important point is that reality-monitoring processes involving memories of complex, naturalistic experiences can be studied systematically.

The second major shortcoming of the reality-monitoring work reviewed above is more an omission than a failing, but it is an omission that is directly relevant to the issue of children's legal testimony. The young children in our studies have been less accurate than adults only when the subject was the actor in both the actual and the imagined events (i.e., the Say-Think and Do-Pretend conditions). It may be that younger children are less accurate at reality monitoring than older children and adults whenever the actor is the same in the actual and the imagined events. That is, although children are as accurate as adults when asked to discriminate between memories of actions they imagined themselves performing and memories of actions they observed another person performing (as in the Think-Listen condition of Foley et al., 1983, Experiment 2), they may have more difficulty when asked to discriminate between memories of what they imagined another person doing and what they observed that same person doing. Adults

sometimes confuse memories of what they imagined another person doing with memories of what that person actually did (Johnson et al., in preparation). Children may be more likely to make such errors. Research investigating this question is under way in our laboratory.

The third major limitation of the research reviewed above—and perhaps the most important—concerns what subjects do when asked to imagine an event. Instructions to imagine an event may produce mentation that is qualitatively different from spontaneous fantasizing. Certainly the affective and motivational properties of the two differ markedly, and intuition suggests that spontaneous fantasies are often much more vivid and rich than images produced on demand. Moreover, people may more often *believe* in their spontaneous fantasies, if only in some limited way and only during the time that they are actually producing them. Real, spontaneous fantasies are also likely to be repeatedly re-created, perhaps because they are often emotionally charged and involving. Finally, spontaneous fantasies may involve fewer effortful cognitive operations than do images produced on demand (cf. Durso & Johnson, 1980; Johnson et al., 1984). In general, memories that are vivid and compelling, frequently rehearsed and richly elaborated, and that contain little evidence of effortful cognitive operations are experienced as more “real” than other memories (see Johnson, 1987). Thus, both children and adults may more often confuse fact and fancy in memory when the latter was spontaneously generated. On the other hand, reality monitoring might actually be better if both the actual and imagined events were more richly detailed and realistic. Our stimuli have consisted of decontextualized pictures, words, and movements that were arbitrarily assigned to different sources. It is possible that the richer the memory, the greater the opportunity to use extended reasoning to identify its source (but children may be less able to take advantage of this opportunity).

We are currently trying to devise procedures that would allow us to study reality-monitoring decisions involving spontaneous fantasies. One idea is to provide children with an array of unstructured toys (e.g., blocks, tubes) and observe their free-play behavior. Both casual observations and the literature on symbolic play indicate that many of the children will play with such objects as if they were other kinds of toys (e.g., a block might serve as a toy car). By observing children's imaginative play and later questioning them about the attributes of the objects they used, we may at least begin to probe the development of reality-monitoring processes involving memories of spontaneous fantasies and naturally occurring events.

Source Monitoring and Eyewitness Suggestibility

Discriminating between memories of actual and imagined events may be viewed as one aspect of a more general problem in memory: discriminating between memories on the basis of their origins (Johnson, 1987). To reiterate the example we used at the beginning of the section on reality monitoring, when a person

witnesses an event and then thinks about it and hears or reads about it, he or she stores information from all three sources. We have referred to discriminations between memories of perceived and imagined events as reality monitoring. We will refer to discriminations between memories from different external sources as "external-source monitoring." This section briefly discusses some evidence regarding the development of external-source monitoring, focusing on children's susceptibility to misleading postevent information.

Most of the developmental studies of reality monitoring described in the preceding section included external-source monitoring conditions as controls (Foley et al., 1983; Foley & Johnson, 1985). For example, in the first experiment reported by Foley et al. (1983), subjects in one condition listened as two people took turns saying words, and were later tested on their ability to determine which person had said which words. No significant age trends emerged in the external-source monitoring data in any of these experiments. Moreover, subjects in all age groups (6-, 9-, and 17-year-olds and adults) performed surprisingly well on these tasks (ranging from 71 to 97% correct on identification-of-origin tests). (It should be noted, however, that both children and adults generally performed better when separating self-generated from other-generated events than when separating different other-generated events.)

Thus, it appears that children as young as 6 years are quite good at retaining and using information about the origin of memories of external events, at least in this type of procedure. To whatever extent these findings can be generalized to real-world situations, we would expect that children can be as accurate as adults when asked to report "who did what." These tasks, however, are fundamentally different from the external-source monitoring problems facing the eyewitness who has been exposed to information about an event from other sources after witnessing the event. Whereas the subjects in our studies were asked to determine the origin of memories for discrete events (except for Johnson et al., 1979), the eyewitness is often called upon to separate different memories that all pertain to the same event. For example, a child in one of our studies may have been asked which of two people had spoken the word "car." In court, on the other hand, a child may be asked (implicitly) to separate memories of seeing a particular car from memories of fantasies, conversations, previous interrogations, and so on, all of which included reference to that same car.

The problem of separating memories of witnessing an event from memories of other sources of information pertaining to the same event has most often been discussed in terms of "suggestibility." Research on eyewitness suggestibility has a long history, dating at least from the late nineteenth century (see Goodman, 1984). The standard procedure is to expose subjects to an event (by staging, videotaping, or photographing one), then provide some sort of misleading information about some of the details of the event (in a written summary of the event or in the phrasing of leading questions). For example, in the studies reported in Loftus, Miller, and Burns (1978), subjects watched a series of slides that depicted an accident involving a red Datsun and a pedestrian. At one point, the car was shown approaching an intersection at which there was either a stop sign (for half

the subjects) or a yield sign (for the remaining subjects). Later, the subjects were asked "Did another car pass the red Datsun while it was stopped at the stop sign?" For those subjects who had seen the slide with a yield sign at the intersection, this question contained misleading postevent information. Subjects were later asked to indicate, on a forced-choice recognition test, whether the intersection had been marked with a stop sign or a yield sign. In this particular experiment, as many as 80% of the subjects (adults) were affected by the misleading postevent information. Generally, investigators have found that subjects are extremely susceptible to misleading postevent information (see Loftus, 1979; Wells & Loftus, 1984).

Are children more susceptible to suggestion than adults? There is surprisingly little rigorous empirical evidence on the issue. Loftus and Davies (1984; see also Johnson & Foley, 1984) reviewed five experiments on children's suggestibility. No systematic relationship between age and suggestibility has been consistently documented. Some studies (e.g., Cohen & Harnick, 1980; Dale, Loftus, & Rathbun, 1978; Murray, 1983) have found that suggestibility decreases with age, but others (e.g., Duncan, Whitney, & Kunen, 1982; Marin, Holmes, Guth, & Kovac, 1979) have found no systematic change with age. Loftus and Davies suggested that whether or not children are more susceptible to suggestion than adults depends upon the interaction of age with other factors, such as attention, comprehension, and interest. This volume includes several interesting investigations of developmental changes in suggestibility (Ceci, Ross, & Toglia, Chapter 5; Goodman, Aman, & Hirschman, Chapter 1; King & Yuille, Chapter 2; Saywitz, Chapter 3; Zaragoza, Chapter 4). All but Zaragoza's chapter report evidence for a decrease in suggestibility with age, although the effect is usually small.

What cognitive processes mediate suggestibility? Predictions for developmental changes in susceptibility to suggestion depend to a large extent on the explanation of the basic phenomenon itself. Loftus (e.g., 1979) has argued that misleading postevent information "overwrites" or replaces the memory for the original information. Other researchers (e.g., Bekerian & Bowers, 1983; Christiaansen & Ochalek, 1983) suggest that misleading postevent information does not overwrite memory for the original information, but rather reduces the probability that it will be retrieved. Recently, McCloskey and Zaragoza (1985a, 1985b; see also Zaragoza, Chapter 4, this volume) have claimed that postevent information does not affect memory for the original information at all.

McCloskey and Zaragoza presented a persuasive case to the effect that all of the evidence for eyewitness suggestibility can be explained in terms of (a) non-retention of the original information, (b) capitulation to demand characteristics, and (c) decisions made by the subject to the effect that the misleading postevent information is more reliable than his or her memory of the original information. McCloskey and Zaragoza argued that it is inappropriate to speak of "overwriting" or loss of availability in subjects who, for reasons unconnected with the manipulation, did not have the original information in memory when the misleading postevent information was presented: Such subjects are simply gaining new information about the original event. As long as some subjects "spontaneously" fail to retain the original information, then the misled group will perform

worse than the control group on the recognition test. This is because subjects in the misled condition who failed to retain the original information but retained the postevent information could use it to guide their test selections, whereas those subjects in the control condition who failed to retain the original information would simply have to guess on the test. Because it is known that some subjects do spontaneously fail to retain the original information, McCloskey and Zaragoza concluded that the procedure Loftus and other researchers have used cannot provide unambiguous evidence about the effects of misleading postevent information on memories of earlier information.

McCloskey and Zaragoza proposed a new test for suggestibility studies. If the overwriting hypothesis is correct and memory for the original information (e.g., STOP SIGN) is totally overwritten by the misleading postevent information (e.g., YIELD SIGN), then the subject should be at a complete loss and should have to guess when asked to choose between STOP SIGN and, for example, CAUTION SIGN. That is, if the memory for the original item is overwritten when the misleading postevent information is presented, subjects should perform at chance level when later asked to choose between the original item and a completely new item. In six experiments using this new testing procedure, McCloskey and Zaragoza found that misled subjects, who presumably should have been guessing more often because the original information had been “overwritten,” did not choose the new option more often than control subjects who were not misled. McCloskey and Zaragoza concluded that “misleading postevent information has no effect on memory for the original event” (1985a, p. 1).

Ceci et al. (Chapter 5, this volume) report two developmental studies (Experiments 3 and 4) in which McCloskey and Zaragoza’s procedure was used in addition to the traditional Loftus procedure. Misled children in the Loftus procedure chose items consistent with the original information significantly less often than control subjects (46% as opposed to 88% correct).⁵ The misled children in the McCloskey and Zaragoza procedure selected items consistent with the original information significantly more often than did the subjects in the traditional Loftus procedure (72% as opposed to 46% correct), but still significantly less often than the controls (72% as opposed to 88% correct). This latter comparison is the strongest evidence to date in favor of the idea that misleading postevent information can render the original information inaccessible (but see Zaragoza, Chapter 4, this volume).

Ceci et al. conclude that, because the performance of subjects who were in the McCloskey and Zaragoza procedure was better than that of those in the traditional procedure, “some of the demand characteristics mentioned by McCloskey and Zaragoza were operative in producing memory degradations” (p. 86). We would like to suggest that at least part of the difference between the performances of subjects in the two conditions may reflect failures in external-source monitoring rather than demand characteristics or other nonmnemonic phenomena. McCloskey and Zaragoza’s procedure cannot assess failures of external-source

⁵These data are from Experiment 4. Experiment 3 yielded comparable results.

monitoring. That is, only subjects in the Loftus procedure were given an opportunity to misattribute their memories of the misleading postevent information to the original source. Misleading information may not increase the number of subjects who do not remember the old information, but it may produce subjects who mistakenly believe that the source of the misleading information was the original event. Such misattributions are memory effects, and we can only see them when the suggested information is an option on the test.⁶

Why would subjects who received a misleading suggestion later make erroneous external-source monitoring attributions and choose the suggested item instead of the original item on the Loftus test? We propose that external-source monitoring, like reality monitoring, is a decision-making process performed when memories are accessed. Thus, if a subject recognizes the postevent information instead of (or as well as) the original information, he or she may erroneously attribute it to the original source. The aspects of a memory that allow a subject to recognize a test item as something that was presented earlier in the experiment are not necessarily the same aspects that allow a subject to determine the specific origin of the item (Johnson, 1985; Johnson & Raye, 1981; Kahan & Johnson, 1984). There are several potential reasons subjects might be led to mistakenly identify the postevent information as being from the original source, depending on the criteria they use to make the attribution. For example, if subjects' judgments are influenced by the relative familiarity of the items, the suggested item might seem more like part of the original event than the original item because of its relatively greater recency and salience or because (as McCloskey and Zaragoza suggest) the original item was not encoded or retained at all. For the same reasons, subjects might think the postevent information was from the original source if their judgments are influenced by the relative "strength" or clarity of their memories of the items (see Ceci et al., Chapter 5, this volume, for a related point). We should note, however, that misattributions require more than a "strong" trace of the postevent information. Having a strong and clear memory of the suggested item would not necessarily lead one to misattribute its source.

For analytic purposes, we have discussed reality monitoring and external-source monitoring as distinct phenomena. In practice, however, the two may overlap. For example, subjects may generate visual images of items referred to in misleading postevent information. Such subjects may later be faced with a reality-monitoring problem: discriminating between their memory of the original information and their memory of the image they constructed when the narrative was read.

Schooler et al. (1986) have recently reported several studies in which the nature of memories for suggested misinformation is discussed in terms of John-

⁶It is possible that external-source monitoring failures also explain the effect Ceci et al. observed among subjects who took the McCloskey and Zaragoza test. During the test, some subjects in the McCloskey and Zaragoza condition might spontaneously recall the misleading postevent information and believe that it is the correct answer to the question that is being asked. Such subjects might respond haphazardly to the item because they believe that neither alternative is correct.

son and Raye's (1981) reality-monitoring model. Although Schooler et al. do not explicitly propose substituting a source-monitoring explanation for an overwriting explanation of suggestibility effects, they do acknowledge that reality-monitoring failures may play an important role in suggestibility. Schooler et al. found that subjects' descriptions of items suggested in the misleading postevent information systematically differed from their descriptions of items that were actually in the original source: the former were longer and included more verbal hedges, more references to cognitive operations, and fewer references to sensory and contextual details than the latter. Consistent with the Johnson and Raye model, these researchers concluded that memories for suggested and observed information differ in characteristic ways, and that subjects who misattribute the misleading postevent information to the original source may have failed to note or use those differences.

The explanations for external-source monitoring misattributions mentioned above do not require that memory of the original event is directly affected by the misleading postevent information. Another interesting possibility is that misleading postevent information impairs aspects of subjects' memory of the original item in such a way that accurate external-source monitoring becomes more difficult. As we mentioned above, McCloskey and Zaragoza (1985a, 1985b) have concluded that misleading postevent information does not impair memory for the original information because misled subjects tested with the McCloskey and Zaragoza procedure perform as well as control subjects. This conclusion does not necessarily follow from their findings. As long as subjects have some memory of the original item, they should choose it over the completely new item with which it is paired on the McCloskey and Zaragoza test. People are extremely sensitive to differences between items presented once and items presented not at all (e.g., Hintzman, 1969). Thus, misleading postevent information could substantially reduce the retrievability of various aspects of memory for the original information without affecting performance on the McCloskey and Zaragoza test, provided it did not reduce retrievability below the (presumably minimal) threshold necessary to choose between the original item and the new item. Therefore, although McCloskey and Zaragoza's findings constitute strong evidence against the overwriting explanation of suggestibility effects, they do not demonstrate that misleading postevent information has no effect on memory for the original information.

Whether or not misleading postevent information has any effect on subjects' ability to remember the original information, we believe that suggestibility procedures do lead subjects to erroneously attribute postevent information to the original event. The conditions under which people are likely to make erroneous source attributions remain to be specified, as do any developmental differences in external-source monitoring.

We have begun to explore the source-monitoring interpretation of suggestibility effects. In one study, as in the traditional procedure, subjects will view a film of a complex event and then read a narrative recapitulation in which some details have been altered, added, and deleted. Later, some subjects will perform a recognition test in which they will be asked only to discriminate information present

in either the film or the narrative from new information. Other subjects will perform an identification-of-origin test in which they will be asked to judge whether each test item was (a) in the film, (b) in the narrative, (c) in both the film and in the narrative, or (d) in neither the film nor the narrative. We anticipate that subjects will sometimes confuse the two sources of information, and that these confusions will be at least partially independent of subjects' ability to correctly recognize both the original and the postevent information. This study will be especially interesting developmentally because the identification-of-origin test eliminates demand characteristics and because we will be able to compare the results with those found in previous developmental studies that included external-source monitoring conditions.

In summary, suggestibility is not yet understood. The theoretical interpretation of suggestion effects in adults is not clear, and the results of studies of developmental trends in susceptibility to suggestion have been inconsistent. We believe that at least some suggestibility effects are due to failures of source monitoring, and at this point our research does not suggest developmental improvements in external-source monitoring beyond 6 years of age (Johnson & Foley, 1984). On the other hand, both developmental theory (e.g., Piaget's) and the findings of most of the suggestibility studies included in this volume suggest that children are more susceptible to misleading postevent information than are adults. The extent to which such developmental trends (if they indeed exist) reflect greater susceptibility to overwriting, greater susceptibility to source confusions, or greater susceptibility to demand characteristics and other social factors remains to be sorted out.

Summary and Conclusions

This chapter has focused on the development of the ability to make two kinds of discriminations that must often be made when one attempts to accurately recount one's memories of an event: (a) separating memories of the event itself from memories of thoughts, dreams, and fantasies about the event (reality monitoring) and (b) separating memories of the event itself from memories of information about the event gathered from other sources (external-source monitoring).

Johnson and Raye (1981) proposed that reality-monitoring discriminations are made via a decision-making process. According to the reality-monitoring model, memories of perceptually derived experiences are distinguished from memories of internal experiences on the basis of a few dimensions along which the two characteristically differ, or on the basis of other available knowledge. The same sort of model may be extended to describe the processes involved in distinguishing between memories that were drawn from different external origins but pertain to the same event. That is, suggestibility effects (and related intrusions) may be viewed as failures to discriminate accurately between memories from different sources. Whereas reality-monitoring decisions may be made on the basis of the quantity of particular dimensions encoded as part of the memory (e.g., the

amount of sensory detail), external-source monitoring decisions must typically involve evaluating the content of certain aspects of the memories. The more similar the memories produced by two sources the more difficult external-source monitoring should be. Furthermore, external-source monitoring should reflect reasoning, prior knowledge, and metamemory assumptions. For example, subjects might believe that pictures produce more lasting memories than words and consequently mistakenly decide that postevent information was part of the original event because they remember it.

Developments in the ability to monitor the origin of information take place in the context of general memory development. We believe that memory development is best considered in terms of knowledge development rather than in terms of increases in memory capacity or trace duration (Chi, 1978; Piaget & Inhelder, 1968/1973). By “knowledge development” we mean to refer both to changes in *what* is known and to changes in *how* things are known. Memory is an inseparable aspect of the developing child as an intellectual, emotive, social being. Thus, the kinds of tasks on which children of different ages will demonstrate adult-like levels of recall and source monitoring will be determined by developments in their motivations, interests, and social knowledge as well as by developments in more purely “cognitive” capabilities and strategies. (See Meacham’s 1977 review of Soviet research on memory development for related arguments.)

Among a great many other abilities, the “skills” required to provide accurate eyewitness testimony develop during childhood. Sometime between birth and adulthood, children develop new ways of (a) attending to and comprehending events, (b) encoding, retrieving, and communicating memories of events, and (c) understanding and participating in the sociocognitive interactions involved in communicating one’s memories to others in various social contexts. Each of these constitutes a vastly complex set of skills and abilities, and all develop in interaction with one another.

At one level of analysis, reality monitoring and external-source monitoring can be viewed as subparts of the retrieval component of the skill domains mentioned above. That is, one of the problems involved in retrieving particular memories is separating them from other memories that pertain to the same subject. Thus, reality monitoring and external-source monitoring may be viewed as processes that reduce intrusions due to interference effects. At a more general level of analysis, however, reality monitoring and external-source monitoring reflect very broad, conceptual attitudes and beliefs that cut across all three of the domains mentioned above (event comprehension, memory, and social knowledge). Children’s apprehension of the distinctions between self and other and between reality and fantasy plays a major role in influencing the way they perceive (and subsequently remember) events in the world around them, and their understanding of the social and practical importance of these distinctions may affect their performance as eyewitnesses.

The theories of Freud and Piaget, along with the ideas generated by the reality-monitoring framework and findings from empirical studies of children’s memory, offer many intriguing (but not necessarily consistent) hypotheses about the

nature of children's minds, and many points of departure for future research. For example, what are the characteristics of children's imaginations? Piagetian theory (e.g., Piaget & Inhelder, 1966/1969) suggests that children under 7 years of age should not be particularly adept at purely mental fantasy, unaided by props and actions, and Freudian theory (e.g., 1933/1964) suggests that the content of children's fantasies changes with age in systematic ways. Are there important differences between spontaneous and guided imaginations, and do these have implications for developments in source monitoring? Are there developmental differences in the amount of confusion between perceived and imagined events depending on who is the agent of the action (self, familiar other, unfamiliar other), or depending on the complexity of the event? Are there ways of improving source monitoring, either through instructions or training? We have emphasized the decision-making aspects of source monitoring, but such judgment processes presuppose concepts and contrasts such as self-other, real-imagined, and Source A-Source B. Before children use the fact that different classes of memories differ in characteristic ways, they must first have some idea that one would want to distinguish between those classes. How and when do children come to appreciate the necessity of discriminating the origin of information?

The complexity and difficulty of reality-monitoring and external-source-monitoring decision making may be particularly great in the case of children who have been physically or emotionally victimized. What goes on in the mind of such a child before and during testimony? It is hard to imagine a question that more insistently demands an integration of many different approaches because cognitive, psychodynamic, social, and sociological factors are all involved. The intention and ability to categorize the origin of one's experiences and memories in various ways is a fundamental part of children's development in all of these domains.

Acknowledgments. We would like to thank the editors of this volume and Ed Casey, David Goldstein, Roger Kreuz, Marion Perlmutter, Carol Raye, Andrea Rusnock, and Susan Sugarman for their insightful comments and helpful suggestions concerning previous versions of this chapter.

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