

Behavioural Responses to Uncertainty: The Relationship Between Intolerance of Uncertainty and Performance on Three Decision-Making Tasks

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Introduction

- ◆ Intolerance of uncertainty (IU) is a dispositional characteristic resulting from negative beliefs about uncertainty over future events (i.e., prospective) and behavioural responses to uncertainty (i.e., inhibitory).
- ◆ IU has been related to several anxiety-related disorders, with theory positing IU as a critical transdiagnostic risk factor. IU has also been associated with a tendency to interpret ambiguous situations as threatening.
- ◆ Most research to date has used self-report measures (e.g., Intolerance of Uncertainty Scale – Short Form [IUS-12]); however, research assessing the relationships between self-reported IU and behavioural responses is relatively sparse.
- ◆ The present study assessed the relationships between self-reported IU and behaviours related to decision-making under uncertainty; specifically, responses to the Wisconsin Card Sorting Task (WCST), the Modified Iowa Gambling Task (MIGT), and the Risky Gains Task (RGT).
- ◆ The hypotheses were as follows:
 - ◆ IU scores were expected to be positively associated with response latency on the WCST and the MIGT.
 - ◆ IU scores were expected to be negatively associated with the number of trials needed to complete the first WCST block.
 - ◆ IU scores were expected to be negatively associated with total scores on the MIGT and the RGT.

Methods

- ◆ Participants included healthy community members ($n = 164$; 68% women; $M_{\text{age}} = 35.09$ years; $SD = 10.28$) who completed the IUS-12 and three behavioural tasks online.
- ◆ The *IUS-12* is a 12-item questionnaire assessing an individual's tendency to consider the possibility of a negative event occurring as unacceptable.
- ◆ The *WCST* is an executive functioning task requiring participants to match a target card to a set of four different cards based on number, shape or color (i.e. categorization rule). The participant is expected to identify the categorization rule and the rule is altered without warning throughout the task (every 10 trials).
- ◆ The *MIGT* is a task designed to simulate decision-making under conditions of uncertainty. The task requires participants to draw cards from four decks of card in an attempt to gather the largest sum of money possible. Each card deck has a different payoff range and a different probability of gains or losses.
- ◆ The *RGT* is a decision task whereby a number of points (i.e., 20, 40, or 80) is presented on a screen and participants have 1 second to choose between terminating or pursuing the trial. Each trial begins with a gain of 20 points, with the possibility of participants winning or losing 40 or 80 points if they elect to continue on. Decision patterns can be used to identify whether participants are risk seeking or risk averse.
- ◆ Pearson correlations were run to assess the relationship between IU and performance on the different tasks.

Results

- ◆ The mean IUS-12 total score for the current sample was $M = 30.71$; $SD = 9.94$. The IUS-12 total score was divided into two subscale scores: prospective IU ($M = 19.91$; $SD = 5.89$) and inhibitory IU ($M = 10.80$; $SD = 4.83$).
- ◆ Preliminary descriptive analyses were used to identify and remove outliers for each variable of interest.
- ◆ There were no robust correlations between scores on the IUS-12 and response latencies on the WCST and the MIGT.
 - ◆ There was a significant negative relationship between inhibitory IU and sum latency on block four of the MIGT ($r = -.20$, $p = .04$).
- ◆ There was no significant relationship between IU scores and the number of trials needed to complete the first block of the WCST ($p > .05$).
- ◆ There was a significant inverse relationship between IUS-12 scores and performance on the MIGT task.
 - ◆ The IUS-12 total score ($r = -.28$, $p < .001$) was negatively associated with total score on the MIGT.
 - ◆ Specifically, both the inhibitory IU ($r = -.23$, $p = .008$), and the prospective IU ($r = -.28$, $p < .001$) scores demonstrated a significant inverse relationship to the MIGT total score.
- ◆ There were no significant relationships between IUS-12 scores and performance on the RGT.

Discussion

- ◆ Contrary to previous research, in the current investigation IU did not appear to be related to response speed on different behavioural tasks involving decision-making under uncertainty.
 - ◆ Participants were community members who were guaranteed compensation regardless of task performance. Accordingly, perceptions of threat and control related to the tasks may have been too minimal to interfere with performance (i.e., speed).
- ◆ In partial support of the hypothesis, higher IU scores were associated with lower overall performance on the MIGT, but not the RGT.
 - ◆ Optimal performance on the MIGT requires reliance on emotional cues. Given the uncertainty inherent in the MIGT, the emotional discomfort associated with increased IU may have impeded performance.
 - ◆ MIGT decisions are assessed by the gain or loss of “money”, whereas risky decisions on the RGT result in the gain or loss of points. Money may have been more personally relevant to participants and have increased the ecological validity associated with the MIGT.
- ◆ Future research should seek to extend the current findings using different methods and different samples.
 - ◆ Relationships between IU and task performance may primarily emerge under conditions of threat.
 - ◆ The use of in lab vs. computer delivered tasks may also influence the level of uncertainty and risk associated with decision-making.

Table 1: Wisconsin Card Sorting Task Correlation Table

	1	2	3	4	5	6	7	8	9	10	11	12
1. IUS-12 Total	-											
2. IUS-12 – Prospective	.94**	-										
3. IUS-12 – Inhibitory	.91**	.72**	-									
4. WCST – Trials Correct	-.12	-.09	-.13	-								
5. WCST – Trials Error	-.03	-.00	-.05	-.25**	-							
6. WCST – Trials Block 1	-.09	-.09	-.06	.11	.11	-						
7. WCST – Lat Block 1	.00	.06	-.06	.26**	.10	.66**	-					
8. WCST – Lat Block 2	.07	.10	.01	.24*	.38**	.09	.27**	-				
9. WCST – Lat Block 3	.08	.12	.02	-.06	.56**	-.09	.02	.33**	-			
10. WCST – Lat Block 4	.20	.19	.17	.34**	.16	.01	.33**	.41**	.27*	-		
11. WCST – Lat Block 5	.03	.11	-.06	.42**	.35**	.10	.33**	.47**	.13	.21	-	
12. WCST – Lat Block 6	.16	.13	.16	.04	.02	-.03	.19	.12	.02	.19	.15	-

Note: IUS-12 – Intolerance of uncertainty scale –short form; WCST – Wisconsin Card Sorting Task; Trials Block 1 – Total number of trials needed to complete the first block; Lat – sum latency; 2-tailed significance; * $p < .05$, ** $p < .01$.

Table 2: Modified Iowa Gambling Task Correlation Table

	1	2	3	4	5	6	7	8	9	10	11	12
1. IUS-12 Total	-											
2. IUS-12 – Prospective	.94**	-										
3. IUS-12 – Inhibitory	.91**	.72**	-									
4. MIGT – % Good play	-.02	-.03	.00	-								
5. MIGT – % Bad play	.06	.05	.05	.85**	-							
6. MIGT – Total score	-.28**	-.28**	-.23*	.37**	-.08	-						
7. MIGT – Lat Block 1	.03	.04	.02	-.21*	-.24*	-.00	-					
8. MIGT – Lat Block 2	-.06	-.03	-.09	-.21*	-.29**	.09	.62**	-				
9. MIGT – Lat Block 3	-.05	-.00	-.10	-.23*	-.31**	.13	.54**	.74**	-			
10. MIGT – Lat Block 4	-.16	-.11	-.20*	-.05	-.18	.34**	.45**	.69**	.80**	-		
11. MIGT – Lat Block 5	-.05	-.05	-.05	.05	-.08	.31**	.38**	.68**	.73**	.85**	-	
12. MIGT – Lat Block 6	-.07	.01	-.15	-.03	-.13	.27**	.35**	.59**	.69**	.78**	.78**	-

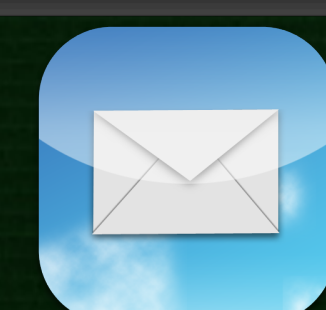
Note: IUS-12 – Intolerance of uncertainty scale –short form; MIGT – Modified Iowa Gambling Task; Good play –plays from the advantageous decks; Bad play – plays from the disadvantageous decks; Lat – sum latency; 2-tailed significance; * $p < .05$, ** $p < .01$.

Table 3: Risky Gains Task Correlation Table

	1	2	3	4	5	6	7	8
1. IUS-12 Total	-							
2. IUS-12 – Prospective	.94**	-						
3. IUS-12 – Inhibitory	.91**	.72**	-					
4. RGT choice – 40	.08	.03	.12	-				
5. RGT choice – 80	.06	-.04	.16	.65**	-			
6. RGT – Total score	.12	.06	.16	.28**	.30**	-		
7. RGT – mean RT 20	-.02	.00	-.04	.27	.25*	.16	-	
8. RGT – mean RT 40	-.06	-.06	-.04	.16	.24*	-.02	.34**	-

Note: IUS-12 – Intolerance of uncertainty scale –short form; RGT – Risky Gains Task; choice – electing to continue on to a higher number; RT – reaction time; 2-tailed significance; * $p < .05$, ** $p < .01$.

For more information about this project please contact the presenting author: sophduranceau@gmail.com



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Poster presented at the 35th Annual Conference of the Anxiety and Depression Association of America, Miami, FL, April 9-12, 2015