

Indecision in psychophysical judgments: A solid source of artifacts

Miguel A. García-Pérez & Rocío Alcalá-Quintana
Universidad Complutense, Madrid, Spain

Psychophysical research draws conclusions on the analysis of data reflecting observers' judgments. Most often, "forced-choice" psychophysical tasks are used which require observers to report, for instance, which of two stimuli is more intense, whether the onset of a stimulus preceded or followed the onset of another, or which of two distinctly different attributes a given stimulus possesses (e.g., location on the left or on the right of the midpoint between two reference marks). The mere design of these forced-choice tasks assumes that observers are always capable of making the required binary judgment: Observers are not supposed to arrive at "equal" judgments when asked to assess which of two stimuli is more intense, at "simultaneous" judgments when asked to assess which of two stimuli was presented first, or at "neither" judgments when asked to choose between two attributes for a stimulus. But any psychophysical experiment carried out using these tasks can identically be conducted under the so-called "same-different" task, in which observers are instead asked to report whether two stimuli have the same or different intensity, whether their onsets were simultaneous or successive, or whether stimulus location is or is not at the midpoint between the reference marks. When the same-different task is used, observers profusely report "same" judgments, which contrast with the apparent ability with which they make informed decisions under forced-choice tasks. This talk will review overwhelming empirical evidence of discrepant results across forced-choice and same-different tasks and will also describe a model that explains these discrepancies. In essence, the model assumes that observers in psychophysical tasks always make a ternary judgment upon comparing stimuli A and B: A lower than B, A equal to B, or A greater than B. Under same-different tasks, the second judgment renders "same" responses whereas the first and third judgments both render "different" responses; under forced-choice tasks, the second judgment cannot be reported and in those cases observers randomly give one of the allowed responses (A lower than B or A greater than B), which thus get mixed up with analogous responses that reflect authentic judgments on other occasions. This contamination appears to explain all observed discrepancies across studies using alternative psychophysical tasks. Empirical evidence will also be presented to the effect that observers actually approach psychophysical tasks as assumed by this model, and some specific artifacts arising from the use of forced-choice tasks will be described.

This talk is based on empirical and theoretical results presented in the following papers:

- Alcalá-Quintana, R., & García-Pérez, M.A. (2011). A model for the time-order error in contrast discrimination. *Quarterly Journal of Experimental Psychology*, 64, 1221–1248.
<http://dx.doi.org/10.1080/17470218.2010.540018>
- García-Pérez, M.A., & Alcalá-Quintana, R. (2010). The difference model with guessing explains interval bias in two-alternative forced-choice detection procedures. *Journal of Sensory Studies*, 25, 876–898. <http://dx.doi.org/10.1111/j.1745-459X.2010.00310.x>
- García-Pérez, M.A., & Alcalá-Quintana, R. (2011). Interval bias in 2AFC detection tasks: Sorting out the artifacts. *Attention, Perception, & Psychophysics*, 73, 2332–2352.
<http://dx.doi.org/10.3758/s13414-011-0167-x>
- García-Pérez, M.A., & Alcalá-Quintana, R. (2012). On the discrepant results in synchrony judgment and temporal-order judgment tasks: A quantitative model. *Psychonomic Bulletin & Review*, 19, 820–846. <http://dx.doi.org/10.3758/s13423-012-0278-y>
- García-Pérez, M.A., & Alcalá-Quintana, R. (2012). Shifts of the psychometric function: Distinguishing bias from perceptual effects. *Quarterly Journal of Experimental Psychology*, in press. <http://dx.doi.org/10.1080/17470218.2012.70876>