GCC Comments on:

Ole Peters and Alexander Adamou and Mark Kirstein and Yonatan Berman (2020). What are we weighting for? A mechanistic model for probability weighting. RESEARCHERS.ONE, https://www.researchers.one/article/2020-04-14 .

The comments below are based on my first pass read of the paper and my own research interest in the probability weighting phenomenon. It is intended to bring the authors attention to other papers where perhaps at least tangentially related results were produced. Of course, no one paper is a panacea on a topic. So I provide the authors with a menu of enumerated comments to choose from.

Comments

1. Page (pg) 2, line 1: "Probability weighting is a concept that originated in prospect theory .." A case can be made that probability weighting has been known to psychologist since at least Preston and Beratta (1948) and a heuristic mathematical specification for probability weighting function was formulated in Allais (1953). Tversky and Waker (1995) axiomatized the probability weighting function, and Charles-Cadogan (2018) axiomatized it in the context of, among other things, a random field.
2. Page 2, paragraph (para) 2. "Our focus is not on how these weights are inferred, but on the robust observation that decision weights, w(x) (used by DMs), are higher than probabilities, p(x) (declared by Dos) extreme events, i.e. when p(x) is small." To be sure, probabilistic risk aversion is consistent with that remark, but many experiments also observe probabilistic risk seeking where DMs underweight low probability events. See e.g. Wilcox (2015)
3. Page 2, equation (eq) (2). To the best of my knowledge the outcome dependent probability weighting function $w(.)$ is a functional of $F_p(x)$. That is, the composite function $(w \circ F_p)(x)$ is motivated by DM's probabilistic risk attitudes over a ranking of outcomes x. See, e.g., Charles-Cadogan (2018, Thm. 2.1). Of course, one can simply use $w(.)$ for the "density" (my interpretation of the paper's intended use) and $W(.)$ as the transformation of the cumulative probability $F_p(x)$.

4. Page 5, eq (7); and pg. 7, §2.3. Rachev, et al (2017), provide a taxonomy of transformations of different probability density functions that subsume eq(7), that also applies to arbitrary distribution functions.
5. Pages 12-13, Figures 6 and 7 produce nice stylized results. For example, the t-distribution is the sample analog of the standard normal and the relative fat tails captures the "bias".
6. Page 13, para. At top of page. Most experiments are of the "one shot" variety in which a DM is incentivized to make choices that provide the maximum payoff for him/her. In that sense, DOs expectation of optimal behavior is admissible. The use of the phrase "common mistake" in that context is a strong assessment, and it should perhaps be nuanced.
7. Page 14. Section 4, first sentence. "…Tversky and Kahneman's physically unmotivated function..." was motivated by a precursor functional form theoretically motivated by Karmarkar (1978), and subsequently generalized by the Goldstein and Einhorn (1987, pg. 248, equations 22-24). In fact, Karmarkar (p. 62) referenced Khaneman and Tversky's prospect theory paper, then in working paper form. It is perhaps unfortunate that Tversky and Kahneman (1992) did not reference Karmarkar (1978) or Goldstein and Einhorn (1987) where the functional form is motivated. But then again, Tversky and Kahneman (1992, p. 311) did not produce a functional form for the "nonlinear procedure" they used to estimate the parameters of the probability weighting function nor the median loss aversion index $\lambda = 2.25$.

References

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