

WITNESSES' PERCEPTION OF MEANING

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ABSTRACT

Subjects who were presented with a video tape of a fight and disruption perceived and remembered the event in terms of meaningful generalizations. The conclusions that subjects formed about the event remained stable over 28 days. In contrast, detailed memory rapidly deteriorated for subjects who were not required to rehearse their memory of the event. As a result, subjects increasingly reported recognizing details that supported and apparently were inferred from their general conclusions.

The study also showed that subjects' conclusions about meaning affect their selective attention to detail. Subjects selectively attended to meaningful information when they did not expect the violence and disruption that occurred during the video-tape event. Subjects who had been led to expect the violence and disruption did not selectively attend to meaningful information. Both groups formed similar conclusions, but subjects who expected violence and disruption formed more certain general conclusions. Thus, the study suggests that observers will selectively attend to meaningful information, if they have difficulty in drawing general conclusions about the meaning of an event. Selective attention seems unnecessary when observers can readily form meaningful general conclusions.

Finally, the study indicates that repeated rehearsal may promote and even enhance accurate memory for meaningful information. Among rehearsing subjects accuracy of recognition for meaningful information showed a significant quadratic trend--increasing through seven days before returning to the original level after 28 days. Over the same period accuracy for irrelevant information showed the usual negatively accelerated trend.

WITNESSES' PERCEPTION OF MEANING

Legal and psychological issues involving witnesses can be adequately considered only if we appreciate the simplifying function of perception. In perceiving, we are not cameras or videotape recorders. Rather, in perceiving we obtain information that we need to react to and deal with the world. We cannot and do not need to deal with all the information provided by objects, events, other persons, our own bodies, our own actions. One of the principal functions of perception is to limit information to matters of significance, to things with which we can or must deal.

Unfortunately, most psychological research on perception and memory has not been concerned with processes of simplification. Rather, most of this research has used already simple stimuli, letters, nonsense syllables, simple words or symbols. Because of this choice of stimuli, theories growing out of this work assert that we remember simply by storing and later retrieving simple information.

Even the perception and memory of complex events are explained as storage and retrieval of sets of simple information (Anderson and Bower, 1973). To account for simplification of complex events, the theories adopt the common sense notion of attention (Mostofsky, 1970). That is observers attend to and select for storage only a part of the available detail. Further, attention is systematically selective. Observers attend to and store expected details or details that support their interpretations of an event (Hochberg, 1970; Zadny and Gerard, 1974).

In contrast to this traditional approach, I began studying memory by presenting "witnesses" with complex events, studying what the witnesses said about those events in interviews, simulated trial testimony and questionnaires. Not surprisingly, this research demanded conclusions different from those of researchers who used simple stimuli. My witnesses clearly remembered little detail. Rather, they provided somewhat abstracted information that conveyed the general course of events and that reflected their own conclusions about the meaning or significance of the events. The details that they provided

were often inaccurate, but tended to be consistent with their conclusions about meaning or significance. This research suggested that the witnesses perceived complex events by drawing conclusions about meaning. They summarized details in terms of meaningful abstractions.

In contrast to storage theory, Bartlett's (1932) theory of reconstructive memory seemed to provide a better explanation of memory among these witnesses. Both Bartlett's research and more recent cognitive research suggest that during perception people form meaningful conclusions about events, but perceive relatively little detail (Bransford and Franks, 1971; Sachs, 1967). Furthermore, over time observers tend to maintain their general conclusions but retain relatively little detail (Bartlett, 1932; Miller and Campbell, 1959). As a result, both immediately after observing an event and increasingly over time, memory may be reconstructive. That is people will rely upon their general conclusions in order to infer or reconstruct details that must have occurred. They will infer details that either follow from or tend to support their general impressions.

Of course, both storage theory and reconstructive theory explain important characteristics of memory. Both imply that observers will remember details as well as generalizations about events. Both account for the consistency generally found between a witnesses' general conclusions about an event and his or her detailed memory of the event.

Storage theory asserts that people selectively attend to a coherent set of details during perception. In thinking back on the event, witnesses' will tend to draw conclusions supported by this consistent detailed memory. Reconstructive theory asserts that people directly remember their conclusions but little detail. Since reported details are inferred from conclusions, detailed memory will be consistent with a witnesses' conclusions.

These two explanations are not necessarily mutually exclusive. Witnesses might retrieve some details from storage and reconstruct other details. However, it is important to appreciate the relative contribution of each of these processes to witnesses' memory for details. The two explanations have quite different implications for the memory of witnesses. Storage theory implies that memory of

witnesses can accurately reflect the details of earlier event. Because of selective attention witnesses may only remember details that support their conclusions, but these details are likely to be accurate. On the other hand, reconstructive theory asserts that little detailed memory is accurate. Most of it is fabrication inferred from an observers' general conclusions about an event.

I examined these two alternative explanations in an experiment in which subjects "witnessed" a videotaped disruption and fight (Peterson, 1977). Before viewing the disruption, all subjects saw one of two preliminary videotapes. Each preliminary tape was shown to a different half of the sample. The two preliminary tapes presented substantially different explanations for the motives of two actors principally involved in the disruption and fight. Presumably, the two tapes created different expectations and consequently different perceptions of events occurring during the disruption videotape. One preliminary tape, which I shall call the *guilt* tape, showed the actors as threatening, angry radicals who intended to prevent a speaker from completing a controversial talk. The other preliminary tape, the *no guilt* tape presented the two actors as polite students concerned about free speech, who wanted to assure that both sides of the controversial talk would be heard.

Subjects saw one of the preliminary tapes and then the disruption videotape. They then completed questionnaires about events during the disruption. Subjects completed the questionnaire at one of four different times, immediately after viewing the disruption, or after one, seven or twenty-eight days delay. Additionally, subjects who took the questionnaire immediately after having seen the disruption also repeatedly took the questionnaire again after one, seven and twenty-eight days delay. This research design is shown on Figure 1. It provided an opportunity to examine the effects of the passage of time on memory and the opportunity to compare memory between subjects who repeatedly rehearse and those who do not. Storage theory and reconstructive theory make different predictions about how rehearsal and the passage of time affect detailed memory. As a result, the experiment provided a number of tests of the two theories, tests which

Figure 1

Design of Experiment

Time of Questionnaire:	<u>Immed.</u>	<u>1 Day</u>	<u>7 Days</u>	<u>28 Days</u>	(Novel Items)
<u>Condition</u>					
Repeating Guilt	X	X	X	X	(X)
Nonrepeating Guilt		X	X	X	(X)
Repeating No Guilt	X	X	X	X	(X)
Nonrepeating No Guilt		X	X	X	(X)

32 Subjects per cell

I shall briefly describe.

The two preliminary videotapes were effective in producing different conclusions among subjects. The questionnaires contained sixty items measuring subjects' conclusions about participants in the disruption. Both *guilt* condition and *no guilt* condition subjects tended to think that the two principal actors had behaved improperly, had bad intentions and were responsible for the disruption. However, subjects differed in their certainty about these conclusions. Subjects who saw the *guilt* preliminary tape were quite certain about the actors' guilt; whereas those who saw the *no guilt* preliminary tape tended to be less certain. The differences between the two groups were statistically significant and stable throughout the twenty-eight days of the experiment.

Both reconstructive theory and storage theory predict that there should also be differences in the detailed memories for subjects in the two conditions. Essentially these differences between the two conditions arise because those subjects who more strongly believe in the actors' guilt should remember facts supporting conclusions of guilt. To test these predictions, I measured subjects' reported recognition of three different sets of items: "Guilty" items supported conclusions that the actors behaved improperly; "not guilty" items supported conclusions that the actors behaved properly; and "neutral" items were unrelated to either conclusion. Also both true and false recognition items were created for each of these three types, so that there were actually six different categories of recognition items.

Both reconstructive theory and storage theory make the following predictions about memory for these different types of items: *Guilt* condition subjects should be more likely than *no guilt* condition subjects to remember "guilty" facts, which support their strongly held conclusions. On the other hand, *guilt* condition subjects should be less likely to remember not guilty facts that conflict with their strongly held conclusions.

To obtain a single measure of this differential memory for details, I subtracted the recognition rate for not guilty items from the

recognition rate for guilty items. Since this function was modeled after the discriminability function, d' , I called the differential memory function r' . Subjects with high r' scores were those who recalled substantially more guilty items than not guilty items. Subjects with low or negative r' scores recalled relatively more not guilty items.

Again, both theories predict that *guilt* condition subjects should have higher r' scores than should subjects in the *no guilt* condition. However, the theories provide different explanations for this result. More specifically, the theories make different predictions about the effects of time and rehearsal on r' . Figure 2 shows predictions about the effect of time for both theories.

Storage theory asserts that differential memory arises from selective attention. Therefore, storage theory predicts that differential memory will be greatest immediately after the subjects view the disruption videotapes. Differential memory will decrease over time as subjects rapidly lose their detailed memory. In other words, differences in r' between *guilt* and *no guilt* subjects should be greatest for the questionnaire administered without delay and should be the least for the fourth questionnaire administered after a twenty-eight day delay.

In contrast, reconstructive theory predicts that differential memory will increase over time. Immediately after observing the disruption videotape, subjects would still remember some details of the tape. However, subjects will lose most of this detail quite quickly. As subjects forget the details, they will have to increasingly rely upon their general conclusions as the principal basis for memory. Subjects will be forced to attempt reconstructions of what happened.

Also, as time passes reconstructions will be less constrained by subjects' accurate memory of an event. Initially, subjects will avoid reconstructions that conflict with their memory for details. However, as this detail drops out, fewer conflicts can arise. As a result of both the greater reliance upon generalizations and also the reduced constraints on reconstruction, memory should become more coherent over time. There should be increasing differences in r' over time

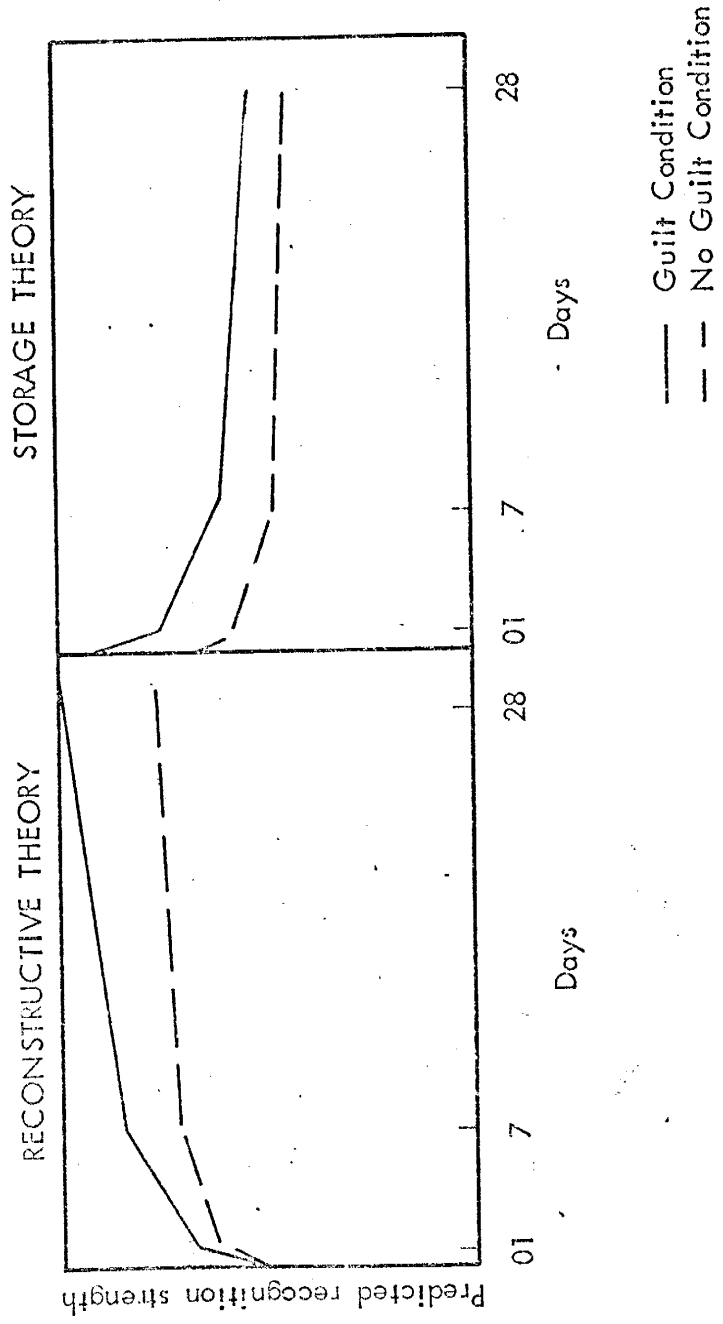


Figure 2. Predicted recognition

between the two conditions.

As Figure 3 shows, the results appear to support predictions of reconstructive theory and contradict predictions of storage theory. Differences between *guilt* and *no guilt* subjects increased over time. This interaction between the guilt-no guilt conditions and the passage of time reached statistical significance only for non-repeating subjects' recognition of true items.¹

As a second test, the two theories predict opposite main effects for the passage of time. Remember that both *guilt* and *no guilt* conditions subjects concluded that the actors behaved improperly. Thus, subjects in both conditions should have positive r' scores; they should report greater recognition of guilty than not guilty items. However, the theories differ with regard to how r' should change over time. Storage theory predicts that r' scores should decrease with the passage of time, as selectively perceived details are forgotten. Reconstructive theory predicts that r' scores should increase as subjects increasingly reconstruct details to support their conclusions that the students acted improperly. Again, the results for non-repeating subjects support reconstructive theory. For non-repeating subjects, r' increased significantly over time, both for true and false items.²

As a third test, reconstruct and storage theory make contrasting predictions about differences in memory between repeating subjects and subjects who took the questionnaire only after one, or seven or twenty-eight days delay. Repetition tends to maintain memory for details. Therefore, storage theory predicts that repeating subjects should show greater differential memory, greater r' scores, than non-repeating subjects. This should occur because repetition prolongs the initial differential memory arising from selective attention. In contrast, reconstructive theory predicts that repeating subjects should show *less* differential memory than non-repeating subjects. Since repetition maintains memory for details, repeating subjects should have less need for and less freedom to reconstruct details consistent with their conclusions.

Again, the results support reconstructive theory. Non-repeating subjects had higher r' scores during the last three administrations of the questionnaire. Differences were significant both for true

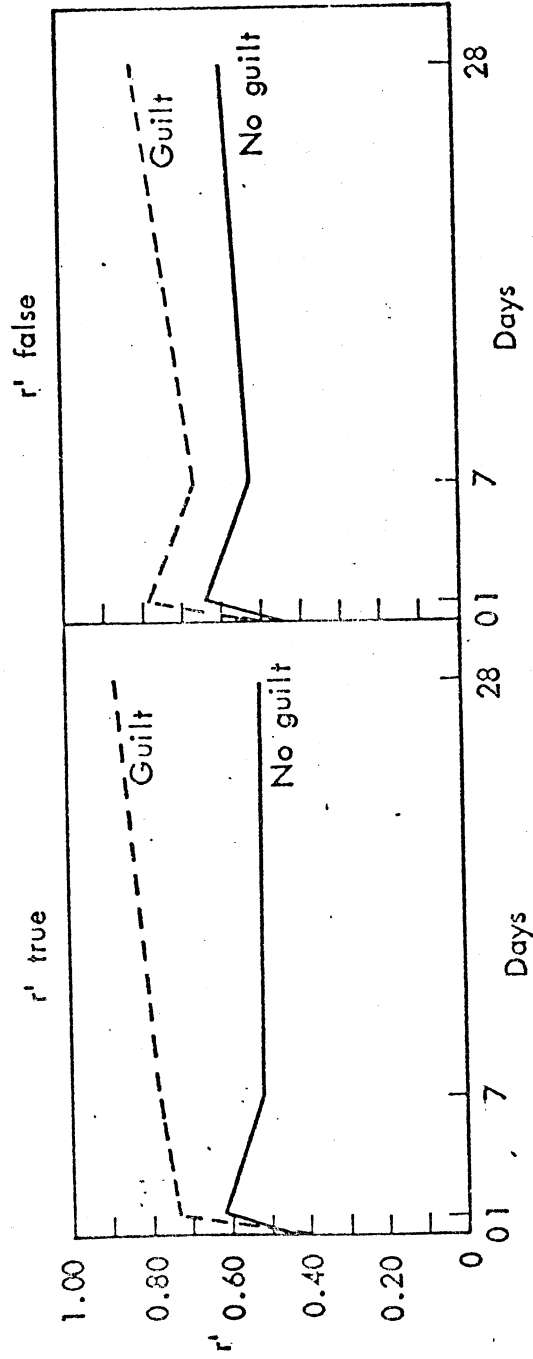


Figure 3. r' - Differential memory

items and for false items.³

In short, the results support the predictions of reconstructive theory with some consistency. Predicted differences between repeating and non-repeating subjects occurred both for true and false items. Further, three of the four predictions concerning non-repeating subjects also occurred. Predictions about the effects of time failed for repeating subjects, but this failure probably occurred because rehearsal attenuated the effects of passage of time for these subjects.

In fact, rehearsal seems to have had a powerful effect in the experiment, contributing to two interesting findings about subjects' accuracy as measured by d' . Without rehearsal, subjects' accuracy showed the customary Ebbinghaus forgetting curve. Accuracy dropped off rapidly during the first day and continued to drop off at a slower rate throughout the twenty-eight days.

Rehearsal effectively maintained memory. In fact, as Figure 4 shows, repeating subjects' accuracy both for guilty and not guilty items actually increased up to seven days after subjects saw the videotapes. Accuracy then dropped, although it stayed above its original level even after twenty-eight days. This quadratic trend was statistically significant only for guilty items.⁴ Note that in contrast to both guilty and not guilty items, neutral items declined, following the Ebbinghaus curve.

This suggests that repeated questioning and rehearsal may actually enhance memory for material information, that is information related to significant conclusions about an event. This enhanced accuracy was apparently not restricted merely to facts which support a subject's general conclusions, since both *guilt* and *no guilt* subjects showed increased accuracy for both guilty and not guilty items. However, rehearsal did not mitigate against loss of memory for unimportant, neutral items.

An additional experimental procedure points out an apparent limitation to the effectiveness of rehearsal. All subjects who took the questionnaire on the twenty-eighth day, both repeating and non-repeating subjects, reported their recognition of 40 new items which repeating subjects had not previously seen. There were no differences between non-repeating subjects on these new items. This suggests

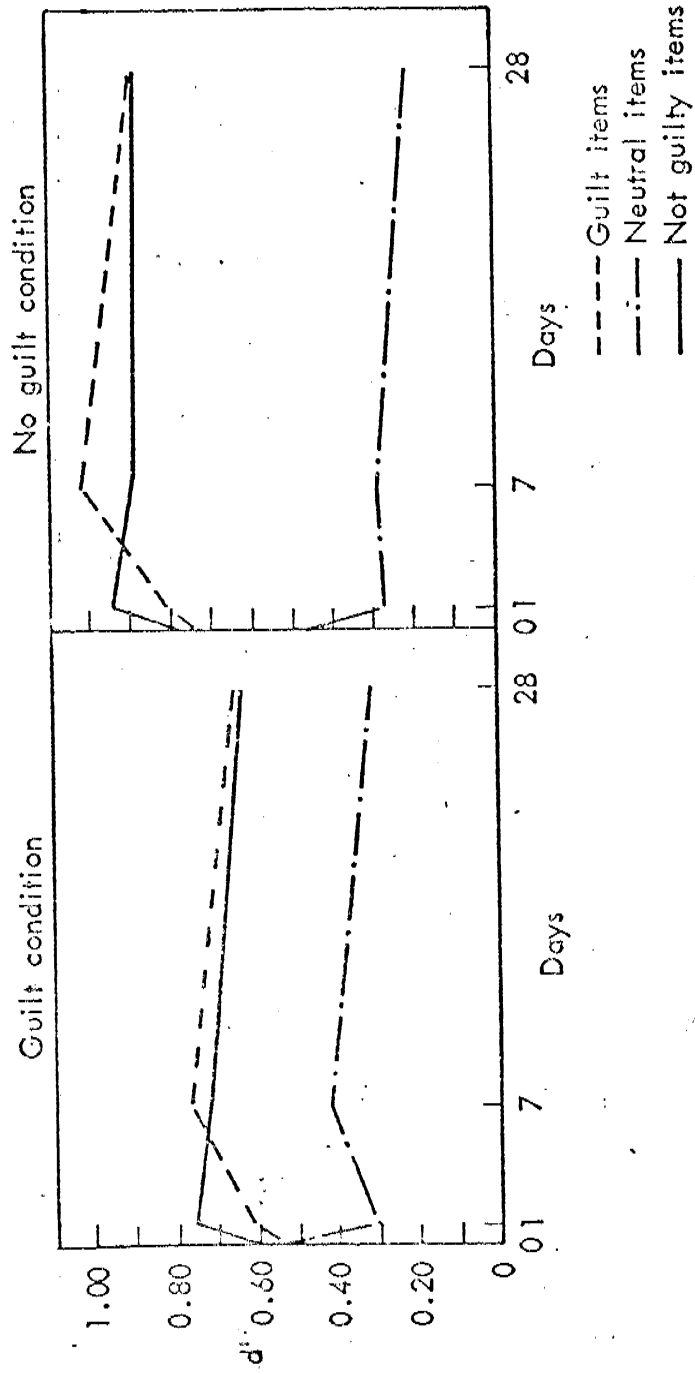


Figure 4. \underline{d} For recognition categories - repeating subjects

that the maintenance and even enhancement of memory that may occur with rehearsal only applies to specific information that was rehearsed.

A second intriguing difference appears between *guilt* and *no guilt* condition subjects immediately after they saw the disruption videotape. As Figure 4 shows, *no guilt* condition subjects had significantly more accurate recognition scores for guilty and not guilty items than they did for neutral items.⁵ On the other hand, *guilt* condition subjects showed no differences in recognition scores for guilty, not guilty or neutral items. This result suggests a limited principal of selective attention.

Remember, *no guilt* condition subjects tended to draw very uncertain conclusions about the disruption and fight incident. The violent events during the disruption were substantially inconsistent with the placid demeanor and intentions stated by the principal actors during the preliminary tape. Presumably, *no guilt* condition subjects had substantial difficulty in forming reasonable conclusions about events during the disruption. The differences in accuracy for meaningful and neutral items suggests that these subjects, who were unable to form easy conclusions about the events, were forced to look closely at information that could aid in forming conclusions. In other words, they seem to have selectively attended both to guilty and not guilty items that helped them explain and understand the event.

In contrast, *guilt* condition subjects were able to draw easy conclusions about the disruption and fight. They had seen a preliminary videotape which indicated that the actors were violent, hostile and radical. The events during the disruption merely confirmed these expectations. They could draw conclusions about the disruption without having to closely attend to important information presented during the videotape. As a result, there was no difference in accuracy between meaningful and neutral items.

Again, this selective attention appears to be a fragile phenomenon. In the non-repeating condition, *no guilt* subjects showed no greater accuracy in memory for guilty and not guilty items one day after having

viewed the videotape than they did for neutral items. Apparently the greater accuracy for meaningful information can only be maintained through repeated rehearsal.

These results have a number of implications both for law and for the psychology of perception of complex events. I shall briefly review only a few. The results suggest that if the general course of events are consistent with a witness's expectations, the witness will form and maintain relatively certain conclusions that explain the event. During perception the witness will not attend selectively to important details, even those that support his or her conclusions.

If an event is not consistent with the witness's expectations, the witness will still form conclusions that account for the event and these conclusions will be maintained. However, both immediately and over time the witness is likely to be relatively uncertain about these conclusions. Perhaps because of this uncertainty, during the event the witness will more closely attend to details that are important in explaining the event. Note that this selective attention will be for important details, whether or not they support conclusions that the witness forms.

In either case, without rehearsal witnesses quickly lose their memory for details. However, they do maintain their general conclusions. Therefore, to provide details about an event, witnesses will increasingly reconstruct from their conclusions what must have happened.

Rehearsal can effectively maintain witnesses' memory for important details, i.e. those relevant to the witness's general conclusions. In fact, memory for the specific material that is rehearsed can even become more accurate over short periods of time. However, rehearsal does not seem to generally immunize against loss of memory. Even with rehearsal, witnesses lose memory for details that are not important to them. Also, rehearsal will not help witnesses maintain memory for those details not actually rehearsed.

The results suggest why witnesses frequently cannot identify actors. In critical incidents such as crimes, the particular facial characteristics of an actor are not immediately important. A witness is likely to note the general characteristics of an actor, such as

sex, race, approximate age and so on. However, the witness is likely to be attending to more important details, such as the criminals' specific acts, the fact of the gun pointed at the witness and so on.

The results suggest that immediate and repeated rehearsal can help preserve the details that a witness does perceive. Conceivably, line-ups, picture arrays and interviews with investigators can help memory. However, the research also suggests why biases introduced by these procedures can totally destroy the usefulness of witness testimony. Since line-ups or picture arrays usually provide a greater chance to observe details, a witness may identify a suspect who generally resembles the original actor and then memorize details of the identified suspect. The only detailed memory that a witness has might be that derived from the line-up or picture array. Further, during these procedures, an interviewer or person conducting a line-up or picture array will frequently influence a witness's general conclusions about what occurred. Since witnesses remember events principally in terms of general conclusions, this influence could have broad and disastrous effects on subsequent testimony.

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Footnotes

¹F = 3.10, dF = 3/248, $p < .01$

²Main effect of time: For r' true: F = 9.15, dF = 3/248, $p < .01$; for r' false: F = 3.65, dF = 3/248, $p < .01$.

³Main effect of repeating-nonrepeating conditions over last three questionnaires: For r' true: F = 23.05, df = 1/372, $p < .01$; for r' false: F = 10.10, df = 1/372, $p < .01$.

⁴Quadratic trend over time for d' guilty items: F = 8.08, df = 1/252, $p < .01$.

⁵For questionnaire 1, difference between guilty and neutral items, $t = 2.99$, $p < .01$.

