EXERCISE 1.2 Analysis

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BIAS IN EYEWITNESS ACCOUNTS: THE EFFECTS OF QUESTION FORMAT, DELAY INTERVAL, AND STIMULUS PRESENTATION

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One of the three representations of a staged automobile collision was shown to 180 students from introductory psychology classes. We then questioned the students about details of the accident, using either marked or unmarked modifiers. Half the students were questioned immediately after viewing the stimulus material and half after a 20-min delay. The results indicated that estimates of the magnitude of a number of aspects of the collision were significantly greater when unmarked modifiers were used in phrasing the relevant questions. Students who were questioned after the 20-min delay gave significantly greater estimates of monetary damage than the students who answered immediately after viewing the representation. The nature of the stimulus material had inconsistent but significant effects.

In recent years, there has been a dramatic proliferation of research concerned with the accuracy and reliability of eyewitness reports. This research has documented the importance of a number of variables of which one of the most interesting and powerful is exposure to *postevent information*, which includes all additional related information to which a person is exposed after witnessing an event. Loftus and Palmer (1974) reported that the nature of questions asked a witness could systematically affect the report of details of that event. Subjects viewed films of automobile collisions and subsequently were quizzed about the speeds at which the vehicles involved were traveling. Speed estimates varied with the verb used in the interrogatory sentence. Specifically, estimates of the magnitude of speed were altered when the verbs *smashed, collided, bumped, hit,* and *contacted* were employed. These verbs were apparently interpreted as implying different degrees of contact and caused the different estimates. Similar results have been obtained by varying the adverb

employed (Lipscomb, Bregman, & McAllister, in press). Loftus and Palmer have consistently argued that these effects are the result of an alteration of the memory of the witnessed event produced by the introduction of postevent information. Although such an explanation is consistent with available data, so too is a somewhat more parsimonious explanation.

The effect of postevent information embedded in the phrasing of the question may produce a response bias independent of memory alteration. This simpler explanation is tenable as the result of a study reported by Harris (1973). Harris obtained responses to questions that varied according to whether a "marked" or "unmarked" modifier was employed. An unmarked modifier implies that a property such as height or length possesses an indefinite upper limit. The marked modifier carries no such implication. Harris asked subjects to give numerical responses to a set of 32 questions employing 16 pairs of marked and unmarked adjectives and adverbs. For example, subjects were asked, "How heavy was the set of weights?" (unmarked) and "How light was the set of weights?" (marked). For 14 of the 16 modifier pairs, the subjects' mean numerical estimates were in the predicted direction. These were hypothetical questions, however; no concrete stimuli were involved, and therefore, there was no possibility that memory was involved.

Other research by Loftus, Miller, and Burns (1978) has revealed that a further variable affecting the reliability of eyewitness accounts is the time lapse between the event and the introduction of postevent information. Therefore, one might expect that modifiers used in a question introducing postevent information would have more influence on the eyewitness after a time lapse than modifiers introduced immediately after the event.

A final issue relevant to the present study is the nature of the stimulus material itself. Although voluminous studies of memory document the importance of this variable, little has been done to determine how the nature of stimulus material might affect eyewitness reports. It is reasonable to propose, however, that information presented in a more complete format would be less vulnerable to contaminating effects than material that was partial in nature.

The present study examined the role of three variables on estimates of details of an automobile collision. These variables were (a) the adjective used in phrasing a question (marked vs. unmarked), (b) the format of the stimulus material (a complete videotaped sequence or an incomplete videotaped sequence or an audio stimulus only), and (c) the delay interval (immediate or following a 20-min delay).

A 2 × 2 × 3 between-subjects factorial design was employed. A Sony video-cassette recorder/player (model SLO-340) and a 19-in, black and white video monitor were employed to present three representations of an automobile accident described previously by Bregman and McAllister (1982). The complete version lasted for 12s and depicted two automobiles colliding at an intersection. The sequence showed a station wagon (Car 1) striking a compact car (Car 2) in the right rear panel and the compact spinning around from the impact. The sequence was followed by a close-up view of the damage sustained by both cars in the collision. (At impact, both cars were traveling approximately 25 mph.) The sounds of engine acceleration and the impact of the collision were clearly audible. The abbreviated 8-s version showed the cars accelerating and colliding and contained the audio-only stimulus.

We recruited 180 students (90 males, 90 females) from introductory psychology classes. The students were divided into groups of three and were exposed to one of three types of stimulus material. They were questioned and debriefed individually. Half the students were questioned immediately after being exposed to the stimulus material, and the other half engaged in a filler activity (reading a *Reader's Digest* story) for 20 min prior to questioning. The students were asked to estimate the speed at which each of the cars was traveling at impact on a 5-point scale (from *very fast* to *very slow*) and to provide an estimate in miles per hour. The phrasing of the questions varied with the experimental condition; half were questioned using a marked adverb (*slow*) and half with an unmarked adverb (*fast*). Students then completed a parallel questionnnaire in a Likert-type format requiring responses on an 11-point scale. There were 13 questions, including some that related to physical damage, monetary damage, and personal injury. Each question employed either a marked or an unmarked adverb.

The data, analyzed by multivariate analysis of variance, resulted in significant effects for stimulus, $F(26, 314) = 1.93\ p < .005$, and for modifier, $F(13, 156) = 3.124$, $p < .001$. Separate analyses of variance were then performed, yielding several significant effects. Estimations of the speed of both cars were significantly greater when the unmarked adverb *fast* was employed as compared to the marked adverb *slow* (see Table 1.6). Similarly, estimates of the extent of damage, skidding, noise, and harm to occupants were all significantly greater when the relevant questions were phrased with unmarked as opposed to marked adverbs (see Table 1.6). Students who were questioned after the 20-min delay estimated greater monetary damage to both cars than those who were questioned immedi-

ately following exposure to the stimulus material, $F(1, 168) = 5.5$, $p < .02$, for Car 1; $F(1, 168) = 8.93$, $p < .003$, for Car 2 (see Table 1.7). The speed of Car 1 was estimated to have been significantly greater by students who were questioned immediately following
5 exposure. Exposure to the complete version of the stimulus exerted significant but inconsistent effects on estimates of damage to Car 2, $F(2, 168) = 3.36$, $p < .037$; noise, $F(2, 168) = 4.71$, $p < .01$; and skidding of Car 2, $F(2, 168) = 7.17$, $p < .001$.

Table 1.6 Mean Estimates and Analysis of Variance Summary as a Function of Adverb Employed

Question and unit of measurement	Modifier	*M*	*F*	*p*
How _____ was Car 1 going? (mph)	Fast[a]	36.20	23.7	<.0001
	Slow	27.50		
How _____ was Car 1 going? (scale)	Fast	3.62[b]	3.93	<.05
	Slow	2.56[b]		
How _____ was Car 2 going? (mph)	Fast	39.76	5.86	<.017
	Slow	35.25		
How _____ was Car 2 going? (scale)	Fast	3.52[b]	4.08	<.05
	Slow	3.31[b]		
How _____ damage was done to Car 1?	Much	6.27[c]	9.43	<.002
	Little	5.40[c]		
How _____ were the skid marks made by Car 1?	Long	5.04[c]	11.20	<.001
	Short	3.88[c]		
How _____ noise occurred as a result of the accident?	Much	7.44[c]	7.62[c]	<.006
	Little	6.52[c]		
How _____ bruises do you think the driver of Car 1 suffered?	Many	5.22[c]	13.16	<.0001
	Few	3.85[c]		
How _____ bruises do you think the driver of Car 2 suffered?	Many	5.27[c]	5.35	<.022
	Few	4.47[c]		

[a]Unmarked adverb is reported first for each comparison. [b]Values could range from 1 to 5. [c]Values could range from 1 to 11.

Table 1.7 Mean Estimates of Speed and Monetary Damage as a Function of Delay Interval

Estimate	Immediate	Delay
Speed of Car 1	5.2[a]	4.6[a]
Monetary damage to Car 1	$659.27	$1,041.19
Monetary damage to Car 2	$688.96	$1,104.11

[a]Values could range from 1 to 11.

Results of the present study represent the most complete documentation to date that in obtaining estimates of aspects of a complex event from witnesses, the way a question is phased can dramatically affect the estimates. In the present study, the use of unmarked adverbs, implying no upper limit, resulted in higher estimates of the extent of property damage, personal injury, noise, and skidding. In fact, the unidirectional nature of this effect and the fact that it occurred across such a broad range of dependent measures is striking. The implication for the legal system is clear. Phrasing of questions by officers of the court may significantly affect various aspects of witnesses' verbal reports. The issue of whether this effect is the result of an alteration of the memory of the event, or due to a response bias operating independent of memory alteration remains unresolved. But our results suggest that this effect is the result of a response bias because no interaction between delay interval and the manner in which the question was phrased or between delay interval and stimulus format was obtained.

The results of the present study suggest two dimensions that might profitably be addressed by future researchers in the area. First, the delay employed in the present study was quite short (20 min). The use of longer delay intervals—days or weeks—might produce quite different results. Second, a more definitive test of whether effects of the manner in which a question is phrased are due to alteration in memory or are simply the result of response bias would be to include conditions in which no stimulus was present. If an effect is obtained with no stimulus, clearly that effect could not be due to memory alteration.

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