

Computational Contributions to Prosocial and Utilitarian Risk-taking

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Real world risky decision making often involves a social trade-off in which the decision will bring positive consequence to one agent but negative consequence to another. Previous studies have investigated factors that influence economic decisions-making, but rarely with a direct social trade-off. Further, little is known about what drives prosocial decision-making, making a choice to benefit another at a personal expense, despite the vast social consequences of prosocial behavior. The current preregistered study (<https://osf.io/ny4as/>) used a novel variant of the Columbia Card Task in which participants' decisions had opposing consequences for themselves and a charity of their choosing. Participants (N=22, ages 18-40 years) played two runs of the Columbia Card Task while wearing wrist devices that measured electrodermal activity (EDA). In one run, the score participant gained conferred direct monetary benefit to themselves, but the losses incurred were taken from a donation to charity. In the other round, the contingencies flipped such that the charity received an actual monetary benefit for gains received whereas the participant's bonus was reduced by the loss incurred. Analyses were performed in R using lme4 and general linear mixed model. We found that decision-making is predicted by context ($B = -0.351, p < 0.001$), risk ($B = -0.031, p < 0.001$), and return ($B = 0.012, p < 0.001$). Participants were more likely to make decisions that benefited themselves at the cost of charity; higher return and lower risk were associated with more likelihood of taking risk. Individual differences in impulsive risk-taking (BAS Fun seeking), loss aversion, and trait anxiety influenced risk-taking in the utilitarian context (gain for self, loss for charity) but had no significant influence in the prosocial context (Fun Seeking: [$B = 0.279, p < 0.01$]; loss aversion: [$B = -0.129, p < 0.05$]; Anxiety: [$B = -0.149, p < 0.05$]). Males were also more likely to take trade-offs at the cost of others. Interestingly, the expected outcome (i.e., return, which was operationalized as the expected value of a given decision) increased prosocial risk-taking. Further, arousal was higher as measured by EDA when subjects took prosocial risks at the cost to themselves. Our results implicate prosocial behavior may be driven by increased magnitude of the benefit to others rather than individual differences of the actor whereas self-oriented utilitarian choices are shifted by individual differences. Affective salience in physiological arousal may be one mechanism by which expected value amplifies prosociality.