

### Response to Commentaries

Our emphasis on discounting in the target article was a response to a request to prepare an article with that emphasis. But whereas we agree that discounting research and theory provide a useful framework in which to view gambling, we also agree that there is much more to the gambling story. Indeed we share Catania's reservation that, while discounting functions are "economical ways to describe patterns of behavior," they do not explain the behavior described.

We are delighted that our article set the occasion for such a thoughtful and varied set of responses. We agree with nearly all the points brought up by the commentators, including the fact that the effects of the putative controlling variables on gambling "will not be ... simple or even direct ..." (*e.g.*, Weatherly and also Hantula and Puvathingal). Some of these controlling variables include: verbal behavior (*e.g.*, Dymond and also Catania) including rule-governed effects (*e.g.*, Ninness and Ninness, and also Arntzen); the effects of context (*e.g.*, DeLeon, and also both Borrero and Dymond); the unique role played by special circumstances such as jackpots (*e.g.*, Madden) or debt (*e.g.*, Lyons); the role of mediating variables such as thinking, which is more properly considered "an aspect of the dependent variable" (*e.g.*, Hayes); the importance of the entertainment and/or escapist value of gambling (*e.g.*, Derevensky); and the role of conditioned reinforcement (*e.g.*, Ghezzi). Moreover, much more should be said about the effects of both environmental (*e.g.*, Catania) and neurobiological (*e.g.*, Potenza) determinants of gambling.

We exercise restraint by addressing three issues only. First, the relevance of Rachlin's elegant string theory was raised in three of the commentaries (Ghezzi, Lyons,

and Madden). We respond by referring to a discussion of string theory in the context of data on sunk cost from our laboratory (Fantino, Navarro, & O'Daly, 2005). These data would appear to pose difficulty for string theory. However as the various commentators have made clear we would not expect any one account of gambling to be applicable for anything approaching all gambling situations.

Second, the points about jackpots and debt are well taken. For someone sufficiently desperate, in the sense of lacking viable alternatives, the long-shot gamble may be the best shot available. In fact, lower-income people may view gambling as one of the rare arenas in which they have an even playing field. For example, Haisley, Mostafa, & Loewenstein (2008) found that participants were more likely to buy lottery tickets after completing a task highlighting situations in which high or low income people had advantages, and thus implicitly calling attention to the fact that all players have an equal chance to win the lottery. And Callan, Ellard, Shead, & Hodgins (2008) found that college students made to feel relatively deprived compared to their peers with respect to the amount of their disposable income were more likely to participate in a gambling opportunity than those who did not feel deprived. The budget rule of behavioral ecology stresses that organisms sufficiently deprived will become (and critically, *should* become) risk-prone. A discussion of risk as a function of budget and some relevant data may be found in Goldshmidt & Fantino (2004). There too the situation is complex. As Borrero points out, there are still other situations in which “risky” choice is also a sensible choice.

Madden's “thought experiment” involving the cigarette and monetary casinos indeed provides food for thought. There are in fact gambling venues where non-monetary rewards are expected and where cartons of cigarettes might be apt inducements (*e.g.*,

bingo parlors). Most smokers do not have a history of gambling for cigarettes; thus, it would not be surprising if they chose the monetary casino. However, this outcome may not tell us much. In order to gamble at the cigarette casino that Madden portrays, the gambler would be gambling his own cigarettes. By definition, then, he would not be cigarette-deprived. A different outcome might be evident if a severely-deprived smoking gambler were using money or some other currency to wager for cigarettes. In fact deprived smokers exhibit steeper discount functions than do non-deprived ones (as found, for example, in recent research conducted by Rick Lamb and Paul Romanowich at the University of Texas, San Antonio). We join Madden and the other commentators in hoping that some of the issues raised in these exchanges will further spur a robust functional analysis of gambling. Gambling behavior, while complex, provides excellent opportunities to study decision-making, self-control and impulsivity, and the roots of addictive-like behavior within the context of everyday settings.

#### References

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