The risky framing effect is a well-documented bias: People tend to be risk averse for gains and risk seeking for losses. De Martino, Kumaran, Seymour, & Dolan (2006) showed neural activity active during frame-consistent decision making was similar to patterns related to anxiety in both frames. The present study tests the exponential parameter for subjective utility and probability weighting between: Item type (framing vs. reflection, framing represents true violations of risky Option)

Also tested for differences between:
- framing and reflection paradigms
- subjective certainty and probability estimation procedures
- Primary Hypothesis: anxiety measures will predict more robust frame-consistent choice patterns; greater risk aversion for gains and greater risk seeking for losses.

Methods

Sample: 161 Qualtrics Participants; 76% female; mean age = 39.0 yrs (SD=14.5)

Procedure: For each frame (gains and losses), 5 subjective certainty and 5 subjective probability elicitation blocks via bisection algorithm, with 2-6 individual comparisons per block. Each block consisted of all or nothing $100 lotteries with starting EVs of $5, $25, $50, $75, $95. Mean total individual comparisons per participant = 89.68

Manipulations:
- Within: Frame (gains vs. losses) and elicitation target (subjective certainty vs. probability estimates)
- Between: Item type (framing vs. reflection, framing represents true violations of invariance and reflection absolute magnitudes across the reference point).

Measures of Anxiety: Intolerance of Uncertainty Scale (IUS), Behavioral Inhibition/Activation Scale (BIS/BAS)

Introduction

- The risky framing effect is a well-documented bias: People tend to be risk averse for gains and risk seeking for losses.
- De Martino, Kumaran, Seymour, & Dolan (2006) showed neural activity active during frame-consistent decision making was similar to patterns related to anxiety in both frames.
- The present study tests whether measures of anxiety can predict frame-consistent choice patterns, as opposed to generalized risk-aversion.
- Also tested for differences between framing and reflection paradigms.
- Subjective certainty and probability estimation procedures.
- Primary Hypothesis: Anxiety measures will predict more robust frame-consistent choice patterns; greater risk aversion for gains and greater risk seeking for losses.

Effects of Condition and Elicitation Target

Group means for SCE. A significant interaction was detected between EV and Item Type.

Estimated Prospect Theory parameter estimates by elicitation target and condition, where \( \alpha \) = exponential parameter for subjective utility and \( y \) = probability weighting parameter.

Significant interaction between Condition and Frame on \( \alpha \).

Tentative Conclusion: There is a meaningful behavioral difference between framing and reflection, even if general patterns are similar. No effect of elicitation target was detected.

Key Results

<table>
<thead>
<tr>
<th>Interaction</th>
<th>( G^2 )</th>
<th>( p )</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frame x IUS</td>
<td>5.56</td>
<td>.02</td>
</tr>
<tr>
<td>Frame x BIS</td>
<td>1.04</td>
<td>.31</td>
</tr>
<tr>
<td>Frame x BIS x BAS-D</td>
<td>3.91</td>
<td>.05</td>
</tr>
<tr>
<td>Frame x BIS x BAS-F</td>
<td>4.28</td>
<td>.04</td>
</tr>
</tbody>
</table>

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Significant interaction between Condition and Frame on \( \alpha \).

Tentative Conclusion: There is a meaningful behavioral difference between framing and reflection, even if general patterns are similar. No effect of elicitation target was detected.

Intolerance of Uncertainty Scale (IUS), Behavioral Inhibition/Activation Scale (BIS/BAS)

To focus on IUS effects, we fit model including interaction term between Frame, IUS, \( E_r \) and, \( E_{nr} \); interaction was statistically significant \( G^2(1) = 12.01, p < .001 \). Suggests effects of covariates vary across frame by IUS level.

Conclusion: IUS predicts robustness of frame consistency, BIS does not.

Differential Effects of Covariates Across Frame

To focus on IUS effects, we fit model including interaction term between Frame, IUS, \( E_r \) and, \( E_{nr} \); interaction was statistically significant \( G^2(1) = 12.01, p < .001 \). Suggests effects of covariates vary across frame by IUS level.

Model Predictions

Estimated Prospect Theory parameter estimates by elicitation target and condition, where \( \alpha \) = exponential parameter for subjective utility and \( y \) = probability weighting parameter.

Significant interaction between Condition and Frame on \( \alpha \).

Tentative Conclusion: There is a meaningful behavioral difference between framing and reflection, even if general patterns are similar. No effect of elicitation target was detected.

Conclusion: Differential effect of IUS, primarily for gains, where high IUS predicts reflexivity. In loss frame, flat slopes across IUS levels indicate all participants showed high reflexivity. Loss frame may induce anxiety/intolerance of uncertainty.