



## Comment

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# Framing the debate on human-like framing effects in bonobos and chimpanzees: a comment on Krupenye *et al.* (2015)

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Recently, Krupenye, Rosati & Hare (KRH henceforth) reported that bonobos and chimpanzees show ‘human-like framing effects’ in a food choice task [1]. Chimpanzees and bonobos could choose between a ‘framed’ option of fruit and an alternative option of peanuts (matched in expected value to the framed option). Apes saw either one fruit piece to which one piece was added with  $p = 0.5$  probability (gain frame) or two fruit pieces from which one piece was subtracted with  $p = 0.5$  probability (loss frame). Apes chose the framed option more often in a gain frame than in a loss frame (though this effect was strongest in male apes).<sup>1</sup> KRH conclude that “...both of humans’ closest relatives exhibit human-like framing effects...” and that this bias may be the product of “...shared ancestry between humans, non-human apes and perhaps other species as well.” (p. 3).

KRH claim that they investigated attribute framing: “...the current study focused on the apes’ preference for an option framed positively (as a gain) versus negatively (as a loss)—or attribute framing—not how framing impacts their risk preferences.” (p. 3). In the human literature, attribute framing is demonstrated by asking participants to evaluate an object with an attribute that is framed positively in one group and framed negatively in another group (e.g. meat is 80% fat or 20% lean; [3]). It is unclear whether KRH’s tasks represents a non-verbal approximation of an attribute framing task as they gave apes a choice between a framed option and a un-framed alternative and, moreover, used a variable pay-off for the framed option (adding or subtracting food 50% of the time, respectively). In fact, KRH’s study is methodologically very similar to previous studies on framing of risky decisions ([4,5]—though these studies framed both, the risky and the safe option) and some recent paradigms in human risky choice [6]. We therefore suggest to evaluate KRH’s findings in relation to human and animal studies on risky decision-making.

In the human literature, most participants choose a risky option over a safe option with equal expected value when pay-offs for both options are described as losses (e.g. lives lost), but exhibit a preference reversal when pay-offs are described as gains (e.g. lives saved) [7]. However, more recent work has found the opposite pattern of risk preferences (i.e. participants become risk-seeking for gains) when probabilities are not presented as descriptions but have to be learnt from experience [8]. This ‘description–experience gap’ has been observed across a range of risky decision tasks [6]. Overall, there is increasing evidence that elicitation methods crucially shape decision outcomes in humans [9]. When comparing decision outcomes in humans and animals,

choice paradigms are thus not interchangeable and need to be scrutinized carefully to ensure that valid cross-species comparisons are drawn.

Importantly, risky decision tasks for animals are usually presented as experience-based paradigms. When comparing KRH's findings with other animal framing studies a puzzling picture emerges: while KRH found that apes were risk-seeking for the gain frame, studies with capuchin monkeys and starlings showed effects in the opposite direction, that is, risk-seeking for the loss frame [4,5]. Moreover, a recent 'uplinkage' replication with humans using the same procedure as the capuchin study [4] found no evidence of framing effects [10]. In this light, framing effects appear inconsistent across non-human primates (and other animals) and fail to correspond to human majority decision outcomes when tasks are equated, which poses a considerable challenge for claims of shared ancestry of these biases [1,4].

Even if the methodological hurdle of selecting appropriate tasks is taken (see [11] as a recent example), comparative research programmes that focus purely on descriptive accounts of decision-making and use one-word labels such as 'human-likeness' are akin to black-box theorizing with little explanatory or predictive power [12]. Instead, we

advocate for decision-making research that aims to generate and test detailed models of cognitive processes and how they interact with an organism's internal states as well as the organism's environment to bring about specific behaviours [13,14]. Comparative research that focuses on cognitive processes underlying biases would help to arrive at a more nuanced picture of the biological, cognitive and social influences on decision-making.

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## Endnote

<sup>1</sup>Apes showed a trend for choosing the gain-framed option significantly different from chance ( $V = 431$ ,  $p = 0.057$ ), but failed to do so for the loss framed option ( $V = 210.5$ ,  $p = 0.658$ )—two-sided Wilcoxon exact rank tests using the online study data [1,2]. Moreover, individuals' choices (in per cent) of the two differently framed options are positively (and not negatively) correlated (Spearman's  $\rho = 0.677$ ,  $N = 40$ ,  $p < 0.001$ ), which would be in line with individual differences in risk-taking.

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