Rejoinder to Letter to the Editor

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Rejoinder to Lesser, L. (2013), Letter to the Editor in response to: Fulton, L. V., Mendez, F. A., Bastian, N. D., & Musal, R. M. (2012), "Confusion Between Odds and Probability, a Pandemic?," *Journal of Statistics Education,* 20(3) (http://www.amstat.org/publications/jse/v20n3/fulton.pdf)

We thank Dr. Lawrence M. Lesser for his interest in our work and for the careful and stimulating comments which expand our discussion and offer a broader perspective of the Texas Lottery example and the educational issue.

We are certainly in agreement with the discussant that there are statistical misconceptions regarding the lottery that could have greater repercussions than the one regarding odds versus probabilities. Statistical terms which are misinterpreted according to use and custom (e.g., randomness, independence, causality, experiment, normal) are found in everyday use. It is in the sense of the generality of their use and the media throughout which these misconceptions "spread" that this situation could be classified as a "pandemic."

In addition to the use and custom, there is another source of misconception regarding statistical terms: key terms having different meanings depending on the discipline (Lesser & Winsor 2009).

Some examples that we have observed include the difference in meaning for the term "variance" in statistics and accounting and the difference in meaning of a "characteristic function" in mathematics and statistics.

The discussant suggests exploring the possibility of a reason why the use of the term "odds" may be more persistent than the word "probability." It could very well be, as suggested, that "odds" better reflects a feeling of a "rough estimate." This could be a matter of perception involving the notion of "concreteness" or "quantization" and the way our brain processes information (Varshney & Sun 2013).

We reflected over the alternative assumptions posed by the discussant when considering the reasons for the existing confusion between "odds" and "probability" in the Texas Lottery website. Certainly, in the case of the Texas Lottery, the numerical difference between the probability and the odds is negligible. In which case, announcing the odds correctly shouldn't cost anything; but this is not what the Texas Lottery has done. That the Texas Lottery keeps using "odds" as a synonym for "probability" as part of a marketing tactic, could be the case; but it might not work well since it is only cute if most players know the difference (and most players not knowing the difference is another proposed assumption). We believe that the third proposed assumption is the most likely: that Texas Lottery's marketing/publicity believes that the five-syllable word "probability" sounds more academic, and presumably out of reach to the masses than the word "odds." It is then possible that the word "probability" was replaced by "odds," believing that they are synonyms, since they are so in use and custom.

We share the inclination of the discussant to continue educating according to academic statistical usage. Choosing less ambiguous terms for our instruction and curriculum requires painstaking attention to detail. The selection of terms and phrases that convey unequivocal definitions should be performed as part of the careful selection of references and teaching materials (to include software). As educators, we foster the habits of seeking and achieving correctness and we cannot require anything less from ourselves. We use situations, such as the Texas Lottery, to exemplify how mistakes do occur within diverse contexts. Under some of these contexts, misconceptions could come with a great loss.

References

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