



Temporal distance reduces the attractiveness of p-bets compared to \$-bets



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ABSTRACT

Although people normally prefer a more certain option over a riskier option of equal expected value, sometimes they are tempted to choose the riskier, but more rewarding one. Such temptation is even stronger when people decide for the distant future as compared with the near future. In Experiments 1 and 2 we showed that increasing temporal distance makes people more likely to choose a high risk \$-bet (€400, 0.02;0) over a low risk p-bet (€14, 0.60;0). Furthermore, the risk aversion shift increased proportionally to the time delay and persisted even for long delays (6 months). In Experiment 3, we showed that this temporal effect is associated with a decrease in positive feelings towards the p-bet, and with a decrease in the positive evaluation of the high-probability (60%) of the p-bet, but not with an increase of the positive evaluation of the high-payoff (400 euro) of the p-bet. In Experiment 4, we showed that increasing the salience of the probability feature tended to decrease the temporal effect, while increasing the salience of the prize did not vary the strength of the effect. Results are in line with an affect-based explanation of the temporal effect.

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1. Introduction

Decisions often involve a trade-off between a more certain option and a less certain but more tempting one. Faced with such a trade-off, most people are generally risk-averse, that is, they prefer the more certain option when it is compared to a gamble of equal expected value (Bernoulli, 1954). People's behavior, however, seems to be much less cautious when the decision has to do with the future rather than the present: When people are told that the outcome of the decision will be resolved in a future time, they act as if they were more tempted by the riskier and richer option, (Abdellaoui, Diecidue, & Öncüler, 2011; Lovallo & Kahneman, 2000; Noussair & Wu, 2006; Sagristano, Trope, & Liberman, 2002). In the present article we generalize the temporal effect to real choices with substantial incentives, in a between-subjects design. In Experiments 1 and 2 we investigated whether increasing temporal distance makes people more or less likely to choose a high risk \$-bet (€400, 0.02;0) over a low risk p-bet (€14, 0.60;0) in a between-subjects experimental design, with real substantial incentives. Furthermore, in Experiments 3 and 4 we explored the psychological underpinnings of this phenomenon. We tested predictions derived from two explanations proposed for the effect: The Construal Level Theory (CLT) explanation (Sagristano et al., 2002) and the affect-based reasoning explanation (Abdellaoui et al., 2011).

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Our findings show that the effect is robust and can be generalized to a real choice in a between-subjects design with substantial incentives. Furthermore, the risk aversion shift increases proportionally to the time delay and persists even for long delays (6 months). Additionally, the temporal delay does not increase the attractiveness of the \$-bet, but instead, decreases the positive feelings towards the p-bet, and decreases the positive evaluation of the certainty feature of the p-bet (the high probability of winning). These findings only partially support CLT predictions (Sagristano et al., 2002) but are in line with the affect-based reasoning explanation (Abdellaoui et al., 2011).

1.1. The effect of temporal distance on risky choice

Only a few studies in intertemporal choice focused directly on the influence of delay on risk attitudes and analyzed if risk preferences are time-dependent (Abdellaoui et al., 2011; Lovallo & Kahneman, 2000; Nisan & Minkowich, 1973; Noussair & Wu, 2006; Sagristano et al., 2002; Öncüler, Onay, & Onculer, 2009) despite the fact that many risky decisions in the real world entail a temporal delay (Arora, Peterson, Krantz, Hardisty, & Reddy, 2012; Hansen & Wänke, 2011; Leiser, Azar, & Hadar, 2008).

In an early study, Nisan and Minkowich (1973) found that participants were less risk-averse when the gamble was immediate than when the gamble was delayed. That is, they preferred high payoff-low probability gambles (\$-bets) to low payoff-high probability gambles (p-bets) when the betting results were expected immediately but they showed the reverse preference when the betting results were expected in a week. The authors explained their findings by proposing that payoffs became less salient as delay increased but probabilities were not affected by delay since they were more abstract constructs.

Several other subsequent studies found the opposite pattern. Lovallo and Kahneman (2000) first demonstrated that people's evaluation of the attractiveness of hypothetical gambles was positively related to their willingness to delay those gambles (i.e., people paid more to speed up the resolution of the gamble for less attractive gambles than more attractive ones). They argued that participants savored the positive outcomes and that the extent of savoring was proportional to the positivity of the outcomes.

Sagristano et al. (2002) directly manipulated temporal distance in a between-subjects experimental design where some participants evaluated near-future gambles, and other participants evaluated distant-future gambles. In their experiment Sagristano et al. (2002), used hypothetical choices. The authors asked participants to rate the desirability of each of 20 games on a 7-point scale, saying that these ratings were to determine which game participants would get to play, and then asked participants how much money they would be hypothetically willing to bid and risk losing for a chance to play each of the 20 games. Results showed that temporal distance increased the desirability and willingness to pay for the low probability of winning a large prize bet (\$-bet), and decreased the desirability and willingness to pay for the high probability of winning a small prize bet (p-bet). The results were explained using the Construal Level Theory (Lieberman & Trope, 1998; Trope & Liberman, 2000, 2003, 2010). According to Construal Level Theory (Trope & Liberman, 2010) psychological representation of information depends on whether it is near or distant in time and space, i.e. on its psychological distance. Liberman and Trope (1998) suggest that temporal distance modifies people's mental representation of the event so that the representation of distant future events is more abstract, broad, and structured (high-level construal) than is the representation of near future events, which is more peripheral, concrete and focused on the local features of the event (low-level construal). Sagristano et al. (2002) explain their results assuming that temporal distance shifts the overall attractiveness of an option closer to its high-level feature (payoff) than to its low-level feature (probability). That is, temporal distance increases the weight of information about payoffs and decreases the weight of information about the probability of winning those payoffs. Sagristano et al. (2002) found that both the weight of probability and the weight of payoffs changed with temporal distance from a gamble: Payoffs became more influential and, independently, probability became less influential as temporal distance increased.

Noussair and Wu (2006) replicated and generalized the effect by using real cash incentives (min 0.00\$ max 19.25\$), and manipulating temporal distance in a within-subjects design on a set of lotteries.

Öncüler et al. (2009) focused on the type of elicitation path used to obtain the present value of a lottery to be resolved and paid in a future time period. The authors found that when the present value of the lottery was elicited under a time-risk task (eliciting the present value of the risky prospect and then determining the certainty equivalent of this current lottery) or under a direct path (eliciting directly the present certainty equivalent of the future lottery), the value obtained was higher than when the value was elicited under a risk-time task (eliciting the future certainty equivalent and then discounting this amount to the present). The authors explained this path-dependency assuming that in evaluating the two sources of uncertainty (time and risk), individuals first discount for time and then for risk.

Abdellaoui et al. (2011) replicated Noussair and Wu (2006) results by manipulating temporal distance in a within-subjects design, as the latter, but using a different elicitation technique. The authors elicited the certainty equivalent at time x , that is, the sure amount payable at time x that the decision maker considers as equivalent to a particular lottery. The authors confirmed the basic finding that subjects exhibited more risk tolerance for delayed lotteries as compared to non-delayed lotteries, but also reported a novel finding, that is, that temporal distance had no impact on utilities but had a considerable impact on the probability weighting function. They argued that this change in probability weighting function might be caused by a decrease in the strength of anticipated affective reactions to the gambles caused by the temporal delay. More specifically, as the time delay increases, they assume that the strength of the anticipated emotional reaction (joy or

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