**Loss Aversion**

**DeBeats 2012: Development of LA questionnaire**

* Prospect Theory: A central assumption of prospect theory is that the probability weighting function for risk-involved decisions toward gains has greater curvature than the function for losses. Kahneman and Tversky (1979) as loss aversion, referring to the fact that “losses loom larger than gains.” Köbberling and Wakker (2005) suggest that risk attitude includes three separate components: basic utility, probability weighting, and loss aversion. Loss aversion is deemed responsible for the largest part of risk aversion, and it refers to the tendency of people making Outcomes are evaluated as losses (or gains) if they are below (or above) a reference outcome, which can be a status quo or an “aspiration level” (Heath, Larrick, & Wu, 1999). Indeed, one of the fundamentals of prospect theory is that people frame a problem around a reference point (Kahneman & Tversky, 1979), a phenomenon termed reference dependence (Tversky & Kahneman, 1991). In decision choices, loss aversion will play its role if something is framed as a loss rather than a gain relative to the reference point.
* The existence of loss aversion has thus been extensively shown in a vast number of situations and via multiple research methods, ranging from economic and psychological laboratory studies to field studies, and by neurobiological approaches such as measuring skin conductance response (Sokol-Hessner et al., 2009) or pupil dilation and heart rate (Hochman & Yechiam, in press), and the use of fMRI scans (e.g. Rick, in press)
* The impact on loss aversion of sociodemographic individual characteristics such as age, gender, education, or profession has been investigated in behavioral economics (e.g. Eckel & Grossman, 2003; G chter, Johnson, & Herrmann, 2007; Haigh & List, 2005; Schmidt & Traub, 2002).
* Although risk and loss aversion are seen as crossovers between economics and psychology, the main body of research still focuses on the economics side. Consequently, measurement is usually in the form of mathematical choice dilemmas.
* Although classical decision theory has regarded risk propensity as situational (Kahneman & Tversky, 1979), it has long been acknowledged that individual risk attitude is a key part of personality (for an overview, see Mohammed & Schwall, 2009). We argue that loss aversion differs significantly across individuals, which is supported by the findings of G chter et al. (2007). They found individual heterogeneity in loss aversion in their experiment: 4.9% of respondents were loss seeking, 7.1% were loss neutral, and 88% were loss averse. More importantly, the 88% loss-averse individuals differed in their degree of loss aversion; among them 10% were even classified as “very strongly loss averse.”
* a new instrument for loss aversion that is capable of measuring individual differences, namely a psychometric scale entitled the Loss Aversion Questionnaire (LAQ).
* we selected 20 items, after taking several criteria into account. We aimed to select a wide variety of losses, such as in personal affairs, reputation, status, and identity. Both positively and negatively formulated items were included to avoid acquiescence bias (Billiet & McClendon, 2000).
* All 20 items were answered on a five-point Likert scale (1 = strongly disagree, 5 = strongly agree) to indicate the extent to which the respondent agreed with the statement
* In study 3, the questionnaire was tested with a large number of participants in various positions. The 18 items with the highest item total correlation and greatest contribution to the overall reliability of the scale from the preliminary studies were retained for larger-scale testing.
* Only the items with a factor loading above .40 on the second factor (loss aversion), with no significant loadings (<.30) on the first factor (anxiety) were retained to form the final version of the Loss Aversion Questionnaire. This final version consists of seven items (in bold in Table 4) with a Cronbach’s a of .72.

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**Mixed-gamble tasks (z.B. in Barkley-Levenson et al., 2013)**

* Series of gambles with a 50% probability of gaining the amount shown on one side of a “spinner” and a 50% probability of losing the amount shown on the other side.
* During the response interval of 3000 ms, participants responded whether they accepted that gamble for real money, by pressing one of four buttons corresponding to a 4-point Likert scale (strongly accept, weakly accept, weakly reject, and strongly reject).
* Rather than a binary response, four responses were used to make it more difficult for participants to default to a simple choice rule; this response design was previously used in the task from Tom et al. (2007).
* The gain and loss amounts were independently manipulated, with gain amounts ranging from +$5 to +$20 in $1 increments and loss amounts ranging from −$5 to −$20 in $1 increments, for a total of 144 trials.
* Randomly interspersed within these trials were 24 gain-only trials and 24 loss-only trials, with values drawn from the same range, for a total of 192 trials across four runs. These gain-only and loss-only trials provided confirmation that participants were engaged with the task, as they should reject all loss-only trials and accept all gain-only trials.
* The side of the “spinner” in which the gain and loss appeared and the order of the stimuli was counterbalanced across participants.
* at the end of the experiment one gamble would be selected at random to be played for real money Participants were told that they had the opportunity to lose or gain up to $20 (based on the theoretical possibility that the gamble with the highest gain or highest loss could be selected) and that their payment depended on their responses to the gambles in the task.
* Tom 2007 people typically reject gambles that offer a 50/50 chance of gaining or losing money, unless the amount that could be gained is at least twice the amount that could be lost (e.g., a 50/50 chance to either gain $100 or lose $50) (Tversky, 1992).
* We computed a behavioral measure of loss aversion using logistic regression. This regression technique allows for the prediction of a binary response variable (i.e. the choice to accept or reject each gamble, coded as 1 or 0) from the independent variables of gain amount and loss amount. The logistic regression yielded regression coefficients () that represent the size of the contribution of the gain amount and loss amount to the participant’s decision. The coefficient of loss aversion, lambda () was then calculated from the regression coefficients using the following formula: .

**Risk Aversion**

**Weber 2002: Domain specific risk attitude scale**

* our risk-attitude scale distinguishes between two psychological variables (risk perception and attitude towards perceived risk) that have been confounded in previous risk-attitude indices and instruments implicitly or explicitly grounded in expected utility theory (Weber, 2001a,b).
* Second, our scale examines risk-taking and its determinants in several distinct content areas.
* In the expected utility (EU) framework and its variants including prospect theory (Kahneman and Tversky, 1979), risk attitude is nothing more than a descriptive label for the shape of the utility function presumed to underlie a person’s choices.
* More recently, some researchers have argued that risk attitude is more naturally conceptualized in the risk–return framework of risky choice used in finance (Sarin and M. Weber, 1993). In this framework, people’s preference for risky options is assumed to reflect a tradeoff between an option’s expected benefit, usually equated to expected value (EV), and its riskiness.
* To reduce the overall length of the scales to 40 items, we selected eight items per subscale (those with the highest item–subscale-total correlations). Just as in Study 1, we only retained items with item–subscale-total correlations close to or greater than 0.30. Most of the selected items were the same as those in the original scale, but there were some substitutions. The final scale, as shown in Appendix C, also reflects some minor changes in wording intended to clarify the intent of some items.
* For many applications, the reasons for observed individual or domain differences in risk taking are immaterial if risk attitudes are measured merely for predictive purposes. In those cases, one or more of the subscales of the Risk-Behavior instrument provided in Appendix C will suffice. Reasons for differences in risk taking become important, however, if risk attitudes are measured with the goal of influencing the observed behavior (i.e. convincing an individual or group to make more risk-averse or more risk-seeking choices). In this case, both conventional risk-attitudes (from the Risk-Behavior Scale) and perceived-risk attitudes (by regressing risk-behavior scores on perceived risks and benefits; see scale instructions in Appendix D) need to be assessed, to find whether discrepancies between observed and desired behavior are the result of (possibly unrealistic) perceptions of risks or benefits or the result of (possibly inappropriate) attitude towards perceived risk.

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**Preference uncertainty**

**Fischer 2000:**

* feelings of ambivalence or preference uncertainty that arise when one must evaluate a single alternative that is good in some respects but bad in others. We argue that such conflict between different aspects of choice or evaluation tasks leads to preference uncertainty. If one is evaluating a single alternative in terms of some metric of value, preference uncertainty means not being sure what value to assign to the alternative.
* Our hypotheses involve ex ante preference uncertainty generated during the evaluation of an alternative. This form of uncertainty is likely related to, but not necessarily perfectly correlated with, ex post subjective confidence ratings made after evaluation of an alternative.
* Broadly, one may take two approaches to measuring preference uncertainty in evaluative judgments. The first is to ask the decision maker to directly assess preference uncertainty, much as one would do with event uncertainty. Thus, one might ask a decision maker to estimate a 90% confidence range for the value of a particular alternative. Alternatives that evoke greater preference uncertainty should evoke wider confidence intervals—but only if people have direct insight into their own preference uncertainty.
* In this article, we take a second approach, inferring preference uncertainty from other properties of the judgment process. In particular, we focus on two indirect indicators of preference uncertainty. The first is response time. The more uncertain one is as to the overall value of an alternative, the longer one is likely to take in assigning a value to the alternative. The second measure is response error. If one is uncertain about one’s preferences, responses to judgment tasks are likely to fluctuate from moment to moment, as one adopts different frames of mind. Therefore, greater preference uncertainty should be associated with greater response error—that is, greater inconsistency between a particular decision maker’s evaluations of an identical stimulus at different times.

**Greco 2003: Uncertainty Response Scale**

* psychometric instrument that has implications for the present study is the Intolerance of Uncertainty scale devised by Freeston, Rhéaume, Letarte, Dugas and Ladouceur (1994). The scale was constructed in conjunction with their Why Worry scale, in the context of research on the reasons why people worry. However, the Intolerance of Uncertainty measure suffers from a number of psychometric shortcomings, including a highly subjective procedure for generating scale items and, more importantly, the extraction of too many factors in the final form of the scale (three of the five factors comprise four or fewer items each).
* structure of the Uncertainty Response Scale (Greco & Roger, 2001) used in the present study was established using confirmatory factor analysis, and was validated against the original rumination scale published as part of the Emotion Control Questionnaire (Roger and Nesshoever, 1987; Roger & Najarian, 1989).
* The Uncertainty Response Scale (URS - Greco & Roger, 2001) is a measure that was aimed in part at addressing research issues in the stressful effects of uncertainty and the role of uncertainty in illness behaviour. Its first factor, Uncertainty Response-Emotional (UR-E), measures emotional responses as a consequence of uncertainty. The scale is differentiated from tolerance of ambiguity in that it specifically measures emotional responses to uncertainty, as opposed to a general preference for, or dislike of, ambiguity. Furthermore, the psychometric properties of the UR-E scale are highly acceptable (Greco & Roger, 2001), whereas scales measuring tolerance of ambiguity presented a number of psychometric problems such as low alpha and test retest reliability, and a lack of predictive validity (Furnham, 1994, 1995).

**Greco 2001:**

* 4-point Likert scale (never, sometimes, often, always)

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**Carleton et al., 2007 Intolerance of Uncertainty Scale Short version**

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**Sensation seeking**

**Zheng 2019:**

* The personality trait of sensation seeking is defined as “the tendency to take risks for varied, novel, complex and intense sensations and experiences” (Zuckerman, 1994).
* Risk taking is a complex construct that can be broadly defined as voluntary participation in behaviors that may be high in subjective desirability but with potential harm or loss (Geier and Luna, 2009; Zuckerman, 2007).
* For sensation seeking, the following question arises: Are high sensation seekers (HSS) more susceptible to risk-taking behaviors than low sensation seekers (LSS) because they are associated with increased desires for rewards or because they are more likely to ignore negative consequences?
* Previous research provides evidence for both. On one hand, traditional theories regard sensation seeking as an expression of a hyperactive approach system (Zuckerman, 1990, 1994) whereby the rewards of “varied, novel, complex, and intense sensations and experiences” outweigh the possible negative consequences of engaging in sensation-seeking activities. HSS relative to LSS exhibit greater subjective rewarding effects of psychostimulants such as alcohol (Fillmore et al., 2009) and d-amphetamine (Kelly et al., 2006; Stoops et al., 2007; White et al., 2006), more sustained electrophysiological responses to novel stimuli (Zheng et al., 2010), as well as enhanced brain activation in response to monetary rewards (Kruschwitz et al., 2012) and emotionally high-arousal stimuli (Joseph et al., 2009). On the other hand, other theories emphasize that sensation seeking is driven by a hypoactive avoidance system (Lang et al., 2005; Lissek et al., 2005). HSS versus LSS show blunted autonomic responses to threatening (Lissek and Powers, 2003) and aversive (Lissek et al., 2005) stimuli, and reduced brain responses to errors (Santesso and Segalowitz, 2009; Zheng et al., 2014), monetary losses (Kruschwitz et al., 2012), as well as stimuli with physical (Zheng et al., 2015) or monetary (Zheng and Liu, 2015) risk.
* In literature, delay discounting has mainly been regarded as an index of impulsive decision making, while probability discounting is mainly associated with risky decision making.
* To our knowledge, few studies examined the relationship between discounting and sensation seeking (Mitchell, 1999; Ostaszewski, 1996, 1997). In these previous studies, HSS and LSS showed comparable discounting rates of delayed monetary rewards (Ostaszewski, 1996, 1997), though higher scores on disinhibition, one facet of sensation seeking, were associated with greater delay discounting rates across cigarette smokers and non-smokers (Mitchell, 1999). However, individual differences in sensation seeking were observed with probability discounting, such that HSS discounted probabilistic rewards less steeply than LSS for large amounts but not small amounts (Ostaszewski, 1997). These findings indicate that sensation seeking is more associated with dysfunctional valuation of rewards in terms of delivery probability than that in terms of delivery delay. However, it remains unclear whether this dysfunctional valuation can be expanded to losses.
* For the probability discounting task, HSS discounted probabilistic losses but not gains more steeply than LSS, irrespective of the amount of outcome. For the delay discounting task, HSS discounted delayed losses more steeply than LSS for the large but not small amount condition. In contrast, both groups exhibited comparable performance in the rate at which gains were discounted across the two amount conditions. These results remained significant when impulsivity levels were controlled. Together, our data strengthen the argument that the dysfunctional valuation in sensation seeking may be driven by a weaker avoidance system, rather than by a stronger approach system.

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