A Note: Can Vehicle Speed Be Estimated Accurately?¹

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In her book, Eyewitness Testimony, Loftus (1979) discussed the ability of eyewitnesses to estimate speeds of vehicles and came to a negative conclusion. Her evaluation was based, in part, on a study involving Air Force personnel who were asked to judge the speed of a vehicle at a field location. Their estimates ranged from 10–50 mph when in fact, the vehicle was traveling at 12 mph (see p. 29). As evidence, Loftus cited Marshall (1966/69).

Field investigations provide information dealing with real-life situations where issues of external validity are addressed. An expert witness should be able to refer to such findings in the context of litigation procedures. However, Marshall did not conduct the research, but rather briefly described the study and indicated that velocity estimates are difficult to make (p. 18). Marshall identified the American Society for Public Administration Bulletin (1959, see ref. Public Administrative Bulletin) as the source. This issue of the Bulletin briefly described the study and cited the “American Judicature Society Journal [sic].”

In 1959, two articles concerning speed estimation appeared in the Journal of the American Judicature Society³ (see Vols. 42 and 43). In the first, Jonathan Karas, director of a motor vehicle research group, discussed the importance of science in a court of law and the problems that he had encoun-

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tered as an expert witness. He cited numerous examples, one of which focused on accuracy of speed estimates in a field setting. The following is his example (p. 188).

We have performed actual experiments on speed estimation and the results are nothing short of phenomenal.

Anything which gives the impression of speed results in a higher guess of actual velocity.

These are factors such as a low convertible, a bright color, or a roaring muffler. The angle at which the car is moving is a factor, as well as the weather and light conditions.

This was confirmed by tests made with alert young members of the Air Force who estimated as ten to fifty miles an hour the speed of a vehicle accurately clocked to be twelve miles per hour!

These observers knew beforehand that they would be trying to estimate speed. Is it any wonder then that the average witness is totally unqualified to estimate speed? Such actual experimental data are of great value to the legal and insurance clients with whom we work on a professional basis4.

The second article (Vol. 43, p. 66) was a letter to the editor from the Morgantown Post which commented on Karas’ speed estimation example. It seems, therefore, that Karas and not Marshall should have been credited for these findings.

However, a more problematic issue centers on the speed estimation research. The original intent of Karas’ article was not to be a formal presentation of the data. A reference was made to an actual experiment where presumably the methodology and the results were formally presented. Unfortunately, no primary reference was provided nor could extensive searches of the literature using different databases identify such a source. Without access to his methodology and results, the scientific and legal communities are denied the opportunity to examine this methodology and the relationship of the data to perceptual and legal issues.

To examine the variables identified by Karas would be a significant and worthwhile undertaking. We recently carried out a field study of speed estimation (Scialfa, Guzy, Leibowitz, Garvey, & Tyrrell, in press). In our study, the automobile was viewed on a portion of a one-mile oval test track. Three different age groups (20–27, 40–54, and 55–74 years) estimated the speed of this vehicle which ranged from 15 to 50 mph. At a speed of 15 mph, individual

4From “Science in Court” by Jonathan Karas, 1959, Journal of the American Judicature Society, 42, p. 188. Copyright 1959 by the American Judicature Society. Reprinted by permission.
estimates ranged from 3 to 20 mph (mean 11.2). Karas' data ranged from 10 to 50 for a 12 mph speed. Thus, our data imply that subjects are more accurate than suggested by Karas. However, the purpose of this note is not to analyze Karas' data. The extent of under- and overestimation which he reported may well be accurate under his testing conditions. Rather, the point is that when such data are reported in a cursory fashion, and when the study does not meet the usual standards for scientific publication, their relevance to a particular set of conditions is unknown.

In relation to the issues raised by Loftus, it should be noted that eyewitnesses are typically asked to recollect events after they have occurred. The speed estimation studies of Karas, as well as ours, were conducted in a "real time" situation in which stationary observers were prepared to estimate speed as the event occurred. Loftus has presented convincing evidence that retrospective reports are frequently inaccurate, in part, because they tend to reflect subjects' expectations and/or their interpretation of events. Until it can be reliably established that real-time estimates of vehicle speed are accurate, the question of retrospective estimates remains open.

References


