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EYEWITNESS SUGGESTIBILITY
ACROSS PRESENTATION MODALITIES

A Thesis
Presented to the
Faculty of
California State University,
San Bernardino

In Partial Fulfillment
of the Requirements for the Degree
Master of Arts
in
Psychology

by
David Van Norman

May 1992

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ABSTRACT

It was hypothesized that all subjects in a simulated eyewitness condition would be found to be suggestible for misleading post-event information contained in stories across three presentation situations in a video format, written format, and audio format. It was further hypothesized that subjects would be differentially susceptible to suggestion and/or accuracy depending on the stimulus format in which the information was presented, because of cognitive processing abilities. This is referred to as the cognitive processing differences hypothesis. The first hypothesis was confirmed, but the results of the cognitive processing differences hypothesis were equivocal.

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INTRODUCTION

Our lives are lived in the past tense, not in the here and now. All experience, from the very moment of its conscious perception, has passed on to memory. No one truly experiences the world outside of his or her own central nervous system; the focus of our interactions are our memories of our perceptions of an experience.

As obvious as all of this seems, it is even more obvious from daily experience that memory is an all too tenuous element in our lives. Memory, in fact, fails at an alarming rate. How, it might be asked, can one rely on one's knowledge of a particular event, or on an important sequence of behaviors if memory is fallible? When memory fails it puts into doubt all other perceived reality; and it fails often. However, it is quite clear that we do indeed trust our memory and that of others. We fly thousands of miles trusting that our pilot remembers routine as well as emergency procedures. We seek treatment from physicians, trusting that they properly recall complex diagnostic clues and intricate courses of treatment. We routinely sentence the accused to confinement, and condemn the guilty to death, trusting the memory of witnesses (or a single witness), separated in space and time from the original experience.

Do we take too much for granted?

That memory fails has been well documented. In fact, memory begins to fail from the very instant that our senses are bombarded by the myriad of environmental stimuli that impinge on our perceptive fields. No matter how perfect the storage, or how accurate the recall of a stored representation, the recounted memory for an event will be held of no account if the observer was not wearing his/her prescription glasses on that dark, moonless, rainy night. Memory, after all, is a chain no stronger than its weakest link.

A body of research literature has developed demonstrating that accuracy of recall can be influenced by a variety of factors, to the point of inducing memories in the observer that did not in fact exist; what Loftus calls "unreal" memories (Loftus, 1979). Leading or suggestive statements or questions made to an observer after he or she has witnessed an event implying the existence of some target object which was never actually there, have been shown to induce some subjects to remember seeing the non-existent detail (Bekerian & Bowers, 1983; Loftus, 1975, 1979, 1980; Loftus, Donders, Hoffman, & Schooler, 1989; Morris & Morris, 1985; Schooler, Gerhard, & Loftus, 1986; Tversky & Tuchin, 1989; Weinberg, Wadsworth, & Baron, 1983).

A classic methodology for this kind of research, designed to induce and study eyewitness suggestibility, was developed by Loftus: subjects observed a slide presentation

or video sequence of some event or events. One half of the subjects saw a detail which the other half did not; such as a yield sign. A period of filler activity followed (say 15 minutes of math problems, or some other activity unrelated to the task); then a series of questions were asked which inquired about selected details of the slide presentation or video: "What was the color of the car at the intersection?" and "Did another car pass the red Datsun while it was stopped at the yield sign?" Notice that the latter question implied the existence of a yield sign, when in fact in some of the conditions no yield sign was present. Following another five minutes of filler activity a second questionnaire asked several questions, such as: "Did you see the Datsun?", "Did you see the yield sign?", etc. Successful suggestibility was observed when the target item, the yield sign in this instance, was identified when it did not in fact exist.

Leading or suggestive visual information such as photographs or police line-ups have also been shown to introduce some new, but misleading, detail (Jenkins & Davis, 1985). According to Jenkins and Davis, after watching a filmed incident, some subjects were shown a composite picture of a so-called suspect, which contained misleading details (i.e., incorrect hair or moustache). These subjects were more likely to misreport the description by including the false details. Even when the suggestion was made prior

to the observation of an event, the memory for that event could be biased in the direction of the suggested information (Lindsay & Johnson, 1989a).

The perceived status of the person asking the questions or making the statement has an effect on the accuracy of recall. A questioner who was perceived as "knowledgeable" (a police officer or some other figure of perceived authority) increased the likelihood that subjects would bias their memories of an event in the direction of misleading post-event information, as opposed to a "naive" communicator (Smith & Ellsworth, 1987).

The way attention was paid to an event also influenced how it was remembered. For example, Lassiter, Stone, and Rogers (1988) showed a video of a woman collating, stapling and stacking questionnaires to groups of subjects who were asked to push a button when they observed either fine (small) or gross (large) units of meaningful action. For example, subjects might segment the observed behavior as "put sheets together, staple, put on stack" (gross units), or as "pick up first sheet from first pile, pick up first sheet from second pile, place papers together, lift stapler, staple upper left corner, place questionnaire on stack... etc." (fine units). They found that when attention was paid to fine units of a performer's action subjects recalled more details than when attention was paid to gross units of action.

Manipulation of system variables (line-up instructions, time of exposure to photographs of perpetrators) or estimator variables (i.e. variables which influence the perception of the observer, such as initial exposure to a perpetrator, or the disguise he/she wore) influenced identification accuracy (recall of perpetrator) (Cutler, Penrod, & Martens, 1987; McKelvie, 1988). Also, remembering details peripheral to the event was found to be negatively correlated to accuracy of identification (Cutler, Penrod, & Stuve, 1987) demonstrating the simple notion that when attention was paid to a particular detail, one does not attend to others.

Some controversy has developed with this body of research regarding the relative permanence of the original memory, which some researchers regard as eternal. Sigmund Freud believed that "all thoughts are in themselves imperishable" (cited in Loftus, 1980, p. 42). This camp argues that memory remains unchanged, citing research that demonstrates retrieval of the original memories when the proper cue or sequence of questioning is used to retrieve it (Kroll, Ogawa, & Nieters, 1988; Zaragoza, McCloskey, & Jamis, 1987). An example of this cued recall of original memory information can be found in research of Bekerian and Bowers (1983). They used random or sequential presentation of an event (such as slides depicting an accident) which lacked critical environmental cues, in this case sequential

cues. They found that the lack of such cues increased the likelihood of forgetting, and, conversely, that the use of such cues allowed for the retrieval of these original memories. Others regard memory as more or less permanently altered by the post-event information, i.e., memory impairment hypothesis (Loftus, 1980; Tversky & Tuchin, 1989). Loftus (1980) stated: "When something happens in life, we generally store fragments of the experience in memory. It is reasonable to assume that some of these fragments may be altered by new experiences that we have." (p. 45).

This view regarding the fragmentary nature of memory is indeed reasonable, and reconciles many of the differences in the research results. If one considers the method by which memory is processed, from the sensory registers and as the limited chunks of working memory, it is easy to conceive of memory as being processed as fragments. Even episodic memory can be thought of as being semantically encoded in chunks. Recall from long term memory (LTM), being very much a constructive process, would incorporate new information along with the old information. Imagine, for example, observing the memory system at work as it takes in stimuli from the senses of an observer interacting with the environment, as previously discussed. As sequential events rapidly enter the senses and compete for attention, event details are broken down into semantic fragments that make up

pieces of the story. Inevitably sensory representation material is either interfered with, or decays from the system, and details are lost. Upon recall, the constructive nature of memory is such that we "reconstruct" these fragments according to our experience and expectation (Bartlett, 1932, as cited in Howard, 1983). "We fill in the gaps of our memory using chains of events that are logically acceptable" (Loftus, 1980, p. 40).

This issue of original memory permanence was the subject of a study by Loftus et al. (1989) in which subject response times to questions about actual and misleading details in a slide presentation were computed to determine the underlying decision-making process. Subjects viewed a slide presentation of a burglary and then read a narrative containing either misleading information or neutral information about details in the story. Loftus and her colleagues hypothesized that misled subjects who make errors because they were responding to a question, based on what they believed was a genuine memory, would exhibit equal response time to control subjects. On the other hand misled subjects who, at test time, must resolve a conflict between the original memory and a suggested one, would exhibit slower response time, since it takes time to resolve the conflict. If the conflict had been resolved prior to the test then response time would be the same as control subjects, indicating that the original memory had probably

been replaced or modified. If response time was slow, however, conflict was being resolved, indicating the presence of the two conflicting memory representations, and original memory permanence.

The resulting response times, which did not differ from non-misled control subjects, indicated that conflict resolution did not take place at the time of the test, supporting the notion that the original memory had changed. However, a modified version of the test was administered by Loftus et al. to another group of subjects: instead of the suggested item (screwdriver) being presented, a choice between the observed item (hammer) and another previously unseen item (wrench) was forced. In two experiments conducted, response times for misled subjects were significantly slower than those of controls. This result indicated that the original memory was still accessible and recognizable, but that time was required to recall it, and even then accuracy was little better than half (although this was also true of the control subjects, who had no conflict to resolve, a result which seriously weakens the researcher's interpretation).

Several theories were discussed that attempted to reconcile these inconsistent findings, the most promising of which was that two memories had indeed been formed--one of them veridical (hammer) and the other for the suggested item (screwdriver). This theory claimed that the last

information to be acquired, in this instance a screwdriver, interfered with the memory of the first, the hammer, such that the screwdriver was easily selected on a recognition test. But when the screwdriver was not presented, the hammer was finally recognized after a search "around" the interfering recent memory (screwdriver). For future research, one method for testing this theory might be to require an active response rather than a recognition test. Response time, even in free recall, would likely be slower for correct "hammer" responses than for incorrect "screwdriver" responses because of the time required to discard the more recent misleading information and search for the correct memory.

While the debate over memory permanence raged, researchers of hypnotic memory enhancement found only that recall, aided by hypnosis, was usually either no more accurate (Nash, Drake, Wiley, Khalsa, & Lynn, 1986; Yuille & McEwan, 1986), or could be a positive menace to accuracy (Sanders & Simmons, 1983). Worse still, hypnotized subjects were demonstrably more susceptible to the implantation of suggested memories or "pseudo-memories" and were more confident about the accuracy of these false memories (Laurence & Perry, 1983; Sanders & Simmons, 1983).

The controversy continues, and presently it is impossible to state whether or not the original memory is altered or replaced. For all practical purposes we may

proceed on the basis that, altered or not, the accuracy of recalled memory can be influenced by suggestion, and that large individual differences are observed from study to study. Some researchers found little or no suggestion effect either in a field research setting with actual witnesses to a crime (Yuille & Cutshall, 1986) under unstructured free-recall of eyewitness to a laboratory study (Sanders & Chiu, 1988), or between misled and control subjects exposed to a post-event narrative (Zaragoza et al., 1987). Other researchers found large effects with the use of misleading questions which implied the existence of a detail not present in observed slides, by which 80% of the subjects were misled (Loftus, 1980); by suggestive narratives (Loftus et al., 1989); or when misleading questions were asked by a person perceived as expert or "knowledgeable" (Smith & Ellsworth, 1987).

Experimental design doubtless accounted for much of variation in success or failure of suggestion implantation, since these studies were designed with a particular hypothesis in mind which drove the research questions, and therefore the research method. The question of particular interest is why some people acquire the suggested memory, while others do not. Experiments have revealed performance differences that may be a function of individual subject characteristics. For example, age effects have been found: young children (3 to 4 yrs old) demonstrated greater

susceptibility to misleading post-event information than older children, but when the information came from a peer rather than an adult (expert effect), suggestibility was reduced (Ceci, Ross, & Toglia, 1987). Elderly witnesses (mean age = 71 years) are shown to be 7 - 20% less accurate than young adults (mean age = 31 years), although suggestibility was not tested directly (Yarmey, 1984). Sex differences were found for eyewitness accuracy almost one hundred years ago by Stern (1903-1904), but countered by Cunningham and Bringmann (1986) in their non-replication of Stern's classic, and apparently inaccurate, turn-of-the-century study. Unfortunately, again, suggestibility was not a test criteria.

Individual Differences:

Personality traits vs cognitive skills

The research literature shows vast differences among studies regarding the number of subjects who have accepted the suggestion. These findings raise a pertinent question: Why do such differences occur? Are such variations a function of individual differences among subjects? What are these differences?

Recently researchers have looked at some personality attributes as a possible determinant of the extent to why someone is suggestible to misleading information. Polans (1985) used a revised version of Byrne's repression-sensitization scale (which assessed responses to

"threatening or anxiety-arousing stimuli") to demonstrate that repressors (individuals who tend to minimize, deny, and avoid thinking about perceived threats to themselves) were significantly less accurate in recall of facial features under stressful conditions, but more confident about their responses than were the sensitizers who freely verbalized and intellectualized a perceived threat. Closer examination of the results revealed that the mean differences under the no-stress condition between the two groups, although statistically significant, was only 1.29 correct answers out of a maximum of 30). This is hardly a difference of practical importance, except that no significant difference was predicted under the no-stress condition. A greater mean difference was predicted and found under high-stress conditions.

Polans suggested that these differences were consistent with the Yerkes-Dodson law (Yerkes & Dodson, 1908) which concerns the facilitation of performance under increasingly stressful conditions, until over-stressing causes a performance decrement. Accordingly, the sensitizers' cognitive approach facilitated learning by allowing the individual to cope by means of cognitive defenses, with the anxiety caused by the imposed stressor. Repressors avoided thinking about the stressor and were therefore unable to overcome its effects, leading to performance decrement. It was thought that the apparent overconfidence of repressors

arises from the fact that as stress-avoiders, they tended to accept the information of their internal state, whereas sensitizers tended to question their internal state and base information on a more accurate appraisal of external information.

The memory task performance of Jungian psychological dimensions (Introvert/Extrovert, Sensation/Intuition), as determined by the results of the Myers-Briggs Type Indicator, were compared by Ward and Loftus (1985). Introverts were defined as those individuals whose consciousness is directed primarily from within, the internal frame of reference being guided by concepts and ideas generated from within the person. Extraverts are seen as directing their consciousness to the external world. Sensitives are persons oriented to perceive the world and incoming information with their senses, whereas intuitives accept information based on their beliefs about the world and events, even in the absence of sensate evidence. These dimensions combined to form psychological types which displayed different basal arousal levels and information acceptance preferences. For example, an extraverted and sensate person would exhibit low basal arousal and rely on the information directly from the senses to update memory. On the other hand, an introverted-intuitive would demonstrate higher levels of arousal and may update and form

memory from internal responses to information perceived by the senses.

As predicted, introverts and intuitives were found to have been significantly more susceptible to the introduction of misleading post-event information than extroverts and sensitives. The authors presented two possible reasons for this: Greater arousal levels interfered with initial memory formation, and secondly, introverts, by virtue of their constant self-monitoring, possessed a lower self-esteem and reduced confidence in their abilities to memorize events and objects and therefore relied on post-event information provided (accurate or inaccurate).

Other individual differences examined included such traits as a subject's status as "neurotic" as measured by the Eysenck Personality Inventory (Bothwell, Brigham, & Pigott, 1987). This study considered the basal arousal differential (reported by Ward and Loftus, 1985) and its effect on memory of extroverts (and of introverts indirectly) which extended the Optimal Level Theory to explain the effect of limbic system arousal on subjects denoted as either extroverted or neurotic by the Eysenck Personality Inventory. By manipulating states of arousal (low, medium, high) they concluded, as did the Ward and Loftus study (1985) cited above, that limbic system arousal facilitated the accuracy of perpetrator identification from a line-up for emotionally stable extroverts, but had a

debilitating effect on emotionally unstable neurotics. These results support the findings cited above about the predictions of the Yerkes-Dodson law: memory recall was facilitated by stress to a point and debilitated beyond a threshold (Polans, 1985), which was lower for individuals classified as neurotic. It should be mentioned that extraverts described themselves as aggressive and assertive, and the authors believed that they may have used these attributes to guard against suggestibility. In other words, the emotional stability of the extraverted subjects could be said to have been a coping skill that was used to protect them from inaccurate external information; information that was not verified by their senses, a coping ability which was either lacking or reduced in the neurotic and introverted subjects.

Gudjonsson (1983, 1984) performed a series of experiments assessing how some personality traits (neuroticism and social desirability), as well as such cognitive abilities as intelligence, affect memory performance and suggestion resistance. Gudjonsson identified two types of suggestibility: one was produced by the suggestive nature of a question (as in the example: "Did another car pass the red Datsun while it was stopped at the yield sign?") and one was actively produced by the negative feedback, or instructions, of the interrogator (as when the interrogator stated directly to subjects that the answer

they had given were incorrect). These could be analogous to the system and estimator variables studied by Cutler et al. (1987). Recall that system variables were defined as structurally related components of questions or procedures, such as line-up instructions, time of exposure to photographs of perpetrators, etc. Estimator variables were described as variables which influence the perception of the observer (initial exposure to a perpetrator, or the disguise he/she wore). These descriptions are very similar to the influence proposed by Gudjonsson of the two types of suggestibility. Conceivably both Gudjonsson (1983 and 1984) and Cutler et al. (1987) were studying the same phenomena. The Gudjonsson Suggestibility Scale (GSS) (1984) was developed and administered to subjects in order to measure these two suggestibility types.

The GSS consisted of a recorded story depicting a robbery, a free-recall segment (during which subjects recalled the story and details about the event), and 20 questions about the event (15 of which were suggestive, and five which were not). A similar procedure was adapted for the present study, but this ratio was reversed to reduce the chance that subjects would detect the subterfuge. Following these 20 questions, 'yield' (change in the subject's responses in the suggested direction) was induced by telling the subject that they had erred on some of their answers and should answer the questions again, being more careful the

second time. Both the WAIS and Eysenck Personality Questionnaire (EPQ) were administered to extract intelligence, neuroticism and social desirability score. In the present study cognitive tests were used to rate certain IQ and cognitive processing abilities.

Suggestibility was found to be significantly related to lower intelligence in subjects, along with poor recall and neuroticism. Neuroticism was determined by the subject's performance on the EPQ and was selected to examine the personality aspect. Gudjonsson argued that subjects of lower intelligence and memory ability, who typically demonstrated neuroticism (high trait anxiety), were less likely to trust their answers and would therefore be more suggestible than subjects with higher intelligence, since they tended to accept cues from other sources, such as the experimenter (type 2 suggestibility) or from the question information (type 1 suggestibility). However, a stepwise regression analysis revealed that whereas the variance accounted for by combining all of the variables (IQ, immediate and delayed recall, percentage of accurate recall, neuroticism, and social desirability) was 44%, a full 43% was accounted for by the IQ and memory variables, leaving only 1% of variance under the influence of neuroticism and self-esteem. Interestingly, it was shown that confidence ratings on answers given by subjects were not strongly correlated with suggestibility, indicating that a person's

confidence (or lack thereof) may be an unreliable indicator of accuracy.

In another study, Singh and Gudjonsson (1984) applied the GSS to recall and self-esteem variables by testing subjects twice. Subjects were given the GSS and then completed some Semantic Differential scales (Myself as I generally am, Myself during the experiment, and The experimenter). After a week, the subjects were instructed to again recount the story, and the attempt was made to "shift" subject's responses. It was revealed that suggestibility was more pronounced in the second test. This was thought to be due to the individual doubting his or her own eyewitness account as time passed and the original event was no longer clearly remembered. This was more true of those subjects of low self-esteem or who seek social approval and are willing to shift their answers under interrogative (instructional) pressure. However, this negative feedback (yield) portion, in which the experimenter told subjects that their initial responses were incorrect, was less effective the second week. Why were these subjects less susceptible the second week? Singh and Gudjonsson posit that perhaps these questions, manipulative pressures, etc., were more effective when surprising and that familiarity with the demand characteristics of the tests rendered the negative feedback less believable, and therefore less effective. Of course, it is possible to

speculate that the traits being tested are not stable over time, and that a subject who demonstrated suggestibility during one test may not necessarily demonstrate it to the same degree during another.

In 1988, Gudjonsson, searching for support for the notion that people may use various coping strategies to deal with the "uncertainties and expectations" of the interrogative situation, examined IQ and memory and their relationship with interrogative suggestibility among a "normal" group of subjects and among a group of subjects consisting of psychiatric patients. He believed that IQ and memory skills were related to a person's ability to detect when they were being misled. Other researchers had not found predicted negative correlations between IQ and suggestibility (Powers, Andriks, & Loftus, 1979; Tata, 1983 [M Phil dissertation cited in Gudjonsson, 1988]). In order to investigate range effects of intelligence, Gudjonsson divided the subjects into groups according to IQ scores above vs. below 100, and memory recall ability above vs. below the average of scores from the WAIS.

As expected, significant negative correlations were obtained for "normal" subjects whose recall fell below the average. Range effects were revealed indicating that lower IQ scores were more strongly correlated with suggestibility (although this effect was stronger in the "normal" subjects than in the psychiatric group), which Gudjonsson claimed

explains why researchers such as Powers et al. (1979) and Tata (1983 as cited in Gudjonsson, 1988) did not detect significant negative correlations between IQ, recall, and suggestibility; these studies had restricted their subjects to those of average IQ, inadvertently leveling out group scores and restricting the range of the correlation. In contrast, it was recall above the mean that correlated significantly for these psychiatric patients. Further, correlations between IQ and memory were significant for both groups.

These findings supported the suggestion by Gudjonsson that interrogative suggestibility occurred as a result of the individual responding to uncertainties about the reliability of information in memory and expectations implied in the interrogative situation. Coping strategies were implemented to deal with such uncertainties and provide the individual with "an internal frame of reference to judge from." (p. 186). Accepting new, suggested information was one way to cope with low confidence (as measured in a previous study [Gudjonsson, 1983] on a 0 - 100 scale) in one's memory for an event. This was particularly true of individuals possessing lower than average memory abilities and IQ, which is consistent with the proposed central cognitive mechanism thought to mediate suggestibility (Schooler & Loftus, 1986).

Other individual differences have been studied in the search for personality variables which may influence suggestibility and recall accuracy. It is beneficial to review these variables, even though no significant contribution was found for them, in order to prevent duplication of research effort in the present study or future studies. Such traits as field dependence and locus of control were found not to be correlated with suggestibility (Christiaansen, Ochalek, & Sweeney, 1984). In an earlier study, such individual cognitive variables as mechanical reasoning and spatial abilities were not found to correlate with interrogative suggestibility (Powers et al., 1979).

Obviously a wide variety of traits have been examined in light of their possible influence on recall and suggestibility: from repression-sensitization to social desirability. The implications are that these individual personality differences exist from subject to subject, which can in some cases be shown to co-vary with suggestibility. However, at present, no single trait or group of traits can be shown to have a substantial influence on recall or interrogative suggestibility. The present line of research will address this issue.

Modes of Stimulus Presentation

The research cited above has supported the idea that individual differences, including personality differences (introverted, extroverted, neurotic, social desirability) and cognitive abilities (IQ, recall) contribute either directly or indirectly to suggestibility. But an important factor in the production of a memory, or memory for events, is the mode by which the information is delivered. Information enters the cognitive processing system via the sensory registers through one or more of the senses. Since no experimental situation can truly duplicate the eyewitness experience, researchers have created controlled artificial presentations which consist primarily of visual and/or aural stimuli. Visual stimuli were the most common, especially in the form of a slide presentation, which lends itself to easy experimental control (Cunningham & Bringmann, 1986; Lindsay & Johnson, 1989a; Lindsay & Johnson, 1989b; Loftus et al., 1989; Schooler et al., 1986; Ward & Loftus, 1985; Zaragosa et al., 1987). Video most closely approximates field observation (with the exception of live actors) yet can be controlled in the experimental setting, providing the same observation stimuli to each observer in real time (Cutler et al., 1987; Cutler et al., 1988; Jenkins & Davis, 1985; Lassiter et al., 1988; Morris & Morris, 1985; O'Rourke et al., 1989; Sanders & Chiu, 1988; Smith & Ellsworth, 1987). Live actors, while offering mundane realism, provide unique

observations for each performance, even under the best conditions, such that each group of witnesses may be exposed to a slightly different experience (Bothwell et al, 1987; Christiaansen et al., 1984; Polans, 1985; Sanders & Chiu, 1988). One field study tested witnesses to an actual crime (Yuille & Cutshall, 1986). Visual information in the form of written passages was used as a stimulus by Lindsay and Johnson (1989b) and Bartlett (1932 [as cited in Howard, 1983]). Although rarer, aural stimulus presentation (such as a narrated story recorded of tape, was studied primarily by Gudjonsson (1983; 1984; 1988; Singh & Gudjonsson, 1984). Only two studies have combined more than one modality or type of presentation, Lindsay and Johnson (written/slides) (1989b) and Sanders and Chiu (live actors/video) (1988). However, neither of these studies compared the modes to each other for suggestibility or accuracy.

What is being proposed is a heretofore unexamined model of individual eyewitness differences in which recall accuracy and suggestibility for misleading post-event information are functions of the cognitive processing abilities of the eyewitness. Obviously, individuals vary in their ability to recall events and in IQ, due presumably to either natural or practiced skills. It is also reasonable to assume that they likewise may vary in their abilities to process and remember information which they have received either aurally, visually, or lexically; some individuals may

simply be advantaged in regards to processing information which is received by one or more of these stimulus modes. At this level of analysis it is irrelevant whether that advantage is due to physiological superiority in the corresponding brain structures responsible for processing that information, or to increased efficiency through practice. Our first task must be to determine whether a connection can be made between recall abilities and stimulus processing abilities.

Thus far no study has addressed the question of the stability of the suggestibility effect across stimulus presentation modalities. The assumption that is being raised is that an individual who is good at processing audio information, for example, should be more accurate and less suggestible for information received aurally, than a person who is less audio capable. How can equivalent consideration be given to eyewitnesses who may not have equivalent abilities in a given eyewitness situation?

Eyewitness research provides an appropriate context within which to test this assumption. Since so much weight is given the testimony of an eyewitness to an event, it would be pertinent to know how reliable a particular witnesses' memory really is. How reliable would the testimony of a person who overheard a telephone conversation be, if it could be determined that this witness possessed significantly inferior audio processing abilities?

The purpose of the present line of inquiry was to test whether such a determination can be made by looking at the influence of modalities of stimulus presentation and corresponding cognitive processing abilities with regard to interrogative suggestibility and recall accuracy for details. To do this it was necessary to present a stimulus in the three sensory modalities, assess witness recall accuracy and suggestibility for details presented in these modes, and compare these scores with performance on tests which measured various cognitive processing abilities. This test of the cognitive processing theory utilized the combined methodology of several researchers, particularly Loftus and Gudjonsson. In order to control the confound of taking the same or similar tests more than once, three different stories were produced in a video format, which provides a combination of two of the sensory presentation modalities (visual and auditory), which were compared with a strictly audio format, and a strictly visual-lexical (written) format. These stories, in these formats, were presented to subjects in different stimulus presentation orders, employing suggestive questions and statements to produce the suggestibility effect, as well as non-suggestive questions designed to elicit measures of recall accuracy.

An important new element in the present study is the inclusion of the cognitive tests. In previous research the stimulus presentation has been separated from the

questionnaires by filler activity made up of any form of timed cognitive tasks which prevented the subject from rehearsing details from the presentation (usually math problems). Although specified time periods were maintained between the presentation of the stimulus and the questionnaires, the filler activity has been replaced by tests of individual cognitive abilities: the Wonderlic Personnel Test (a fifty-item, timed test of general reasoning, mathematical, and problem solving abilities), the vocabulary test from the French Verbal Intelligence Test (FVIT) (a test of verbal/lexical ability), an object-number association test (a measure of visual/lexical recall ability), a number-picture association test (a measure of visual imagery recall ability), and the Learning Styles Instrument (LSI) (a self-report of learning style preferences: Visual Language, Auditory Language, Visual Numerical, and Auditory Numerical).

By administering these cognitive processing evaluations between the presentation of an eyewitness condition and eliciting information about details contained in that presentation, a basic assumption is being made about the nature of the cognitive processing skills of subjects. These abilities are assumed to be stable individual skills, across time and conditions. Concerns arise regarding positive and negative transfer effects, wherein observation of the stimulus presentation may interfere with performance

on these cognitive tests, or conversely, taking these tests may interfere with performance on the following questionnaires. However, performance on these measures, because of the nature of the skills being examined, are assumed to be the same regardless of whatever activities a person may engage in before or after taking them.

Participation in the study, including the observation of visual, written, or aural stories, should not interact with these abilities, as these conditions represent the types of situations any individual may be expected to encounter during an eyewitness experience.

The theoretical premise that cognitive processing differences influence an eyewitness' accuracy and suggestibility leads to some specific predictions. If one assumes that subjects may be more susceptible to suggestion by misleading post-event information that was presented in one stimulus mode than that which was presented in another, then one would expect to find that through the course of being presented with the three primary stimulus presentation modes that virtually all subjects would be suggestible in at least one condition. Furthermore, if one assumes that different cognitive processing abilities influence memory for details presented by different stimulus modalities, then accuracy for recall of those details should positively covary with corresponding cognitive abilities as measured by the cognitive tests, while suggestibility should negatively

covary with the same tests. Therefore, accuracy scores influenced by the video stimulus presentation were expected to positively correlate with a test of visual memory, the Number-Picture Association test (parts 1 and 2) as well as the Visual-Language and Visual-Numerical indices of the Learning Styles Instrument (LSI). Accuracy scores influenced by the written stimulus presentation were expected to positively correlate with general measures of intelligence such as the Wonderlic Personnel Test, the vocabulary portion of the French Verbal Intelligence test (FVIT), and the Number-picture tests (parts 1 and 2). Accuracy scores influenced by the audio stimulus presentation were expected to positively correlate with the Wonderlic Personnel Test, and the Audio-Language and Audio-Numerical indices of the LSI. Conversely, suggestibility scores for each of the above stimulus presentation modalities were expected to negatively correlate with the corresponding cognitive tests.

Essentially this study was as much a test of experimental design, as a test of the experimental hypothesis. In order to ensure that the cognitive processing hypothesis is being properly tested, the experimental design was expected to produce a certain pattern of results, which will be referred to as design predictions (these results would be expected regardless of the influence of cognitive processing differences): (1)

Experimental subjects, who are provided with misleading post event information, should be more suggestible than control subjects, who receive no misleading information. (2)

Experimental (misled) and control subjects (not misled) should be equally accurate in their answers to those questions which do not suggest false information. (3) It is predicted that individual accuracy, as well as suggestibility, should vary across presentation modalities, but since individual differences across modalities cannot be evaluated in this design, group scores should not be found to differ from each other as a consequence of either the mode by which the stimuli are presented (video, written or audio) or by the order which these modes are presented.

METHOD

Sixty-two students in five lower division classes in the Psychology Department of California State University, San Bernardino, participated in the study for extra credit. The students represented a wide variety of majors. Forty-seven of the subjects (76%) were female and 15 (24%) were male. These subjects ranged in age from 17 to 47 years, with a mean age of 22.2. Thirty-seven percent of the subjects were 18 years of age. Forty-eight of the subjects were right handed (77%), four were left handed (7%), and eight were ambidextrous (13%). Two subjects did not answer the question concerning handedness.

Initial instructions read by each subject described the purpose of the study as a comparison between the accuracy of recall for information from three stories by question type: active (short answer/non-cued/free recall) vs. passive (multiple choice/recognition: see Appendix D).

The three stories were excerpted from the television program "COPS." This program was made up entirely of actual film footage made by camera crews following police officers on routine calls. There was no narration, and events were filmed as they occurred, without re-creation. These programs were ideally suited for use as stimulus presentation media since they provided subjects with unstaged action for eyewitness observations from the

perspective of one of the participants, i.e., the camera person. These stories were presented to subjects by three presentation modes:

VIDEO: Three stories, lasting approximately five and one half minutes each, were reproduced on video cassette and were played to small groups of subjects, no more than 6 at a time. This restriction was stipulated because of the small size of the room in which the experiment was carried out. It was necessary to ensure that subjects were arrayed such that each had approximately the same view of the screen.

AUDIO: The stories, lasting between five and one half minutes and seven minutes, consisted of both dialogue recorded from the video and narration for visual details, were recorded onto VHS video cassettes and were played on the same equipment as for the video, but with only a black screen.

WRITTEN: The stories, corresponding to the video version, and consisting of exactly 1100 words each, were read individually and silently by subjects from prepared texts.

Design

Subjects were randomly assigned to three different story by condition order groups according to a Latin Square counterbalancing schedule for stimulus presentation modality, such that each subject received each story by

means of a different presentation mode: video, audio, and written, as shown in the table below:

Table 1

Story by mode presentation schedule for groups (A, B, or C) according to the Latin-square design

		Story:		
		1	2	3
Mode:	Video	A	C	B
	Written	B	A	C
	Audio	C	B	A

Example: both experimental and control subjects in order A received story #1 as a video, read story #2 from a written text, and heard story #3 in an audio format.

Stories. The first story portrayed a foot patrol by two police officers and the subsequent search of two trespassing suspects. During the search one of the officers is stuck by a needle from a syringe hidden in a suspect's pocket. The second story depicted a patrol officer's chase of a suspicious vehicle driven by juveniles. During the high-speed chase the suspect vehicle spins out of control, and the suspects are arrested. The third story follows an officer to the scene of a shooting and the victim's identification of the assailants. The order with which these stories were presented to all subjects was held constant, such that each subject received the stories in the

order listed above. The written version of these stories is presented in Appendix A.

Procedure

Each story presentation was followed by 15 minutes of cognitive testing/filler activity unrelated to the stories. Following the cognitive testing/filler activity subjects answered a 20-item short-answer (active) question set. Following another ten minutes of cognitive testing/filler activity, twenty multiple-choice (passive) questions were administered. This procedure was repeated for each presentation medium.

Questions

Active (short answer/non-cued/free recall) questions.

The instruction sheet for each of the first question sets after each stimulus presentation (see Appendix C) described them as "active" questions, or questions that required an "active" search of long term memory for the correct answer. Comparing this type of memory search to passive recognition memory search (below) was ostensibly the intended purpose of the study in order to divert attention away from the true purpose. For this study, the active questions were short-answer questions which did not cue the answer, unlike multiple-choice questions. Of the 20 active questions, both control and experimental subjects received 15 questions which, are referred to as "accuracy questions."

The following are accuracy questions from the first active (non-cued) question set:

What is the name of the officer who was injured?

What is the primary color of the police uniforms?

While on patrol, did either of the officers wear a helmet?

These questions do not infer the existence of any false or misleading details. The remaining five of the 20 active questions are referred to as "suggestors." Suggestor questions differ from the accuracy questions in that they are worded in such a way as to imply the existence of a false detail or misleading information only to the experimental subjects, which was never presented in the story. For example:

Besides the graffiti in Spanish, were there any other signs described?

When the officers approached the opening with handguns drawn, where were the suspects?

The details "Spanish" graffiti and "handguns" did not exist in the story, and are implied only in the question. Only experimental group subjects receive suggestor questions; for control subjects these questions were modified in such a way that, like accuracy questions, they do not infer the false information. All question sets are presented in Appendix C.

Passive (multiple-choice/cued/recognition) questions.

The second question set after each stimulus presentation was

identified on the instruction sheet as "passive question," or questions which cue the proper response, requiring only recognition of the correct answer as one of the multiple-choice responses. Note the examples below:

What did one of the officers believe many transients are?

- a. drug addicts
- b. ex-military
- c. ex-convicts
- d. none of the above

The officers approached the hole armed with ____.

- a. handguns
- b. radios
- c. nightsticks
- d. none of the above

As with each active question set, there are 15 accuracy questions, such as the first passive example. However, rather than five suggestor questions, there are five "target" questions, which correspond to each of the suggestor questions from the active set. The second sample question is a target question. It is designed to elicit either a correct answer (which for this question would be C) indicating that in the case of an experimental subject, the suggestion had not been accepted, or a "suggested" answer (which for this example would be A), indicating that the suggestion had been accepted. As with all questions, wrong answers are also possible (B or D).

Cognitive tests. In lieu of the usual filler activity several tests were administered in order to elicit data about each subject's cognitive abilities. These tests

included the Wonderlic Personnel Test, which is a general measure of intelligence, a vocabulary test, a picture-number association test, a word-number association test, and the Learning Styles Instrument (LSI). Subject responses to these tests formed the basis of the comparison between cognitive abilities and accuracy or suggestibility for recalled information.

Additional information of a more personal nature was requested on a confidential personal information questionnaire (PIQ), which concerned age, level of education, occupation, etc. In the event that subjects completed the cognitive tests before the specified time had elapsed between stimulus presentation and question sets, three pages of math problems were prepared. Subjects were instructed to work on these during only those periods when time remained after cognitive tests.

The entire procedure took approximately two hours and ten minutes to complete, and was followed by a debriefing statement (see Appendix D).

RESULTS

Accuracy

Experimental vs. control. Accuracy scores are represented by subjects' correct responses to the fifteen questions in each of the three test conditions, from both active (short answer/free recall) and passive (multiple choice/recognition) question; a total of 90 questions for each subject, or two sets of fifteen questions per story. The means for accuracy question responses, out of a possible fifteen, were 9.55 (standard deviation = 1.28) for the experimental group, 9.48 (standard deviation = 1.35) for the control group, and 9.51 (standard deviation = 1.31) for all subjects combined. An analysis of variance comparing the combined accuracy of subjects for active and passive questions by experimental and control groups revealed that there was no significant difference between the two groups. Thus, as expected, experimental and control groups were equally accurate for non-misleading questions.

Modes. The same analysis of variance revealed a significant difference between active and passive accuracy question scores for each stimulus presentation mode: $F_{(2,126)} = 12.874$, $p < .001$. Pairwise comparisons showed that subjects influenced by the video presentation mode differed from the written presentation mode $q_{(3,173)} = 4.295$, $p < .01$ (Tukey's), and the written mode differed from the audio mode

$g_{(3,173)} = 4.901$, $p < .01$, but that the video presentation mode did not differ from the audio presentation mode. These means and standard deviations for the three modes are 9.177 (standard deviation = 1.90) for video, 10.234 (standard deviation = 2.08) for the written mode, and 9.129 (standard deviation = 2.58), making the written mode a little over one question out of fifteen more accurate.

Stories. An analysis of variance was performed to determine whether the stories influenced accuracy scores resulted in a significant main effect for the stories ($F_{(2,122)} = 4.202$, $p < .05$).

As regard the variable of accuracy, experimental and control subjects were equally accurate. Both the modes of stimulus presentation, and the stories influenced recall accuracy.

Suggestibility

Experimental vs. control. Suggestibility scores are represented by subjects' suggested responses to only the five passive (multiple choice/recognition) questions; a total of 15 questions for each subject (across all three stories). Twenty-seven of these 32 subjects (84%) accepted the suggestion at least once during each of the three story/mode combinations, while five (16%) were suggestible during only two story/mode combinations. No experimental subjects accepted a suggested detail in less than two of the

story/mode combinations. Experimental subjects accepted the suggestion a mean of 2.75 times out of a possible 5 (standard deviation = 1.43), whereas the control group selected the alternative that corresponded to the suggested answer only .88 times (standard deviation = .91).

In order to test the hypothesis that subjects would be suggestible across presentation modalities, it was first necessary to ensure that the suggestion effect had been obtained. Comparisons were made of suggestibility scores of experimental vs. control groups for each of the stories I (needle), II (car chase) and III (shooting) (Table 2).

Table 2

Experimental vs. control groups by story: mean suggestibility scores, t scores, and probabilities

Story	exp. mean (SD)		control mean (SD)		t	prob.
I	2.63	(1.19)	.50	(.73)	8.43	.001
II	1.69	(1.06)	.80	(.89)	3.56	.001
III	3.94	(1.05)	1.33	(.92)	10.37	.001
Comb.	8.25	(2.29)	2.63	(1.59)	11.17	.001

degrees of freedom = 60

These tests revealed a strong significant suggestibility effect for each story.

An analysis of variance compared experimental group means and control group means by the three stimulus presentation modes: video, written, and audio. As

predicted, a significant difference between the experimental and control groups was found ($F_{(1,60)} = 4.66, p < .05$).

Modes. The same analysis of variance, also as predicted, found no significant difference between the suggestibility scores of the three modes, since individual differences would be leveled out in the combined group scores.

Stories. The contribution of the three stories to suggestibility error variance was assessed by an analysis of variance in which the stories were compared by order of stimulus presentation (order A = video, written, audio; order B = written, audio, video; and order C = audio, video, written) for scores on the suggestibility eliciting questions of the passive question sets (target questions) for each of the three stories. There was a significant main effect for the stories ($F_{(2,28)} = 44.728, p < .001$), but none for order, nor was there a significant interaction. All pairwise comparisons of the target question means for each story condition showed that the stories were significantly different from each other: Stories I-II $q_{(3,185)} = 6.62, p < .01$ (Tukey's), stories II-III $q_{(3,185)} = 15.997, p < .01$, stories I-III $q_{(3,185)} = 9.277, p < .01$.

The suggestibility effect was pronounced in the experimental group. But because of the grouped nature of the scores, suggestibility was not found to be significantly

different across modes of stimulus presentation. Also, as with accuracy, suggestibility was influenced by the stories.

Modes By Cognitive Tests

Accuracy. Spearman rho (rank ordered) correlation coefficients were calculated to determine whether or not performance on the accuracy portion of the active and passive question sets would covary with higher scores on predicted ability tests.

Table 3

Spearman rho (rank ordered) correlations: predicted cognitive test scores with active accuracy question scores (left column) and with passive accuracy question scores (right column), for each mode

ACTIVE Questions			PASSIVE Questions		
Mode	Test	<u>r</u>	Mode	Test	<u>r</u>
video	Obj.-Num. 1	.0429	video	Obj.-Num. 1	-.2126
	Obj.-Num. 2	-.1841		Obj.-Num. 2	-.1483
	Vis.-Lang.	-.1921		Vis.-Lang.	-.0729
	Vis.-Num.	-.0024		Vis.-Num.	-.0729
written	Vocabulary	.116	written	Vocabulary	.2692*
	Wonderlic	.3104**		Wonderlic	.1889
	Obj.-Num. 1	.2924*		Obj.-Num. 1	.1641
	Obj.-Num. 2	.2493*		Obj.-Num. 2	.2421*
audio	Audio-Lang.	.2027	audio	Audio-Lang.	.0984
	Audio-Num.	-.1538		Audio-Num.	-.0459

1-tailed significance: * - .05 ** - .01

Five significant correlations were obtained, and only in the written stimulus presentation for passive accuracy questions with vocabulary, active with the Wonderlic Personnel Test,

active with the number-picture part 1, active with number-picture part 2, and passive with number-picture part 2.

Suggestibility. Spearman rho (rank ordered) correlation coefficients were also calculated to determine whether or not the suggested answer scores on the passive question sets would negatively covary with scores on the predicted ability tests. Only one correlation was found to be significant, written accuracy questions with the Wonderlic Personnel scores $r = -.3003$, $p < .05$.

For both accuracy and suggestibility only the written mode elicited any predicted correlations.

Experimental Design Validity

Since other factors in the overall design influence the production and interpretation of results, the following analyses were done to ensure that theoretical results were not confounded by faulty experimental design.

Order counterbalance. The influence of the order by which the stimulus modes were presented was assessed to ensure that the experimental design did in fact counterbalance order effects. Experimental subjects' suggested responses to passive target questions were compared for each of the three different orders of presentation (i.e. the order by which the video, written, or audio story form was presented) by one-way analysis of variance. There were no differences among orders A (video,

written, audio), B (written, audio, video) and C (audio, video, written).

This result demonstrates the success of the design in countering order effects.

Accuracy: active vs. passive questions. The mean accuracy for active (short answer/free recall) and passive (multiple choice/recognition) questions of experimental and control subjects by stories ranged from 8.91 for experimental group responses to story #2 passive questions (standard deviation = 2.161) to 10.22 for experimental group responses to story #3 passive questions (standard deviation = 1.996), a difference of only 1.31 correct answers.

An analysis of variance comparing performance for active vs. passive question accuracy for both experimental and control groups revealed that there was no significant difference between the two forms of questioning.

Subject responses to the 15 accuracy questions from the active and passive question sets for each story were correlated using Pearson product-moment correlations in order to determine whether or not the question sets were eliciting approximately the same level of accuracy. The resulting correlations for both experimental and control groups appear in Table 4.

Table 4

Experimental and control group by story: Correlations for active with passive accuracy questions

experimental group (n=32), accuracy questions:

story	question type	\bar{r}	probability
1	active with passive	.2892	
2	active with passive	.5107 *	.01
3	active with passive	.5040 *	.01

control group (n=30), accuracy questions:

story	question type	\bar{r}	probability
1	active with passive	.3180	
2	active with passive	.4820 *	.01
3	active with passive	.5705 **	.001

Since these active and passive accuracy questions for each story shared common source information it was expected that they would be correlated. For both the experimental and control group they did, but only for stories II and III. Story I accuracy questions were not found to be correlated.

Pearson product moment correlation coefficients were obtained for the active and passive accuracy questions for each stimulus presentation mode. The active and passive accuracy questions of each stimulus presentation mode were found to be significantly correlated: video $\bar{r} = .2491$, $p < .05$.; written $\bar{r} = .355$, $p < .01$; and strongest of all, audio $\bar{r} = .5971$, $p < .001$. Interestingly, the greatest number of correlations occurred between audio accuracy scores and video accuracy scores, for both active and passive questions. Active video accuracy questions correlated with active audio accuracy questions $\bar{r} = .3065$, active video with passive audio $\bar{r} = .3187$, and passive video with passive audio $\bar{r} = .3555$, all significant to $p < .01$. Passive video

accuracy questions correlated with active audio questions $r = .2556$, $p < .05$. Only one other correlation occurred across modalities, between written and audio stimulated active accuracy questions with $r = .222$, $p < .05$.

Suggestor and target questions. Five of the 20 active questions acted as "suggestor" questions to imply a false detail to the 32 experimental subjects, while five corresponding questions administered to the 30 control subjects were modified so as not to imply any false detail.

Table 5

Mean scores for active suggestor questions (experimental group) and non-suggestor questions (control group), for each story

story	suggestor (SD)		non-suggestor (SD)	
I	2.63	(1.56)	2.83	(1.29)
II	2.38	(1.18)	2.97	(1.22)
III	2.84	(1.11)	2.70	(1.12)

The information implied by these active "suggestor" questions was elicited by another type of question in the passive sets, called a "target" question. These questions were designed to determine whether or not subjects had accepted the false detail into their memories of the event, or retained the correct information from the story. The means of those target questions for which experimental subjects selected correct answers (i.e., declined the suggestion), and the corresponding means for the same questions answered by control subjects, who received no false suggestion for each story condition appear in Table 6.

Table 6

Experimental vs. control group passive target question
(suggestion declined) mean scores, by story

	experimental	(SD)	control	(SD)
story I	1.60	(1.01)	3.37	(1.22)
story II	2.19	(1.15)	2.73	(.94)
story III	.84	(1.11)	2.20	(1.42)

Target questions (suggestion accepted). The means of those questions of the five target questions in the passive sets for which experimental subjects selected answers that had been suggested in the active suggestor questions for each stimulus presentation condition are shown in Table 7.

Table 7

Experimental vs. control group passive target question
(suggestion accepted) mean scores, by story and by mode

scores by story:				scores by mode:			
	exp.	(SD)	cont. (SD)		exp.	(SD)	control (SD)
I	2.63	(1.19)	.50 (.73)	V	2.72	(1.42)	.80 (.86)
II	1.69	(1.06)	.80 (.89)	W	2.72	(1.44)	.87 (.99)
III	3.94	(1.05)	1.33 (.92)	A	2.82	(1.47)	.97 (.89)

DISCUSSION

Theoretical Predictions

To restate the theoretical predictions: virtually all subjects should be found to be suggestible in at least one of the suggestion modalities, and accuracy and suggestibility scores should covary with performance on cognitive ability tests.

Suggestibility across presentation modalities. Whereas Schooler et al. (1986) found that 25% of the subjects they exposed to a false detail accepted the suggestion, and in Loftus' (1980) research, 80% accepted the suggestion, fully 100% of the subjects in the experimental group of the present study accepted at least one suggestion of the five target question in one of the three exposures. In fact no experimental subjects accepted a suggested detail in less than two of the story/mode combinations.

These findings support the hypothesis that subjects who may not be suggestible in one modality are likely to be susceptible to interrogative suggestibility in another.

However, it must also be considered that 90% of the control subjects also selected a target answer in at least one of the three phases, albeit at a greatly reduced rate, selecting details that they had never actually seen during the stimulus presentation or in the question sets. Still, the strong statistically significant difference between

experimental and control group means point to the probability that the control group suggestibility mean represents a baseline of common erroneous responses, pointing to the general fallibility of memory.

Modes By Cognitive Tests

Accuracy. The theoretical prediction that performance on the accuracy portion of the active and passive question sets by subjects in certain conditions would be positively correlated with predicted performance on the cognitive abilities turned out to be supported only for the written mode. The Wonderlic Personnel Test, the vocabulary test, and the Number-Picture Association tests were correlated for this mode.

One likely explanation, which does not require a cognitive processing differences interpretation, is that the measure of IQ employed, i.e., the Wonderlic Personnel Test, relies on the reading ability of the subject. Superior reading ability would allow greater comprehension of the test and subsequently higher scores on the IQ measure as well as the vocabulary test. Likewise, the same superior reading ability would provide the subject with greater comprehension of the written story and subsequently higher accuracy scores.

Suggestibility. Again, only the written mode was found to correlate with a cognitive test, in this case only with the Wonderlic Personnel Test.

Although some support has been lent to the theoretical premise that cognitive processing differences are influencing subject responses by the significance of some of written story questions to the four tests, these results are equivocal. It would appear that either these tests do not satisfactorily predict accuracy or that cognitive processing differences do not play a large enough role overall to be predictive.

It must be noted that this study used an unusually large amount of time for each subject to conclude since each subject was required to complete three separate test conditions. Accordingly, the cognitive tests used in the present study were selected because of their simplicity and ease of administration. Since this three-part design would not be required in future research, more time can be used to administer more appropriate tests.

Design predictions

In order to test the cognitive processing hypothesis, it was expected that the present experimental design would provide the structure by which the theoretical predictions could be tested. If the experimental design was sound the following predictions should be confirmed: that experimental

subjects should be more suggestible than control subjects, that experimental and control subjects should be equally accurate in their answers to those questions which do not suggest false information, and that even though individual accuracy, as well as suggestibility, should vary across presentation modalities. Additionally, since individual differences across modalities cannot be evaluated in this design group scores should not be found to differ from each other as a consequence of either the mode by which the stimuli are presented (video, written or audio) or by the order which these modes are presented.

Accuracy, suggestibility, and the mode of stimulus presentation (video vs. written vs. audio). The first design prediction was supported: the experimental group differed significantly from the control group for suggested answers, providing a strong replication of previous research findings.

Since both experimental and control subjects received the same 15 accuracy questions per condition, no significant difference was expected or found between experimental and control group accuracy scores, for either active, passive, or combined scores. This result provides confirmation of the validity, across situations, of the accuracy questions, with one possible exception: the expected correlation between active and passive questions for the first story condition was lacking (active questions correlated

significantly with passive questions for stories 2 and 3). This result may demonstrate a lack of cohesion between the information being elicited by the two question sets, for the first story, since the same pattern was found for both experimental and control subjects. Implying that these question sets should be rewritten with a view to duplicating the cohesion found for the other two stories.

Finally, as predicted, group suggestibility, as well as accuracy, was found to be equal for each group, for each of the presentation modes, presumably due to the aggregation of all subject scores across the sample. Even though the hypothetical prediction is that individual differences exist, group differences found at this level of analysis could have only been attributed to differences in the testing procedures given.

Other Results

No study can be fairly evaluated in the light of an analysis of such narrow parameters as results derived from three theoretical predictions and three design predictions. Other factors in the overall design influence the production and interpretation of results, and therefore deserve thoughtful consideration.

Stories. The order of the stories to which each subject witnessed was held constant to control for the order effects that might occur for the mode of stimulus

presentation, and therefore differences were expected between answers to suggested questions, where the suggestion was accepted, but these differences are not important to understanding the results.

Strong statistically significant differences were found between passive target questions (suggestion accepted), which were attributed to the differential influence of the stories. It should not be surprising that the stories were found to elicit differences in accuracy and suggestibility. This result could simply lend support to one or more of five hypotheses: First, that some stories elicit greater error through misleading questions because they promote higher levels of expectation in the subjects for the suggested information. Second, that some of the details of the stories, as in mundane eyewitness situations, vary greatly in clarity and salience. High salience would increase the likelihood of a detail being remembered, whereas low salience may create "detail vacuums" that must be filled by the details provided in the subsequent question sets. Third, the amount of detail contained in a story would affect memory for any particular detail. Fourth, that some details implanted by the particular target questions merit logical inclusion, and therefore are more likely to be remembered. And finally, that the structure of some of the questions plays a role by providing phraseology such that the target detail is more strongly implied than in others.

It may be impossible to discern which of these factors is creating the suggestible variance from story to story, such differences lend support to the mundane realism of this study.

However, it was not within the scope of this study to analyze story differences. These stories, excerpted as they were from regular television programming, were selected because of the realistic nature of the observation they provided the subjects. It would be virtually impossible to control for such variability unless the stories were scripted and produced, which would lessen the desired impact for the eyewitness experience. Future studies may be refined to focus on desired details. Replications from this more mundane research concept will provide strength to future conclusions.

Questions

Accuracy: active vs. passive questions. Neither the active nor the passive question sets demonstrated any superiority for the accuracy of information recall, contrary to anecdotal, experience. However, this result is not revealing in and of itself, since the order by which the question sets were administered (active first, then passive) was held constant, thus confounding the results. In any case, the comparison of these questions was not part of any theoretical predictions and is only mentioned as a

parenthetical note concerning the experimental design. The implication for this result is that since no difference was found between the two types of questions then either can be confidently used in future research, or in real interrogative situations.

Accuracy. The correlations for the active and passive accuracy questions for each stimulus presentation mode were expected to produce two patterns of results. First, active and passive questions for each presentation modality should correlate, substantiating the validity of the question sets. Second, no correlations should be found between presentation modalities, since different cognitive processing abilities are believed to be acting on the information recall stimulated by each presentation mode. The results revealed an interesting pattern. Besides the predicted active and passive accuracy questions correlating with like-stimulated presentation modalities (i.e., written active correlations with written passive questions), two other correlation patterns emerged. One was a weak correlation between written and audio active questions, the other was the correlation between all video and audio active and passive questions, three of which were significant to $p < .01$.

The general lack of correlations between active and passive questions under video and written modes, and (except for the weak active question correlation) written and audio modes, supports the influence of cognitive processing

differences. Yet these results also run counter to what would be expected by this theoretical premise. It was surprising that all of the video and audio active and passive questions were correlated, since these presentation modes should rely on two different cognitive processing systems, visual and aural. However, it is conceivable that these two modes may actually share cognitive processing components which only further research would define. Almost certainly they share auditory components as well as visual imagery components, but it does not explain why a correlation would occur for such divergent stimulus modes as written and audio. Also, if shared components account for video-audio correlations, why did video-written modes, which share visual and imagery components, not correlate. Presumably, one possible explanation is that the type of cognitive processing that is occurring during the encoding, storage and retrieval of video information is more akin to the processing of audio information and quite different from the processing of written (lexical) information.

The same explanation may be at work in the analysis of variance comparing active and passive accuracy question scores for each stimulus presentation mode which demonstrated significant differences between video and written mode, and the written and audio modes, but not the video and audio mode, supported the predictions made by the cognitive processing theory, since it demonstrated that

subjects did not perform equally across presentation modalities. Recall was superior for the written condition, but equal for the video and audio conditions. In spite of the obvious argument, that the subjects are all university students and therefore expected to do well under conditions that require recall from written information, it cannot be avoided that cognitive processing differences, practiced or not, are at work. Why then was no significant difference found for the video and audio modality comparison?

An inference which may be drawn from these results is that the audio-video cognitive processing connection, supported by these correlations, represents much more than a shared audio component. Unlike reading a story and then recalling discrete bits of information from lexical memory, the audio and video stories require encoding memory of the event as a sequence through time. An example of such retrieval differences would involve the target stimulus "handguns" from the first story. After being presented the first story, subjects answer the passive question "The officers approached the hole armed with _____. a. handguns, b. radios, c. nightsticks, d. none of the above". For the written format, subjects need only recall (recognize) the word "handguns" or "nightsticks". However, if the story were received in the video mode the recall process follows a different routine, requiring the subject to "replay" the action through that portion of the sequence

containing the target detail (the image of handguns or nightsticks). The audio mode is more puzzling; the story presentation also occurs through time, as with the video, but the stimulus is still lexical (the words "handguns" or "nightsticks"). Since significant correlations were only found in one condition of the written-audio comparisons, the encoding and retrieval process for written words and aurally presented words must be different.

In conclusion, the present research has established that interrogative suggestibility does occur across presentation modalities. Also, support has been shown for the influence of cognitive processing difference for both interrogative suggestibility and accuracy in the recall of information from different presentation modalities, but that discrepancies between predicted and observed behavior exist.

The implications for the area of eyewitness testimony are far reaching. Suggestibility occurs in various modalities, and given multiple eyewitness situations, suggestibility is pervasive. Tremendous weight is given to the testimony of the eyewitness by both judge and jury in determining guilt of a suspect. This weight is absolutely shocking in light of the measurable fact that every subject exposed to the 15 false details in this study was suggestible at least two out of three exposures! Even under the best of observational conditions differences exist between the way people report events that they have actually

observed and those that they believe (or are led to believe) they have observed, and neither they nor the naive listener are aware of the difference.

How many people, innocent or otherwise, have been convicted and executed on the word of one eyewitness? How many stories, anecdotal or otherwise, have told of the refutation of an eyewitness account months or years after the conviction of the innocent? Only by discovering a testable link between an individual's eyewitness abilities and measurable individual differences can we move forward to ensure that justice is served. Should more predictive cognitive tests be discovered or developed, it may be possible to confirm a person's relative abilities as an eyewitness, with a view to assessing whether or not a witness to an event should be taken at his or her word. Does this imply that potential eyewitnesses should be administered some form of cognitive test, in addition to the traditional "line-up" or mug shot? The obvious response is that whatever needs to be done, should be done, to ensure the protection of the innocent.

It is the responsibility of cognitive psychology to increase the body of knowledge and understanding of this very human task: processing our perceptions of the external world into an interpretation that we accept as our view of the external world. Such knowledge represents to the researcher, as to a court of law, the search for truth.

APPENDIX A

SCRIPT #1

Portland Bureau of Police
Central Precinct: FOOT PATROL

Officer Barry Cook and another officer known only as "John" proceed through an intersection on their way to patrol the area under a freeway interchange. The officers, dressed in the standard blue, short sleeve Portland police uniforms, are each armed with handguns and nightsticks.

Officer Barry Cook: "We're going to try to discourage people from living down here on the street, so they don't become victims."

They continue under the freeway cloverleaf along weed-choked paths.

Officer Cook: "We've found body parts down here; people stabbed to death. An area like this draws people that are hiding from the police..."

The officers pass through a transient camp in the shelter of the concrete overpass. Five men lounge by bedrolls and other personal gear, while a woman dressed in blue shirt and jeans, squats by two dogs: a Doberman Pincer and a beige Labrador retriever.

Officer Cook: "A lot of the transients are ex-convicts. It's a good place to go and hide. Grow a beard and no one will ever know who you are."

No one looks toward the officers as they pass, except one bearded caucasian man with shoulder-length brown hair, wearing an unbuttoned brown checkered cotton shirt, and holding a dark bundle. The concrete walls lack any decoration or graffiti.

Officer "John": "As a practice Barry and I try to give them a chance to move. And we inform them that if they come back we will cite them."

John has donned his dark blue wind-breaker and both officers now wear blue baseball-style police caps.

Officer John: "It's the hard core when-you-tell-us-to-go-to-hell-we're-going-to-camp-here-anyway, then you can bank on the fact that you're going to get kicked out."

9:45 AM The officers ascend an embankment toward a hole that has been dug out under the concrete roadway. They have drawn their nightsticks and peer into the opening, which is strewn with trash.

Officer John: "It's the same ones."

Officer Cook: "Come on out of there! Hey, come on out. Come on!"

The aperture is approximately two and one half feet high by three and one half feet wide, through which can be seen a dirty blue blanket, a light brown coverlet, and the legs of a man kneeling on a mattress.

Officer John: "Cooking again. Woo (indicating strong odor)."

John picks up an object, which turns out to be the bottom half of an aluminum can. He points out a substance that is stuck to the surface, near the rim.

Officer John: "That's tar heroin."

Officer Cook: "Whoowee! It's strong in there! Looks like somebody made the hole a little bit bigger."

Officer John: "Just make 'em pull their pants down when you get 'em out here. Make 'em pull their pants down."

The two suspects crawl slowly out of the opening. The first suspect to crawl out of the opening, suspect #1, is a 5 ft. 9 in. latino male with medium-length, dark brown hair, an untrimmed moustache, and several days growth of facial hair. He is attired in a black imitation leather jacket over white undershirt and grey pants. He wears a nervous smile, showing teeth. His sneakers are untied.

Officer Cook: "Solino! So we meet again. Huh? Who's your friend; same guy?"

The other man, suspect #2, is 5 ft. 6 in. latino wearing black pants and a blue pull-over shirt under a black and white plaid long-sleeve shirt. This suspect also has a moustache, although he is otherwise clean shaven. He does not smile. Officer John begins to search this man, while Officer Cook takes charge of searching Suspect #1.

Officer Cook indicates to John that he has found something: "This one's under arrest."

Officer John: "What's he got?"

Officer Cook: "Tar."

Suspect #1 (over his shoulder, in a heavy spanish accent):
"It's not my jacket!"

Officer Cook: "Put your hands behind your head. Put your hands on the back of your head, now." Officer Cook takes each of his hands in turn and cuffs them behind his back. "Well, I'm afraid you missed something, pal."

Suspect #1: "It's not my jacket."

Officer Cook: "That's tar heroin. You're under arrest, for about the tenth time. Yeah, well you missed this one. You missed this one. Yeah." The suspect continues to indicate that he does not own the garment in which drugs were found. "That's not your jacket? Hey, what can I say? Just doing my job."

Officer Cook continues to search the suspect's black jacket, starting with the right inside pockets.

Officer Cook: "See, know you're in trouble. Your under arrest for a felony, okay? What can I say, man? We asked you to stay out of the area. And that's it. We don't want you to come back here; don't do it."

Officer Cook searches the suspect's trouser pockets, right rear first, and then the left rear. The second time he reaches into the pocket he quickly withdraws his hand.

Officer Cook: "I just got bit."

Officer John: "On what?"

Officer Cook: "A needle"

Officer John: "God dammit. Where at?"

Officer Cook: "In his back pocket."

Cook squeezes the middle finger of his right hand, drawing blood out of the wound. John pulls the syringe out of the pocket, then tosses it away.

Officer John: "Just make it bleed as much as you can; just keep it bleeding."

Officer Cook (still squeezing his finger): "Well, I hope you don't have AIDS or anything, pal! Are you okay here, John?"

Officer John (cuffing suspect #2): "Yep. Go ahead and take him with you, and throw him in the back seat."

Cook leads suspect #1 down the slope of the embankment and over to the patrol car. The suspect enters the right rear door of the white squad car with blue markings. John soon arrives with suspect #2, who is placed into the vehicle through the right rear door. A train rolls by in the background. Cook is looking through the First Aid Kit in the trunk

Officer Cook: "I didn't even see the syringe in his pocket."

Officer John: "The needle was bent, that's why it got you. I'm going to take the other one for prohibited camping: Criminal trespass, actually. Criminal trespass on the highway right of way."

Officer John: "Most of 'em if you talk to them about it, you say: 'if you've got a needle, tell me, I don't want to stick myself', they'll look you right in the eye and lie to you."

Officer Cook: "Now I've got to worry about this for the next ten years."

(Word Count: 1100)

SCRIPT #2

Harris County Sheriff Department - Houston, Texas
Street Patrol

Deputy James Bilinovich, 27 years old, has well-trimmed dark-brown hair, and moustache. His Harris County Sheriff's uniform consist of a dark brown shirt, khaki trousers with brown stripe, and khaki tie.

12:09 A.M. - Deputy Bilinovich: "I don't like thieves. We've got a lot of car thieves out here. I've had two cars stolen in the past ten years, so I've got a kind of a bad taste in my mouth. So when I 'pop' a car thief; get to chase 'em and catch 'em... that's a good high."

Deputy Bilinovich, responding to a suspicious vehicle call, radios to the Communications Center: "Forty-two sixty-three, I'm going to be southbound on Cedar, trying to get what looks like a cream-colored Buick." The dash of Bilinovich's patrol car is free of weapons.

In pursuit, the siren wails as Deputy Bilinovich closes in on the suspect vehicle. Speeding along the freeway, the patrol car passes a tow truck at 85 mph. "Looks like they're not going to stop." The car he's following turns right, onto a two-lane road, which is called Three-Sisters Road. "They're running."

The vehicle is a tan sedan (two-door) with a dark top. On the highway through town, they pass an Econo Lodge. "Okay, when they bail out I'm going after the driver. You all watch any passengers; watch their heads, because when they bail out they're gonna scatter."

The suspect vehicle runs a red light, then passes two cars. "We're headed down into the city."

"Looks like they're lost," the deputy observes as they accelerate through a green light. "I'm not sure they know where they're at. Looks like it's going to be a car load of juveniles. Lot's of little heads looking back at us."

They pass a Service station on the right of the road. "We're doing about 80 now."

"We're down in the city now, so we should get some back-up from the city."

The vehicle speeds through another red light. "The City (police vehicle) is behind us... Looks like he's going to

join us." They pass a Chevron station. Up ahead is a McDonald's on the right, after which they make an uncertain lane change to the left.

On the radio one of the other pursuing officers notes: "They're going about 85 mph, now."

Suddenly the suspect vehicle veers to the right, misses the turn, and skids out of control into an empty parking lot. With a long screech of tires, it spins 180 degrees and sparks fly from the front end. Sliding backward now, the car turns back to the left and comes to rest facing straight ahead again, directly in front of the pursuing sheriff's vehicle. In the distance a Food Land store is illuminated.

Deputy Bilinovich screeches to a halt ten feet in back of the suspect vehicle, and instantly another police car is pulling to within a few feet of the driver's door. The passenger door opens, but before anyone can exit Deputy Bilinovich has leaped out of his vehicle and leveled his service revolver. He carries a flashlight in his left hand.

"Okay, let's see your hands!" Bilinovich yells. "Everybody! Let's see some hands. Alright, don't nobody move! Don't get out of the car; stay where you're at."

Three police vehicles have arrived. Several officers, with guns drawn, surround the car. A pair of hands are held out the open passenger door. The city police officer, wearing blue shirt (no tie), black pants and black jacket, has crossed over to the right to cover the passenger-side door. In his left hand he holds a flashlight very close to the left side of his face.

Deputy Bilinovich: "Okay, Richard! Take the passenger side for me. I'll cover here. Go ahead and take them out: bring them out one at a time." Then to the suspects: "Alright, on the ground face down. Get on the ground. Hands behind your head."

Another sheriff's vehicle pulls up after the four suspects are already prone on the ground, hands behind their heads. One by one, Bilinovich kneels onto each suspect, placing his right knee into the small of each suspect's back, and thoroughly frisks each. The first suspect is a young male teenager, wearing a yellow plaid shirt.

Deputy Bilinovich kneels on the back of one of the suspects (wearing a white shirt with grey stripes), as he cuffs, first his left hand, then his right. This boy groans loudly

in discomfort. Without sincerity, Deputy Bilinovich says "Oh, excuse me."

"Okay, Richard, who was the last one you brought out?" Richard points. "Are you the driver?" he asks the boy, who says "No." "You weren't the driver? Who was driving?"

Still groaning, the suspect says: "I was in the back seat." Deputy Bilinovich gets up off the boys back. "Stay put."

He kneels down to handcuff the boy wearing the dark jacket over a red T-shirt, and blue-jeans. "Put your hand back here, Hoss."

Another officer observes: "This is the driver here."

"Were you driving?" asks Deputy Bilinovich.

"Yes, sir." answers the suspect.

"Yes, sir." repeats Deputy Bilinovich, patting the boy on the face. "Good deal. Guess what? You're going to jail. How old are you?"

"Fourteen." The suspect replies.

"Fourteen." the deputy repeats incredulously. "Come on, sit up."

Putting the suspect into the driver's side rear door of the black police car with white markings, deputy Bilinovich tells him: "Watch your head getting in there. There you go." The 911 Emergency telephone number is painted just behind the rear window.

Deputy Bilinovich sums up the evening on the ride to the station.

"They'll get them to the station; I'll call juvenile detention, give them their names. But if none of these kids has been handled before for any type of a crime, they'll release them to their parents. They may not even spend the night in jail. It's going to depend on who we get a hold of down there in juvenile, and whether they've been handled before. So, that's what's kind of frustrating in some of this: that we get into a chase like this; with the speeds we were up to. We jerk them out of the car, get them all cuffed and stumped, and find out that they're fourteen years old and under. They may walk. I'll still be at the station doing my report, and they're already on the way home with mamma."

"They may be kiddy crooks, but they grow up to be big crooks.

A crook is a crook, as far as I'm concerned."

(Word Count: 1100)

SCRIPT #3

Tucson, Arizona
Tucson Police Department

9:48 P.M., Shooting Call - Radio: "Reference to a yellow sedan... there are four females, three males in the vehicle and a .22 handgun."

Officer Terri O'Rourke: "We're going to a shooting victim. Somebody just called in and said that somebody had been shot. Three males left the scene, eastbound, in a yellow-colored vehicle."

Speeding through a tunnel, the siren wails as Officer O'Rourke, dressed in the blue long-sleeve shirt and dark blue slacks of the Tucson Police Department, guides the car past a Circle K on the way to the scene. She wears glasses. There is a great deal of confusion at the scene of the shooting. Other emergency vehicles had already arrived, including a green Tucson City Fire Dept. engine.

Radio: "On Speedway... they just threw something out the window."

A black male witness (approximately 5 ft. 8 in., 150 - 160 lbs.), wearing a brown jacket, white T-shirt with logo, and a plain black baseball cap, is excitedly telling officers about the shooting. He shows where he had been standing when the shots were fired (behind a blue two-tone pick-up truck). "They were right there," he points to a spot a few feet away in the apartment complex parking lot. "I thought I was dead! I felt it on my neck. They said: 'You wanna play?' - BOOM, BOOM, BOOM. My brother was right there on the phone. If I'd been out there, they'd have gotten me with all of 'em." A few feet away from his position behind the pick-up, against a white-washed wall, is an open phone booth with a chair in front of it.

Officer O'Rourke: "Is that your brother over there?" she asks, pointing to a large black male (6 ft. 3 in., 240 lbs.), wearing a black sleeveless sweat-shirt. The witness confirms. "Okay, do me a favor: have a seat. Just sit down for a minute."

Other officers are interviewing the shooting victim, whose name is "Willie". Willie: "Me and my brother were just sitting there talking on the phone. They said: 'Do you wanna shoot?' I said: 'I ain't got no gun, how am I gonna shoot?' I thought they were playing. And then they just started shooting." Willie lifts up his shirt, exposing a

small hole approximately 1½ in. to the right of his navel. Officers are scanning the white plaster wall behind the phone booth looking for more bullet holes.

Officer O'Rourke explains to a supervising officer what she has pieced together from the story: "He says that they came here to visit a female named Bertha, who lives in one of the apartments. Basically what we have is one brother who has been hit with what appears to be shrapnel, or (we're guessing) a .22 cal; at this point we don't know. The other brother is standing here with him, but they can I.D. the shooters. Apparently one of the females lives in the complex, and took off in a car. Two of our units have them stopped south of here."

Officer O'Rourke asks Willie if he'll go to the suspects' location to identify them: "What I want you to do is tell me when we get there who you recognize and who you don't." She also asks: "Are you gonna go to the doctor, or what?" En route to the place where the suspect vehicle was stopped, she asks Willie: "Did you get into a fight with them, or what?"

"No," Willie replies. "It was my brother who was talking to them. I wasn't even in it. I was just standing up there. You see, me and my brother were coming down the stairs from a friend's house. He stopped by Bertha's house. My brother was talkin' some noise... he was just playin' with them, you know? That girl, who was driving, got smart; she started talkin' back. She was saying to get out of her house. Which it's not her house, it's Bertha's house. Sammy started this stuff. He should have minded his own business. He stopped by the house; I said I was going to go home and watch the news. He said that they were runnin' a little whorehouse. I don't know how that got started. That's what the girl got mad over. They started shooting. I thought they were just shooting blanks. Hit me and the wall and stuff. I went by the other house, and saw my shirt and that I'd been hit."

They arrive at the arrest scene. Officer O'Rourke shuts the lights off inside the police car, "So that when Willie comes by to give some I.D. on these people, they can't see in, to see who's identifying them. It gives him some anonymity... and protects everybody."

Willie is positive about his identification. "Yeah. That's them, right there. That's all of them, right there."

Officer O'Rourke (to radio): "Four Seven Seven Three. Put the three males together." They are lined up for identification. The first suspect is has remained seated on

the pavement, wearing a blue sweat-shirt, jeans, and long brown hair that covers most of his face. One of the standing suspects wears a white shirt, jeans, white tennis shoes, and short, dark hair. The last male suspect also has short hair, but wears a red plaid hunting vest over a tan long-sleeved pull-over shirt, and jeans.

Again Willie is sure. "Yeah. That's all three of them, there. I don't know which one did the shooting, though."

Officer O'Rourke reports to one of the on-scene supervisors: "He I.D's all of them. Three that were standing; everybody that was in the car. He can't pick out who was doing the shooting, but he says that it was one of the males."

Officer O'Rourke and another officer check out the suspect vehicle through the windows and see two revolvers in the center of the front seat. "Oh, baby! It's a pretty big looking gun... a couple of them. They (the suspects) all look like juveniles. They appear to be between the ages of sixteen and eighteen."

Later, back on patrol, Officer O'Rourke sums up the evening's events: "The man who was shot in the stomach went in for exploratory surgery. They did not find the bullet inside of him. It may have hit him and grazed off, which it didn't look like it. He'll be in the hospital for the next couple of days. They've arrested one male for aggravated assault, and they'll "long form" the others. Basically all that means is that it's an ongoing investigation."

"So, there are other arrests pending."

(Word Count: 1100)

APPENDIX B

TRANSCRIPT #1

(Quotations denote soundtrack from video recording).

NARRATION: Portland Bureau of Police

Central Precinct: FOOT PATROL

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Officer Cook: "We've found body parts down here; people stabbed to death. An area like this draws people that are hiding from the police..."

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It's a good place to go and hide. Grow a beard and no one will ever know who you are."

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9:45 AM The officers ascend an embankment toward a hole that has been dug out under the concrete roadway. They have drawn their nightsticks and peer into the opening, which is strewn with trash.

Officer John: "It's the same ones."

Officer Cook: "Come on out of there! Hey, come on out. Come on!"

The aperture is approximately two and one half feet high by three and one half feet wide, through which can be seen a

dirty blue blanket, a light brown coverlet, and the legs of a man kneeling on a mattress.

Officer John: "Cooking again. Woo (indicating strong odor)."

John picks up an object, which turns out to be the bottom half of an aluminum can. He points out a substance that is stuck to the surface, near the rim.

Officer John: "That's tar heroin."

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Officer John: "Just make 'em pull their pants down when you get 'em out here. Make 'em pull their pants down."

The two suspects crawl slowly out of the opening. The first suspect to crawl out of the opening, suspect #1, is a 5 ft. 9 in. latino male with medium-length, dark brown hair, an untrimmed moustache, and several days growth of facial hair. He is attired in a black imitation leather jacket over white undershirt and grey pants. He wears a nervous smile, showing teeth. His sneakers are untied.

Officer Cook: "Solino! So we meet again. Huh? Who's your friend; same guy?"

The other man, suspect #2, is 5 ft. 6 in. latino wearing black pants and a blue pull-over shirt under a black and white plaid long-sleeve shirt. This suspect also has a moustache, although he is otherwise clean shaven. He does

not smile. Officer John begins to search this man, while Officer Cook takes charge of searching Suspect #1.

Officer Cook indicates to John that he has found something:

"This one's under arrest."

Officer John: "What's he got?"

Officer Cook: "Tar."

Suspect #1 (over his shoulder, in a heavy spanish accent):

"It's not my jacket!"

Officer Cook: "Put your hands behind your head. Put your hands on the back of your head, now." Officer Cook takes each of his hands in turn and cuffs them behind his back.

"Well, I'm afraid you missed something, pal."

Suspect #1: "It's not my jacket."

Officer Cook: "That's tar heroin. You're under arrest, for about the tenth time. Yeah, well you missed this one. You missed this one. Yeah." The suspect continues to indicate that he does not own the garment in which drugs were found.

"That's not your jacket? Hey, what can I say? Just doing my job."

Officer Cook continues to search the suspect's black jacket, starting with the right inside pockets.

Officer Cook: "See, know you're in trouble. Your under arrest for a felony, okay? What can I say, man? We asked you to stay out of the area. And that's it. We don't want you to come back here; don't do it."

Officer Cook searches the suspect's trouser pockets, right rear first, and then the left rear. The second time he reaches into the pocket he quickly withdraws his hand.

Officer Cook: "I just got bit."

Officer John: "On what?"

Officer Cook: "A needle"

Officer John: "God dammit. Where at?"

Officer Cook: "In his back pocket."

Cook squeezes the middle finger of his right hand, drawing blood out of the wound. John pulls the syringe out of the pocket, then tosses it away.

Officer John: "Just make it bleed as much as you can; just keep it bleeding."

Officer Cook (still squeezing his finger): "Well, I hope you don't have AIDS or anything, pal! Are you okay here, John?"

Officer John (cuffing suspect #2): "Yep. Go ahead and take him with you, and throw him in the back seat."

Cook leads suspect #1 down the slope of the embankment and over to the patrol car. The suspect enters the right rear door of the white squad car with blue markings. John soon arrives with suspect #2, who is placed into the vehicle through the right rear door. A train rolls by in the background. Cook is looking through the First Aid Kit in the trunk

Officer Cook: "I didn't even see the syringe in his pocket."

Officer John: "The needle was bent, that's why it got you. I'm going to take the other one for prohibited camping: Criminal trespass, actually. Criminal trespass on the highway right of way."

Officer John: "Most of 'em if you talk to them about it, you say: 'if you've got a needle, tell me, I don't want to stick myself', they'll look you right in the eye and lie to you."

Officer Cook: "Now I've got to worry about this for the next ten years."

TRANSCRIPT #2

(Quotations denote soundtrack from video recording).

NARRATION: Harris County Sheriff Department - Houston,
Texas

Street Patrol

Deputy James Bilinovich, 27 years old, has well-trimmed dark-brown hair, and moustache. His Harris County Sheriff's uniform consist of a dark brown shirt, khaki trousers with brown stripe, and khaki tie.

12:09 A.M. - Deputy Bilinovich: "I don't like thieves.

We've got a lot of car thieves out here. I've had two cars stolen in the past ten years, so I've got a kind of a bad taste in my mouth. So when I 'pop' a car thief; get to chase 'em and catch 'em... that's a good high."

Deputy Bilinovich, responding to a suspicious vehicle call, radios to the Communications Center: "Forty-two sixty-three, I'm going to be southbound on Cedar, trying to get what looks like a cream-colored Buick." The dash of Bilinovich's patrol car is free of weapons.

In pursuit, the siren wails as Deputy Bilinovich closes in on the suspect vehicle. Speeding along the freeway, the patrol car passes a tow truck at 85 mph. "Looks like they're not going to stop." The car he's following turns right, onto a two-lane road, which is called Three-Sisters Road. "They're running."

The vehicle is a tan sedan (two-door) with a dark top. On the highway through town, they pass an Econo Lodge. "Okay, when they bail out I'm going after the driver. You all watch any passengers; watch their heads, because when they bail out they're gonna scatter."

The suspect vehicle runs a red light, then passes two cars. "We're headed down into the city."

"Looks like they're lost," the deputy observes as they accelerate through a green light. "I'm not sure they know where they're at. Looks like it's going to be a car load of juveniles. Lot's of little heads looking back at us."

They pass a Service station on the right of the road.

"We're doing about 80 now."

"We're down in the city now, so we should get some back-up from the city."

The vehicle speeds through another red light. "The City (police vehicle) is behind us... Looks like he's going to join us." They pass a Chevron station. Up ahead is a McDonald's on the right, after which they make an uncertain lane change to the left.

On the radio one of the other pursuing officers notes:

"They're going about 85 mph, now."

Suddenly the suspect vehicle veers to the right, misses the turn, and skids out of control into an empty parking lot. With a long screech of tires, it spins 180 degrees and sparks fly from the front end. Sliding backward now, the

car turns back to the left and comes to rest facing straight ahead again, directly in front of the pursuing sheriff's vehicle. In the distance a Food Land store is illuminated. Deputy Bilinovich screeches to a halt ten feet in back of the suspect vehicle, and instantly another police car is pulling to within a few feet of the driver's door. The passenger door opens, but before anyone can exit Deputy Bilinovich has leaped out of his vehicle and leveled his service revolver. He carries a flashlight in his left hand. "Okay, let's see your hands!" Bilinovich yells. "Everybody! Let's see some hands. Alright, don't nobody move! Don't get out of the car; stay where you're at."

Three police vehicles have arrived. Several officers, with guns drawn, surround the car. A pair of hands are held out the open passenger door. The city police officer, wearing blue shirt (no tie), black pants and black jacket, has crossed over to the right to cover the passenger-side door. In his left hand he holds a flashlight very close to the left side of his face.

Deputy Bilinovich: "Okay, Richard! Take the passenger side for me. I'll cover here. Go ahead and take them out: bring them out one at a time." Then to the suspects: "Alright, on the ground face down. Get on the ground. Hands behind your head."

Another sheriff's vehicle pulls up after the four suspects are already prone on the ground, hands behind their heads.

One by one, Bilinovich kneels onto each suspect, placing his right knee into the small of each suspect's back, and thoroughly frisks each. The first suspect is a young male teenager, wearing a yellow plaid shirt.

Deputy Bilinovich kneels on the back of one of the suspects (wearing a white shirt with grey stripes), as he cuffs, first his left hand, then his right. This boy groans loudly in discomfort. Without sincerity, Deputy Bilinovich says "Oh, excuse me."

"Okay, Richard, who was the last one you brought out?"

Richard points. "Are you the driver?" he asks the boy, who says "No." "You weren't the driver? Who was driving?"

Still groaning, the suspect says: "I was in the back seat."

Deputy Bilinovich gets up off the boys back. "Stay put."

He kneels down to handcuff the boy wearing the dark jacket over a red T-shirt, and blue-jeans. "Put your hand back here, Hoss."

Another officer observes: "This is the driver here."

"Were you driving?" asks Deputy Bilinovich.

"Yes, sir." answers the suspect.

"Yes, sir." repeats Deputy Bilinovich, patting the boy on the face. "Good deal. Guess what? You're going to jail. How old are you?"

"Fourteen." The suspect replies.

"Fourteen." the deputy repeats incredulously. "Come on, sit up."

Putting the suspect into the driver's side rear door of the black police car with white markings, deputy Bilinovich tells him: "Watch your head getting in there. There you go." The 911 Emergency telephone number is painted just behind the rear window.

Deputy Bilinovich sums up the evening on the ride to the station.

"They'll get them to the station; I'll call juvenile detention, give them their names. But if none of these kids has been handled before for any type of a crime, they'll release them to their parents. They may not even spend the night in jail. It's going to depend on who we get a hold of down there in juvenile, and whether they've been handled before. So, that's what's kind of frustrating in some of this: that we get into a chase like this; with the speeds we were up to. We jerk them out of the car, get them all cuffed and stumped, and find out that they're fourteen years old and under. They may walk. I'll still be at the station doing my report, and they're already on the way home with mamma."

"They may be kiddy crooks, but they grow up to be big crooks.

A crook is a crook, as far as I'm concerned."

TRANSCRIPT #3

(Quotations denote soundtrack from video recording).

NARRATION: Tucson, Arizona

Tucson Police Department

9:48 P.M., Shooting Call - Radio: "Reference to a yellow sedan... there are four females, three males in the vehicle and a .22 handgun."

Officer Terri O'Rourke: "We're going to a shooting victim. Somebody just called in and said that somebody had been shot. Three males left the scene, eastbound, in a yellow-colored vehicle."

Speeding through a tunnel, the siren wails as Officer O'Rourke, dressed in the blue long-sleeve shirt and dark blue slacks of the Tucson Police Department, guides the car past a Circle K on the way to the scene. She wears glasses. There is a great deal of confusion at the scene of the shooting. Other emergency vehicles had already arrived, including a green Tucson City Fire Dept. engine.

Radio: "On Speedway... they just threw something out the window."

A black male witness (approximately 5 ft. 8 in., 150 - 160 lbs.), wearing a brown jacket, white T-shirt with logo, and a plain black baseball cap, is excitedly telling officers about the shooting. He shows where he had been standing when the shots were fired (behind a blue two-tone pick-up truck). "They were right there," he points to a spot a few

feet away in the apartment complex parking lot. "I thought I was dead! I felt it on my neck. They said: 'You wanna play?' - BOOM, BOOM, BOOM. My brother was right there on the phone. If I'd been out there, they'd have gotten me with all of 'em." A few feet away from his position behind the pick-up, against a white-washed wall, is an open phone booth with a chair in front of it.

Officer O'Rourke: "Is that your brother over there?" she asks, pointing to a large black male (6 ft. 3 in., 240 lbs.), wearing a black sleeveless sweat-shirt. The witness confirms. "Okay, do me a favor: have a seat. Just sit down for a minute."

Other officers are interviewing the shooting victim, whose name is "Willie". Willie: "Me and my brother were just sitting there talking on the phone. They said: 'Do you wanna shoot?' I said: 'I ain't got no gun, how am I gonna shoot?' I thought they were playing. And then they just started shooting." Willie lifts up his shirt, exposing a small hole approximately 1½ in. to the right of his navel. Officers are scanning the white plaster wall behind the phone booth looking for more bullet holes.

Officer O'Rourke explains to a supervising officer what she has pieced together from the story: "He says that they came here to visit a female named Bertha, who lives in one of the apartments. Basically what we have is one brother who has been hit with what appears to be shrapnel, or (we're

guessing) a .22 cal; at this point we don't know. The other brother is standing here with him, but they can I.D. the shooters. Apparently one of the females lives in the complex, and took off in a car. Two of our units have them stopped south of here."

Officer O'Rourke asks Willie if he'll go to the suspects' location to identify them: "What I want you to do is tell me when we get there who you recognize and who you don't." She also asks: "Are you gonna go to the doctor, or what?" En route to the place where the suspect vehicle was stopped, she asks Willie: "Did you get into a fight with them, or what?"

"No," Willie replies. "It was my brother who was talking to them. I wasn't even in it. I was just standing up there. You see, me and my brother were coming down the stairs from a friend's house. He stopped by Bertha's house. My brother was talkin' some noise... he was just playin' with them, you know? That girl, who was driving, got smart; she started talkin' back. She was saying to get out of her house. Which it's not her house, it's Bertha's house. Sammy started this stuff. He should have minded his own business. He stopped by the house; I said I was going to go home and watch the news. He said that they were runnin' a little whorehouse. I don't know how that got started. That's what the girl got mad over. They started shooting. I thought they were just

shooting blanks. Hit me and the wall and stuff. I went by the other house, and saw my shirt and that I'd been hit."

They arrive at the arrest scene. Officer O'Rourke shuts the lights off inside the police car, "So that when Willie comes by to give some I.D. on these people, they can't see in, to see who's identifying them. It gives him some anonymity... and protects everybody."

Willie is positive about his identification. "Yeah. That's them, right there. That's all of them, right there."

Officer O'Rourke (to radio): "Four Seven Seven Three. Put the three males together." They are lined up for identification. The first suspect is has remained seated on the pavement, wearing a blue sweat-shirt, jeans, and long brown hair that covers most of his face. One of the standing suspects wears a white shirt, jeans, white tennis shoes, and short, dark hair. The last male suspect also has short hair, but wears a red plaid hunting vest over a tan long-sleeved pull-over shirt, and jeans.

Again Willie is sure. "Yeah. That's all three of them, there. I don't know which one did the shooting, though."

Officer O'Rourke reports to one of the on-scene supervisors: "He I.D's all of them. Three that were standing; everybody that was in the car. He can't pick out who was doing the shooting, but he says that it was one of the males."

Officer O'Rourke and another officer check out the suspect vehicle through the windows and see two revolvers in the

center of the front seat. "Oh, baby! It's a pretty big looking gun... a couple of them. They (the suspects) all look like juveniles. They appear to be between the ages of sixteen and eighteen."

Later, back on patrol, Officer O'Rourke sums up the evening's events: "The man who was shot in the stomach went in for exploratory surgery. They did not find the bullet inside of him. It may have hit him and grazed off, which it didn't look like it. He'll be in the hospital for the next couple of days. They've arrested one male for aggravated assault, and they'll "long form" the others. Basically all that means is that it's an ongoing investigation."

"So, there are other arrests pending."

APPENDIX C

ACTIVE QUESTIONS

Answer the following 20 questions in the spaces provided.

Answer all questions based only on information from the story presentation. Be as accurate as possible, but please keep your answers brief.

PLEASE TURN TO THE FIRST PAGE NOW AND BEGIN

I.D.# _____

QUESTION SET A (C): Script #1

1. In which city did this story take place?
2. What is the name of the officer who was injured?
3. In what area of the city did the foot patrol of transient camps occur?
4. What is the primary color of the Portland police uniforms?
5. One of the officers describes finding stabbing victims as well as _____.
6. Besides the woman, how many people resided in the first transient camp?
7. While on foot patrol, did either of the officers wear a helmet?
8. Were any graffiti or other signs described?
9. How many dogs was the woman in the first transient camp holding?
10. At what time did the officers approach the suspects who were living in the hole under the roadway?
11. Which officer first observed that the suspects had been "cooking again"?
12. What did one of the officers find in the bottom of the can?
13. When the officers approached the opening with nightsticks drawn, where were the suspects?
14. Which officer wore a jacket?
15. On which hand was the officer's finger injured?
16. What did the officer do with the syringe that was found on the suspect?
17. For what offence was the suspect with the syringe arrested?
18. Into which pocket did the officer put the drug that was found in the possession of suspect #1?
19. What was the suspect, on whom the drug was found, wearing?
20. What were the names of the officers in this story?

I.D.# _____

QUESTION SET A (E): Script #1

1. In which city did this story take place?
2. What is the name of the officer who was injured?
3. In what area of the city did the foot patrol of transient camps occur?
4. What is the primary color of the Portland police uniforms?
5. One of the officers describes finding shooting victims as well as _____.
6. Besides the woman, how many people resided in the first transient camp?
7. While on foot patrol, did either of the officers wear a helmet?
8. Besides the graffiti in spanish, were there any other signs described?
9. How many dogs was the woman in the first transient camp holding?
10. At what time did the officers approach the suspects who were living in the hole under the roadway?
11. Which officer first observed that the suspects had been "smoking again"?
12. What did one of the officers find in the bottom of the can?
13. When the officers approached the opening with handguns drawn, where were the suspects?
14. Which officer wore a jacket?
15. On which hand was the officer's finger injured?
16. Did the officer place the syringe into the evidence baggie before or after hand cuffing the suspect?
17. For what offence was the suspect with the syringe arrested?
18. Into which pocket did the officer put the drug that was found in the possession of suspect #1?
19. What was the suspect, on whom the drug was found, wearing?
20. What were the names of the officers in this story?

PASSIVE QUESTIONS

Answer the following 20 questions by circling
the letter next to the correct answer.

Answer all questions based only on information from the
story presentation. Be as accurate as possible.

PLEASE TURN TO THE FIRST PAGE NOW AND BEGIN

I.D.# _____

QUESTION SET B: Script #1

1. This story takes place in _____.
 - a. Tucson
 - b. Portland
 - c. Houston
 - d. none of the above
2. What did one of the officers believe many transients are?
 - a. drug addicts
 - b. ex-military
 - c. ex-convicts
 - d. none of the above
3. What color blouse was worn by the woman with the dogs?
 - a. blue
 - b. brown
 - c. black
 - d. none of the above
4. How many transients were in the first camp?
 - a. two
 - b. four
 - c. six
 - d. none of the above
5. The officers described finding _____ and _____ in this patrol area.
 - a. body parts and shooting victims
 - b. stabbing victims and body parts
 - c. ex-convicts and victims
 - d. none of the above
6. The graffiti was _____.
 - a. in English
 - b. in spanish
 - c. illegible
 - d. none of the above
7. One officer observed that the suspects were _____ again.
 - a. smoking
 - b. cooking
 - c. trespassing
 - d. none of the above

GO ON TO THE NEXT PAGE

8. When they approached the hole, both officers were wearing
 - a. windbreakers
 - b. caps
 - c. civilian clothes
 - d. none of the above
9. What was the residue that was found in the can?
 - a. cocaine
 - b. alcohol
 - c. hashish
 - d. none of the above
10. The officers approached the hole armed with _____.
 - a. handguns
 - b. radios
 - c. nightsticks
 - d. none of the above
11. The transient with the beard was _____.
 - a. smoking
 - b. holding a dog
 - c. arrested
 - d. none of the above
12. The transient claimed that the _____ was not his.
 - a. residue
 - b. jacket
 - c. cocaine
 - d. none of the above
13. Suspect #1 wore a _____.
 - a. black and white flannel shirt
 - b. dirty red bandanna
 - c. black jacket
 - d. none of the above
14. The officer was stuck by a _____ while searching a suspect.
 - a. pin
 - b. knife
 - c. needle
 - d. none of the above

GO ON TO THE NEXT PAGE

15. At what time did the officers approach the hole?
a. 10:55 A.M.
b. 3:20 P.M.
c. 9:45 A.M.
d. none of the above
16. The officer put the syringe into _____.
a. an evidence bag
b. his pocket
c. onto the ground
d. none of the above
17. The suspects were put into _____.
a. police van
b. police car
c. hospital
d. none of the above
18. Officer Cook was afraid of _____.
a. AIDS
b. hepatitis
c. his wife finding out
d. none of the above
19. What kind of drugs were found on the suspects?
a. cocaine
b. heroin
c. hashish
d. none of the above
20. What were the names of the officers in the story?
a. Solino
b. Barry
c. John
d. none of the above

STOP-LAY DOWN YOUR PENCIL-CLOSE BOOKLET-WAIT FOR INSTRUCTIONS

I.D.# _____

QUESTION SET A (C): Script #2

1. In which city did this story take place?
2. Deputy Bilinovich, while patrolling, stated that he had lost how many automobiles to theft?
3. Are the City Police neckties the color as the Sheriff Dept. neckties?
4. Does Deputy Bilinovich wear a moustache?
5. Deputy Bilinovich was in a high-speed pursuit of a vehicle that was what color car?
6. Did the tow truck passed by Bilinovich have it's emergency lights on?
7. How fast was the suspect vehicle travelling when it passed the Econo Lodge and the Chevron station?
8. The chase reached speeds of up to _____ mph.
9. The McDonald's was on which side of the highway?
10. The suspect vehicle passed through how many red lights?
11. Did the suspect vehicle pass a light post as it spun out of control?
12. The suspect vehicle turned 180° in which direction (R/L)?
13. After the suspect vehicle came to rest, which door opened first?
14. Did Officer Bilinovich reach for the radio before exiting the vehicle?
15. The suspects exited the car from which side?
16. Deputy Bilinovich, while still in pursuit, commented that it looked like a carload of _____.
17. The deputies approached the suspect vehicle with handguns and _____.
18. How old did the driver claim to be?
19. Did the driver wear a yellow plaid shirt?
20. Which suspect wore the black jacket?

I.D.# _____

QUESTION SET A (E): Script #2

1. In which city did this story take place?
2. Deputy Bilinovich, while patrolling, stated that he had lost how many automobiles to theft?
3. Are the City Police neckties the color as the Sheriff Dept. neckties?
4. Does Deputy Bilinovich wear a moustache?
5. Deputy Bilinovich was in a high-speed pursuit of a vehicle that was what color car?
6. Did the ambulance passed by Bilinovich have it's emergency lights on?
7. How fast was the suspect vehicle travelling when it passed the Motel 6 and the Chevron station?
8. The chase reached speeds of up to _____ mph.
9. The McDonald's was on which side of the highway?
10. The suspect vehicle passed through how many red lights?
11. Did the suspect vehicle pass to the right or left of the light post as it spun out of control?
12. The suspect vehicle turned 180° in which direction (R/L)?
13. After the suspect vehicle came to rest, which door opened first?
14. Did Officer Bilinovich reach for the shotgun or the radio before exiting the vehicle?
15. The suspects exited the car from which side?
16. Deputy Bilinovich, while still in pursuit, commented that it looked like a carload of _____.
17. The deputies approached the stolen car with handguns and _____.
18. How old did the driver claim to be?
19. Did the driver wear a yellow plaid shirt?
20. Which suspect wore the black jacket?

I.D.# _____

QUESTION SET B: Script #2

1. This story takes place in _____.
 - a. Los Angeles
 - b. Houston
 - c. Portland
 - d. none of the above
2. Who or what does Deputy Bilinovich hate?
 - a. kids
 - b. thieves
 - c. car thieves
 - d. none of the above
3. The first vehicle passed by Officer Bilinovich was _____.
 - a. ambulance
 - b. fire engine
 - c. tow truck
 - d. none of the above
4. Houston Police Dept. neckties are _____.
 - a. beige
 - b. blue
 - c. black
 - d. none of the above
5. The color of the car chased by Deputy Bilinovich was _____.
 - a. tan
 - b. blue
 - c. green
 - d. none of the above
6. What was the call that prompted the chase?
 - a. Stolen Car
 - b. Robbery
 - c. Suspicious Vehicle
 - d. none of the above
7. Just before the Chevron station the chase passed the _____.
 - a. Motel 6
 - b. McDonald's
 - c. Food Land
 - d. none of the above

GO ON TO THE NEXT PAGE

8. The chase reached speeds of up to _____ mph.
a. 75
b. 80
c. 85
d. none of the above
9. The McDonald's was on which side of the highway?
a. left
b. right
c. undetermined
d. none of the above
10. The suspect vehicle passed through how many red lights?
a. two
b. one
c. more
d. none of the above
11. The most prominent item on the Sheriff vehicle dash is the _____?
a. shotgun
b. computer
c. radio
d. none of the above
12. In relation to Deputy Bilinovich's vehicle, which direction was the suspect vehicle facing when it came to rest?
a. same direction
b. opposite direction
c. crosswise
d. none of the above
13. The sparks result from striking the _____.
a. light post
b. other vehicle
c. pavement
d. none of the above
4. What was Deputy Bilinovich's first instruction to the occupants of the suspect vehicle?
a. to get out of the car
b. to stay put
c. hands up
d. none of the above

GO ON TO THE NEXT PAGE

15. Where did the suspect wearing the white and gray striped say he was riding?
- a. front passenger seat
 - b. driver's seat
 - c. claimed he wasn't in car
 - d. none of the above
16. The deputies approached the stolen car with _____ and _____.
- a. radios and flashlights
 - b. flashlights and handguns
 - c. handguns and radios
 - d. none of the above
17. What symbol appears to the rear of the passenger window on the Sheriff vehicles?
- a. Harris County Sheriff's emblem
 - b. Houston Police Dept. emblem
 - c. 911 Emergency emblem
 - d. none of the above
18. What was the color of the T-shirt worn by the driver?
- a. white and grey striped
 - b. yellow plaid
 - c. red
 - d. none of the above
19. How many suspects had been riding in the stolen vehicle?
- a. 1
 - b. 2
 - c. 3
 - d. none of the above
20. Where does Deputy Bilinovich believe the suspects will spend the night?
- a. at home
 - b. in jail
 - c. juvenile detention center
 - d. none of the above

STOP-LAY DOWN YOUR PENCIL-CLOSE BOOKLET-WAIT FOR INSTRUCTIONS

I.D.# _____

QUESTION SET A (C): Script #3

1. Where does this story take place?
2. How many females were found to be riding in the suspect vehicle?
3. How many males were found to be riding in the vehicle?
4. How many weapons were found at the scene of the arrest of the suspects?
5. The voice on the radio that said a something had been thrown out of the window of the car was male or female?
6. What type weapons were found at the arrest scene?
7. To which direction did the suspects flee after the shooting?
8. What was the color of the Tucson City Fire engine that had responded to the scene of the crime?
9. Besides the fire engine what other emergency response vehicles were at the scene?
10. The fight with the woman (the driver) started when _____ said her apartment was a whorehouse.
11. What was the color of the hat worn by the witness?
12. What was the color of the witness' t-shirt?
13. Was the victim asked if he was going to see a Doctor?
14. What was the shooting victim's response to being asked if he was going to see a Doctor?
15. Was the shooting victim involved in the fight with the suspects?
16. Who did the shooting victim claim started the fight?
17. Why did the officer turn off the light inside the car when they had arrived at the arrest scene?
18. Was the shooting victim able to identify the person who shot him?
19. The suspects who had been arrested were between the ages of _____.
20. Were any bullet holes found near the phone booth?

I.D.# _____

QUESTION SET A (E): Script #3

1. Where does this story take place?
2. How many females were found to be riding in the suspect vehicle?
3. How many males were found to be riding in the Chevrolet?
4. How many weapons were found at the scene of the arrest of the suspects?
5. The voice on the radio that said a gun had been thrown out of the window of the car was male or female?
6. What type weapons were found at the arrest scene?
7. To which direction did the suspects flee after the shooting?
8. What was the color of the Tucson City Fire engine that had responded to the scene of the crime?
9. Besides the fire engine and ambulance, what other emergency response vehicles were at the scene?
10. The fight with Norma (the driver) started when _____ said her apartment was a whorehouse.
11. What was the color of the hat worn by the witness?
12. What was the color of the witness' t-shirt?
13. Was the victim asked if he was going to see a Doctor?
14. What was the shooting victim's response to being asked if he was going to see a Doctor?
15. Was the shooting victim involved in the fight with the suspects?
16. Who did the shooting victim claim started the fight?
17. Why did the officer turn off the light inside the car when they had arrived at the arrest scene?
18. Was the shooting victim able to identify the person who shot him?
19. The suspects who had been arrested were between the ages of _____.
20. Were any bullet holes found near the GTE phone booth?

I.D.# _____

QUESTION SET B: Script #3

1. This story took place in _____.
 - a. Los Angeles
 - b. Houston
 - c. Tucson
 - d. none of the above
2. Officer O'Rourke is a member of the _____.
 - a. City Police
 - b. County Sheriff
 - c. State Trooper
 - d. none of the above
3. The color of the suspect vehicle was _____.
 - a. green
 - b. blue
 - c. yellow
 - d. none of the above
4. What was the make of the vehicle driven by the suspects?
 - a. Cadillac
 - b. Pontiac
 - c. Chevrolet
 - d. none of the above
5. How many suspects were eventually arrested?
 - a. one
 - b. two
 - c. three
 - d. none of the above
6. What do police believe was the weapon used in the shooting of the shooting victim?
 - a. .38 caliber handgun
 - b. .22 caliber handgun
 - c. .357 magnum handgun
 - d. none of the above
7. What was the call that Officer O'Rourke answered, which lead her to the scene of the crime.
 - a. aggravated assault
 - b. shooting
 - c. family dispute
 - d. none of the above

GO ON TO THE NEXT PAGE

8. The Tucson City Fire engine that had responded to the scene of the crime was _____.
a. red
b. white
c. green
d. none of the above
9. Besides the fire engine what other vehicle was present at the scene?
a. news van
b. SWAT van
c. ambulance
d. none of the above
10. What is the relationship between the shooting victim and the witness?
a. friend
b. spouse
c. brother
d. none of the above
11. What was the color of the truck that the witness hid behind during the shooting?
a. blue
b. white
c. green
d. none of the above
12. What was the color of jacket worn by the witness to the shooting?
a. brown
b. black
c. red plaid
d. none of the above
13. What was the name of their friend in the complex?
a. Willie
b. Norma
c. Bertha
d. none of the above
14. Bullet holes were found on the wall near the _____ phone booth.
a. GTE
b. Bell
c. ATT
d. none of the above

GO ON TO THE NEXT PAGE

15. The victim's exploratory surgery found _____.
a. .38 caliber bullet
b. .22 caliber bullet
c. .357 magnum bullet
d. none of the above
16. What is the name of the shooting victim?
a. Willie
b. Sammy
c. Bertha
d. none of the above
17. What color shirt was the victim wearing?
a. red plaid
b. white
c. black
d. none of the above
18. The witness became involved in a fight with _____.
a. Willie
b. Norma
c. Bertha
d. none of the above
19. Who was the shooting victim able to identify as those who he had seen at the scene of the crime?
a. the females
b. the males
c. all of the above
d. none of the above
20. The suspects threw _____ out of their window.
a. a bottle
b. a gun
c. a knife
d. none of the above

STOP-LAY DOWN YOUR PENCIL-CLOSE BOOKLET-WAIT FOR INSTRUCTIONS

APPENDIX D

DESCRIPTION & GENERAL INSTRUCTIONS

This is a study to determine whether memory for information is better when elicited by "active" or by "passive" questions. Active questions or statements are those that require us to actively reproduce the information from memory without any cues. For example:

"The Battle of Hastings occurred in the year ____."

It is necessary to actively search for the information for recall. Passive questions provide a list of alternative answers from which to choose. For example:

"The Battle of Hastings occurred in which year?"

- a. 981
- b. 1066
- c. 1512
- d. none of the above

You will be presented with three stories, in three different formats (Video, written, and audio). After each story you may be given an information questionnaire (no personally identifiable information is requested) or memory tests completely unrelated to the stories. Then you will answer 20 "active" questions about each story. These questions are similar in form to those used to elicit answers in court. Another memory test, or some mathematical problems, will be followed by 20 multiple choice "passive" questions.

Each memory test, questionnaire, and active/passive question set will have its own instructions. Please observe only the instructions for the activity on which you are working.

Please answer all questions honestly and to the best of your ability. Your participation is greatly appreciated.

PLEASE RAISE YOUR HAND IF YOU HAVE ANY QUESTIONS

INFORMATION QUESTIONNAIRE

ID# _____

AGE: _____

GENDER: _____

LEVEL OF EDUCATION: Years _____, Degree (_____)
Examples - 12 (High School Graduate),
 14 (AA Degree),
 16 (BA Degree),
 etc.

MAJOR: _____

When did you last attend classes of any kind? _____

OCCUPATION: _____
Any experience in Law Enforcement (circle one)? Yes No
If yes, please explain: _____

CITY OF RESIDENCE: _____

ARE YOU RIGHT OR LEFT HANDED? _____ (ambidextrous? Yes No)

DO YOU WEAR PRESCRIPTION GLASSES? _____
If so, are you wearing them now? Yes No

EYESIGHT: _____
Examples - 20/20, 20/100, etc.

HEARING (circle one): Poor 1 2 3 4 5 Good

MARRITAL STATUS (circle one):
Married Divorced Widowed Never Married

IF MARRIED, HOW LONG? _____

IS YOUR SPOUSE PARTICIPATING IN THIS STUDY? Yes No

IF YOU HAVE CHILDREN, INDICATE NUMBER: _____ AGES _____

AVERAGE ANNUAL INCOME (from all sources): \$ _____

HAVE YOU EVER BEEN DIAGNOSED WITH A MENTAL ILLNESS? Yes No
If yes, please explain: _____

1. $23 \times 3 = \underline{\hspace{2cm}}$ 2. $14 + 8 = \underline{\hspace{2cm}}$ 3. $44 - 16 = \underline{\hspace{2cm}}$

4. $\begin{array}{r} 17 \\ \times 2 \\ \hline \end{array}$ 5. $\begin{array}{r} 91 \\ - 9 \\ \hline \end{array}$ 6. $\begin{array}{r} 37 \\ + 13 \\ \hline \end{array}$ 7. $\begin{array}{r} 78 \\ + 21 \\ \hline \end{array}$ 8. $\begin{array}{r} 84 \\ \div 2 \\ \hline \end{array}$

9. $64 \times 3 = \underline{\hspace{2cm}}$ 10. $89 + 8 = \underline{\hspace{2cm}}$ 11. $66 \div 6 = \underline{\hspace{2cm}}$

12. $\begin{array}{r} 69 \\ \times 2 \\ \hline \end{array}$ 13. $\begin{array}{r} 155 \\ - 9 \\ \hline \end{array}$ 14. $\begin{array}{r} 131 \\ + 157 \\ \hline \end{array}$ 15. $\begin{array}{r} 98 \\ + 21 \\ \hline \end{array}$ 16. $\begin{array}{r} 57 \\ \div 3 \\ \hline \end{array}$

17. $(2 + 17) - (4 \times 3) = \underline{\hspace{2cm}}$ 18. $(9 \times 8) + (21 - 8) = \underline{\hspace{2cm}}$

19. $3 \div 3 = \underline{\hspace{2cm}}$ 20. $14 + 99 = \underline{\hspace{2cm}}$ 21. $4 \times 16 = \underline{\hspace{2cm}}$

22. $\begin{array}{r} 21 \\ \div 3 \\ \hline \end{array}$ 23. $\begin{array}{r} 72 \\ \div 9 \\ \hline \end{array}$ 24. $\begin{array}{r} 49 \\ \times 11 \\ \hline \end{array}$ 25. $\begin{array}{r} 71 \\ + 121 \\ \hline \end{array}$ 26. $\begin{array}{r} 72 \\ \div 12 \\ \hline \end{array}$

27. $69 \times 3 = \underline{\hspace{2cm}}$ 28. $89 + 88 = \underline{\hspace{2cm}}$ 29. $144 \div 6 = \underline{\hspace{2cm}}$

30. $\begin{array}{r} 199 \\ \times 2 \\ \hline \end{array}$ 31. $\begin{array}{r} 349 \\ - 87 \\ \hline \end{array}$ 32. $\begin{array}{r} 1131 \\ + 287 \\ \hline \end{array}$ 33. $\begin{array}{r} 898 \\ + 91 \\ \hline \end{array}$ 34. $\begin{array}{r} 567 \\ - 73 \\ \hline \end{array}$

35. $(9 \times 8) \div (4 \times 3) = \underline{\hspace{2cm}}$ 36. $(9 - 8) \times (21 - 8) = \underline{\hspace{2cm}}$

37. $(3 \times 3) \times 6 = \underline{\hspace{2cm}}$ 38. $194 - 36 = \underline{\hspace{2cm}}$ 39. $9 \times 9 = \underline{\hspace{2cm}}$

40. $\begin{array}{r} 39 \\ \times 2 \\ \hline \end{array}$ 41. $\begin{array}{r} 291 \\ - 29 \\ \hline \end{array}$ 42. $\begin{array}{r} 37 \\ + 13 \\ \hline \end{array}$ 43. $\begin{array}{r} 88 \\ + 21 \\ \hline \end{array}$ 44. $\begin{array}{r} 134 \\ \div 2 \\ \hline \end{array}$

45. $34 \times 3 = \underline{\hspace{2cm}}$ 46. $89 - 76 = \underline{\hspace{2cm}}$ 47. $240 \div 6 = \underline{\hspace{2cm}}$

48. $(2 + 1 - 7) \times 3 = \underline{\hspace{2cm}}$ 49. 9^2 50. 5^3

51. $313 \times 3 = \underline{\hspace{2cm}}$ 52. $924 + 831 = \underline{\hspace{2cm}}$ 53. $944 - 616 = \underline{\hspace{2cm}}$

54.
$$\begin{array}{r} 317 \\ \times 2 \\ \hline \end{array}$$
 55.
$$\begin{array}{r} 891 \\ -499 \\ \hline \end{array}$$
 56.
$$\begin{array}{r} 37 \\ + 13 \\ \hline \end{array}$$
 57.
$$\begin{array}{r} 478 \\ + 21 \\ \hline \end{array}$$
 58.
$$\begin{array}{r} 284 \\ + 2 \\ \hline \end{array}$$

59. $91 \times 3 = \underline{\hspace{2cm}}$ 60. $989 + 8 = \underline{\hspace{2cm}}$ 61. $666 \div 6 = \underline{\hspace{2cm}}$

62.
$$\begin{array}{r} 69 \\ \times 2 \\ \hline \end{array}$$
 63.
$$\begin{array}{r} 155 \\ - 9 \\ \hline \end{array}$$
 64.
$$\begin{array}{r} 131 \\ + 157 \\ \hline \end{array}$$
 65.
$$\begin{array}{r} 98 \\ + 21 \\ \hline \end{array}$$
 66.
$$\begin{array}{r} 57 \\ + 3 \\ \hline \end{array}$$

67. $(42 \div 2) - (4 \times 5) = \underline{\hspace{2cm}}$ 68. $(9 \times 8) + (21 - 11) = \underline{\hspace{2cm}}$

69. $333 \div 3 = \underline{\hspace{2cm}}$ 70. $114 - 99 = \underline{\hspace{2cm}}$ 71. $5 \times 16 = \underline{\hspace{2cm}}$

72.
$$\begin{array}{r} 27 \\ + 9 \\ \hline \end{array}$$
 73.
$$\begin{array}{r} 72 \\ + 9 \\ \hline \end{array}$$
 74.
$$\begin{array}{r} 49 \\ \times 11 \\ \hline \end{array}$$
 75.
$$\begin{array}{r} 971 \\ + 121 \\ \hline \end{array}$$
 76.
$$\begin{array}{r} 1272 \\ + 12 \\ \hline \end{array}$$

77. $69 \times 3 = \underline{\hspace{2cm}}$ 78. $99 + 88 = \underline{\hspace{2cm}}$ 79. $144 \div 3 = \underline{\hspace{2cm}}$

80.
$$\begin{array}{r} 499 \\ \times 2 \\ \hline \end{array}$$
 81.
$$\begin{array}{r} 849 \\ -87 \\ \hline \end{array}$$
 82.
$$\begin{array}{r} 11131 \\ + 287 \\ \hline \end{array}$$
 83.
$$\begin{array}{r} 698 \\ + 4 \\ \hline \end{array}$$
 84.
$$\begin{array}{r} 567 \\ -73 \\ \hline \end{array}$$

85. $(9 - 8) \div (4 - 3) = \underline{\hspace{2cm}}$ 86. $(9 + 8) \times (21 - 8) = \underline{\hspace{2cm}}$

87. $(3 \times 9) \times 3 = \underline{\hspace{2cm}}$ 88. $194 - 36 = \underline{\hspace{2cm}}$ 89. $99 \times 9 = \underline{\hspace{2cm}}$

90.
$$\begin{array}{r} 939 \\ \times 3 \\ \hline \end{array}$$
 91.
$$\begin{array}{r} 2291 \\ -929 \\ \hline \end{array}$$
 92.
$$\begin{array}{r} 837 \\ + 913 \\ \hline \end{array}$$
 93.
$$\begin{array}{r} 688 \\ + 721 \\ \hline \end{array}$$
 94.
$$\begin{array}{r} 148 \\ + 4 \\ \hline \end{array}$$

95. $34 \times 8 = \underline{\hspace{2cm}}$ 96. $89 - 76 = \underline{\hspace{2cm}}$ 97. $246 \div 6 = \underline{\hspace{2cm}}$

98. $(93 \div 3 - 7) \times 3 = \underline{\hspace{2cm}}$ 99. 8^3 100. 2^4

$$101. 3113 \times 4 = \underline{\hspace{2cm}} \quad 102. 424 + 1831 = \underline{\hspace{2cm}} \quad 103. 44 \times 66 = \underline{\hspace{2cm}}$$

$$104. \begin{array}{r} 937 \\ \times 3 \\ \hline \end{array} \quad 105. \begin{array}{r} 1891 \\ -459 \\ \hline \end{array} \quad 106. \begin{array}{r} 437 \\ + 13 \\ \hline \end{array} \quad 107. \begin{array}{r} 2478 \\ + 221 \\ \hline \end{array} \quad 108. \begin{array}{r} 284 \\ \div 4 \\ \hline \end{array}$$

$$109. 991 \times 3 = \underline{\hspace{2cm}} \quad 110. 989 \times 8 = \underline{\hspace{2cm}} \quad 111. 666 \div 36 = \underline{\hspace{2cm}}$$

$$112. \begin{array}{r} 879 \\ \times 2 \\ \hline \end{array} \quad 113. \begin{array}{r} 955 \\ - 9 \\ \hline \end{array} \quad 114. \begin{array}{r} 131 \\ + 6157 \\ \hline \end{array} \quad 115. \begin{array}{r} 4498 \\ \times 21 \\ \hline \end{array} \quad 116. \begin{array}{r} 171 \\ \div 3 \\ \hline \end{array}$$

$$117. (92 \div 2) - (8 \times 5) = \underline{\hspace{2cm}} \quad 118. (9 \times 8) \div (21 - 11) = \underline{\hspace{2cm}}$$

$$119. 546 \div 6 = \underline{\hspace{2cm}} \quad 120. 989 - 99 = \underline{\hspace{2cm}} \quad 121. 25 \times 16 = \underline{\hspace{2cm}}$$

$$122. \begin{array}{r} 450 \\ \div 9 \\ \hline \end{array} \quad 123. \begin{array}{r} 972 \\ \div 9 \\ \hline \end{array} \quad 124. \begin{array}{r} 1149 \\ \times 11 \\ \hline \end{array} \quad 125. \begin{array}{r} 9971 \\ +121 \\ \hline \end{array} \quad 126. \begin{array}{r} 3600 \\ \div 12 \\ \hline \end{array}$$

$$127. 69 \times 3 = \underline{\hspace{2cm}} \quad 128. 99 + 98 = \underline{\hspace{2cm}} \quad 129. 144 \div 9 = \underline{\hspace{2cm}}$$

$$130. \begin{array}{r} 499 \\ \times 4 \\ \hline \end{array} \quad 131. \begin{array}{r} 870 \\ -87 \\ \hline \end{array} \quad 132. \begin{array}{r} 11131 \\ + 2987 \\ \hline \end{array} \quad 133. \begin{array}{r} 698 \\ \div 12 \\ \hline \end{array} \quad 134. \begin{array}{r} 567 \\ -73 \\ \hline \end{array}$$

$$135. (9 \times 8) \div (4 \times 3) = \underline{\hspace{2cm}} \quad 136. (9 + 8) \times (21 - 9) = \underline{\hspace{2cm}}$$

$$137. (3 \times 8) \times 4 = \underline{\hspace{2cm}} \quad 138. 994 - 36 = \underline{\hspace{2cm}} \quad 139. 9 \times 9 = \underline{\hspace{2cm}}$$

$$140. \begin{array}{r} 939 \\ \times 13 \\ \hline \end{array} \quad 141. \begin{array}{r} 2291 \\ -999 \\ \hline \end{array} \quad 142. \begin{array}{r} 7837 \\ +903 \\ \hline \end{array} \quad 143. \begin{array}{r} 9688 \\ +421 \\ \hline \end{array} \quad 144. \begin{array}{r} 441 \\ \div 9 \\ \hline \end{array}$$

$$145. 34 \times 9 = \underline{\hspace{2cm}} \quad 146. 189 - 176 = \underline{\hspace{2cm}} \quad 147. 66 \div 6 = \underline{\hspace{2cm}}$$

$$148. (99 \div 3 - 7) \times 3 = \underline{\hspace{2cm}} \quad 149. 9^4 \quad 150. 11^4$$

DEBRIEFING STATEMENT

You have just completed a study about the influence of active and passive questions on memory for an event, under different modalities. There were additional focuses of this study, which at this time cannot be disclosed, since such knowledge could influence the way in which subjects approach the experiment, observe the stories, and answer the questions. For this reason I will make the full purpose of this study, and preliminary findings, available to anyone interested by posting this information on the Experimental Board of the Psychology Department on January 25, 1992.

Your participation in this experiment has been greatly appreciated. I would also ask that you do not discuss the content of the experiment with anyone until the testing of subjects has been completed on October 31, 1992.

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