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The Relationship Between Gambling Fallacies and Paranormal Beliefs

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Disclosure of Potential Conflicts of Interest

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Gambling Fallacies

- Gambling specific versions of a subset of known cognitive errors that create erroneous beliefs about how gambling works.

  (Leonard, Williams, & Vokey, 2015)

  - Hot hand
  - Monte-Carlo (a.k.a. the Gambler's fallacy)
  - Belief in dispositional luck
  - Illusion of control
  - Insensitivity to sample size
  - Base rate neglect

Gambling Fallacies: Susceptibility

- Gambling Engagement
  (Leonard & Williams, 2016)
- Mathematics and/or Statistical training reduces GF susceptibility
  (Williams, Wood, & Currie, 2010; Williams & Connolly, 2006)
- Cognition & Monte Carlo
  (i.e., Toplak, West, & Stanovich, 2011; West & Stanovich, 2003; West, Toplak, & Stanovich, 2008).
  - Rational cognitive style
  - Greater cognitive ability

Paranormal Belief

- Belief in phenomenon for which there is NO robust scientific evidence
  - Ghost
  - PSI (telekinesis and extrasensory perception)
  - Spiritual healing/ Psychic surgery
  - Astrology
  - Magical powers
  - Demons / demonic possession

Paranormal Belief Susceptibility

- **Lower probabilistic reasoning**

  (Blackmore & Troscianko, 1985; Bressan, 2002; Brotherton & French, 2014, Pennycook, Cheyne, Koehler, & Fugelsang, 2013).
- **Cognitive style**

  (Aarnio & Lindeman, 2005; Gervais, 2015; Gervais & Norenzayan, 2012, Leonard & Williams, 2017).
  - Higher Intuitive
  - Lower Rationality
- **Lower general intelligence**

  (Messer & Griggs, 1989; Musch & Ehrenberg, 2002; Pennycook et al., 2013, Tobacyk, 1984)
- **Lower educational attainment**

  (Aarnio & Lindeman, 2005; Blagrove, French, & Jones, 2006; Otis & Alcock, 1982).
- **Personality**

  (Rattet & Bursik, 2000; Smith, Johnson, & Hathaway, 2009; Thalbourne, 1981; Thalbourne & Haraldsson, 1980; Windholz & Diamant, 1974).
  - Greater Openness
  - Greater Extraversion
  - Greater Neuroticism
- **Demographics**

  (Irwin, 2001; Lange & Thalbourne, 2002; Leonard & Williams, 2017; Messer & Grigs, 1989, Rogers, Qualter, & Wood, 2016).
  - Younger
  - Female

Purpose of the current study

1. To evaluate the relationship between gambling fallacies and paranormal beliefs
2. To assess the susceptibility factors of each fallacious belief type

Sample

- Lethbridge community and university
  - *n* = 266
  - Age 17+
  - 56% Female
  - 73.31% Caucasian
  - Education
    - 22.5% Bachelor's (+)
    - 58.1% Some post-secondary
    - 19.4% High school (-)

Measures

- Gambling Fallacy Measure (GFM) (Leonard, Williams & Vokey, 2015)
  - 10 item multiple choice instrument – higher scores indicate greater resistance to gambling fallacies
  - Good internal consistency & test-retest reliability
  - Good content, convergent, discriminant & external validity

- Revised Paranormal Belief Scale (PBS) (Tobacyk, 2004)
  - 26item instrument with
  - Very good internal consistency and test-retest reliability

Measures

- Number of Gambling Formats (past year)
  - Aggregate measure (0-11)
    - Calculated based on past year participation in lottery tickets; instant win tickets; EGMs; casino table games; games of skill; sports betting; horse or dog racing; high risk stocks, option futures or day trading; internet gambling; and 'any other' forms of gambling
- Gambling Expenditure (past year)
  - Aggregate measure
    - Sum of reported expenditures on each type of gambling for a typical month * 12 months
- Frequency of Gambling (past year)
  - Aggregate measure (0-360)
  - Number of days in a typical month during the past year (capped at 30) * 12 months

Measures

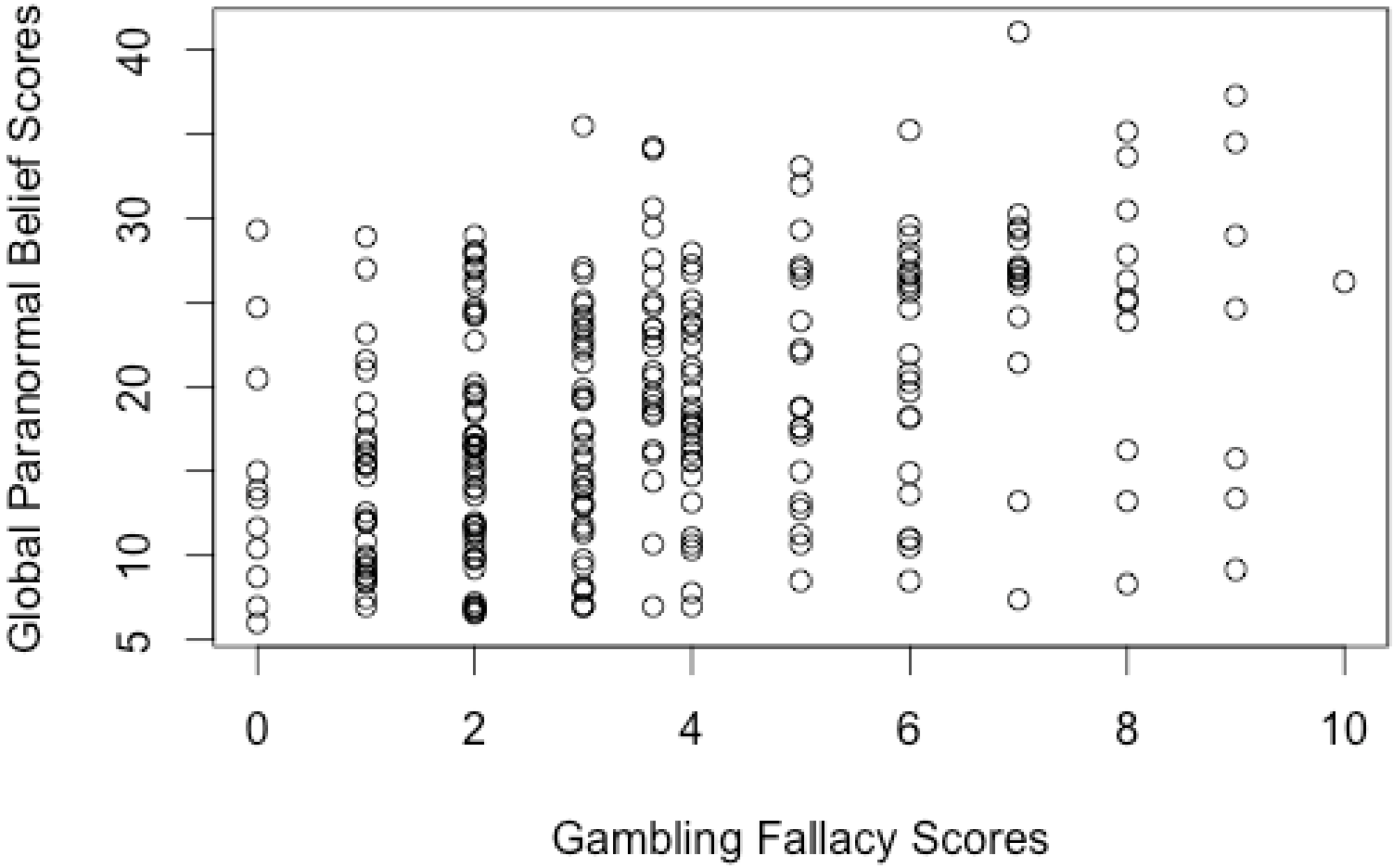
- General Intelligence
  - Raven's Advanced Progressive Matrices
- Cognitive Reflection Test
  - A measure of ability to suppress intuitive thinking
- Rational-Experiential Inventory (REI)
  - Intuitive Cognitive Style
  - Rational Cognitive Style

Measures

- Probabilistic Reasoning
  - Probability maximizing decision strategies
  - Outcome bias
  - Use of large numbers in decision making
  - Regression to the mean
  - Covariation detection
    - POMP scores
- NEO-PI-R
  - Big Five Personality domains & facets
- Demographics
  - Age, gender, educational attainment, ethnicity

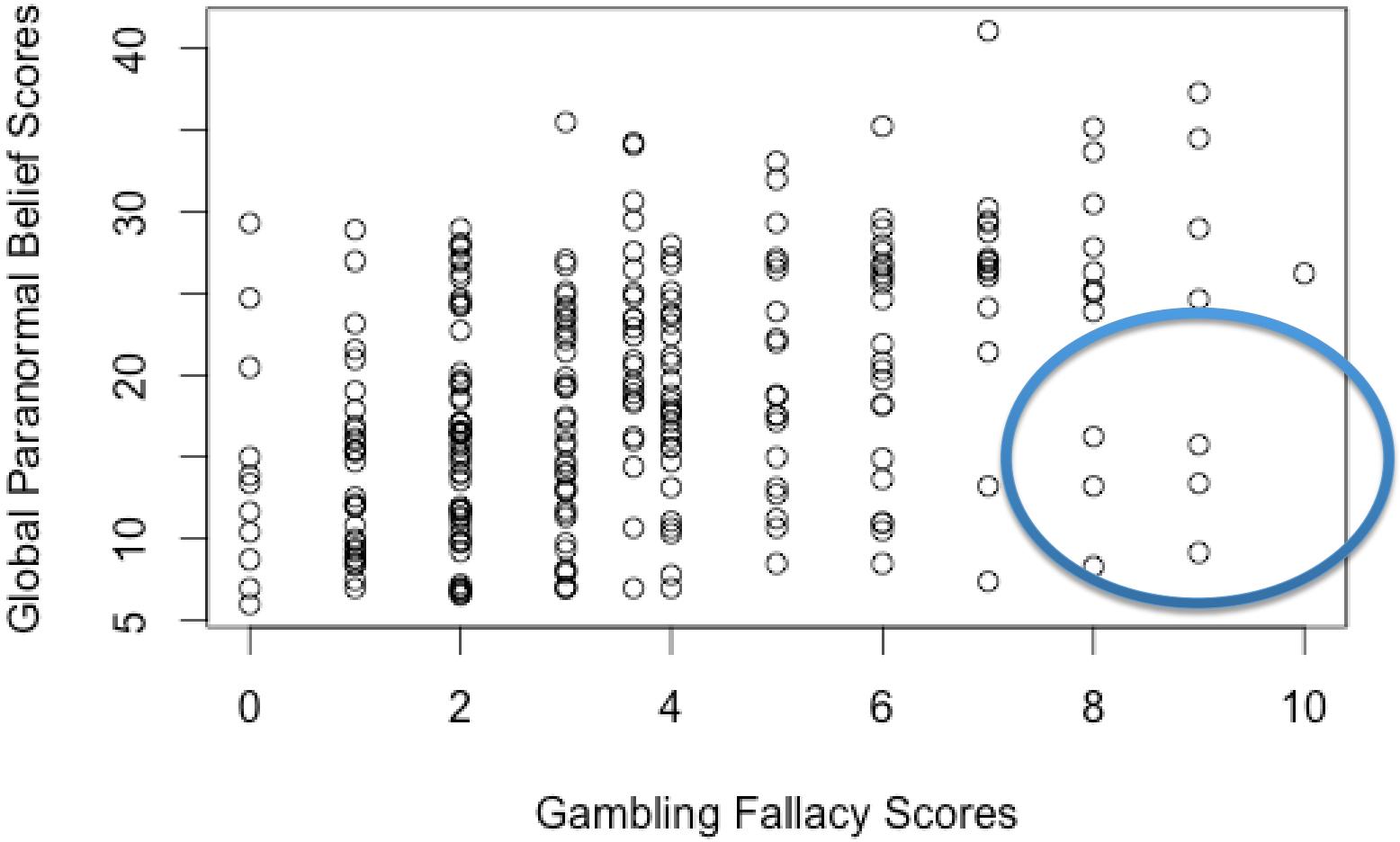
GFM Scores by PBS

$r = .40^{**}$



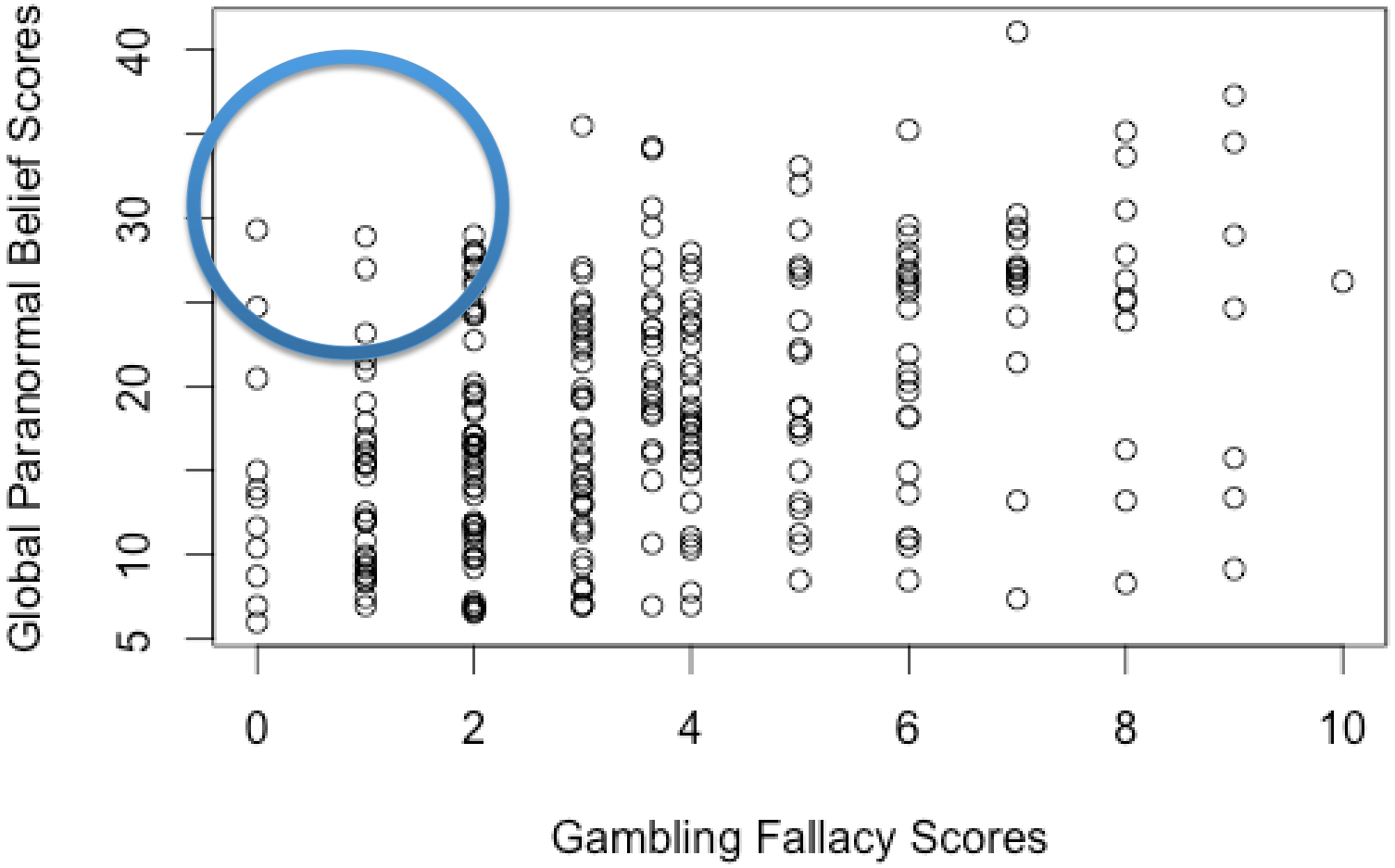
GFM Scores by RPBS

$r = -.40^{**}$



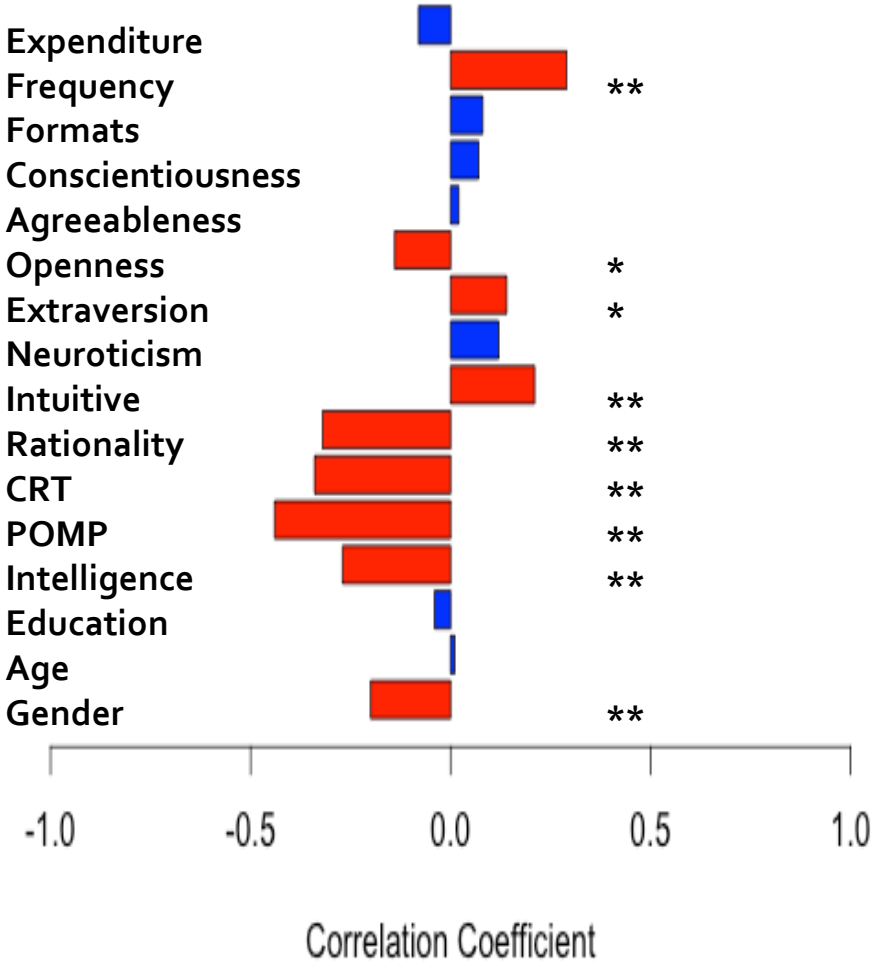
GFM Scores by RPBS

$r = -.40^{**}$

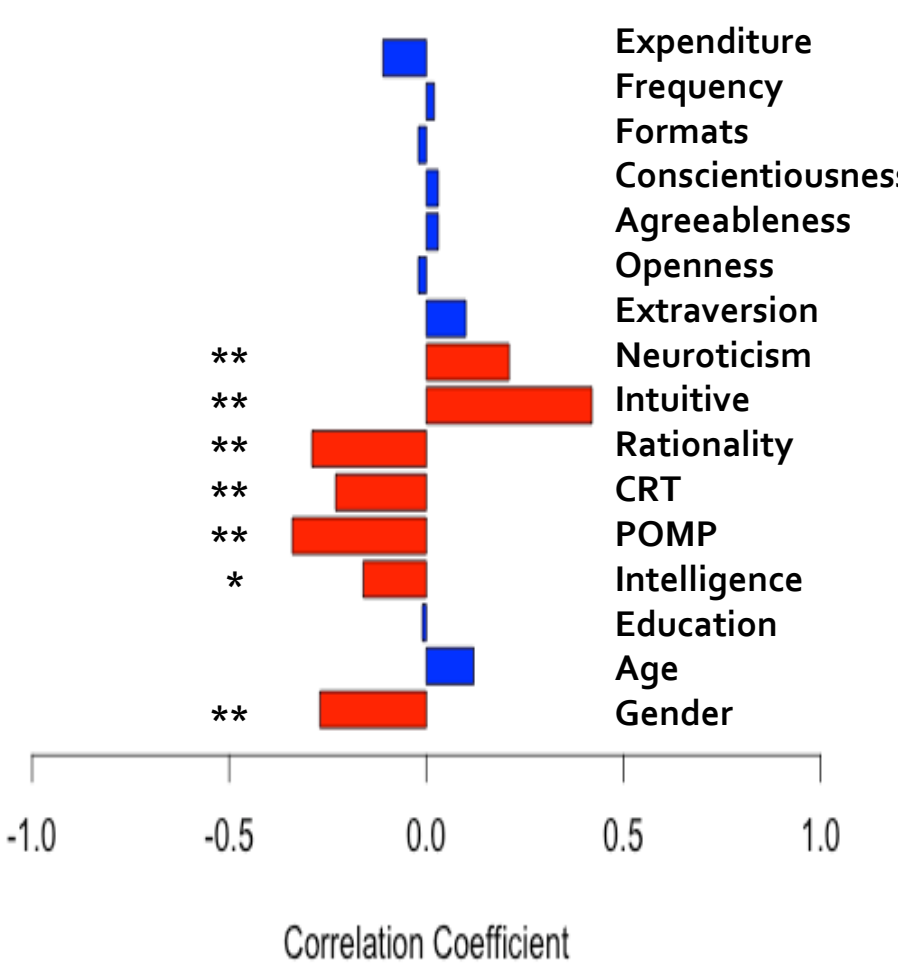


Univariate Results

GFM



PB

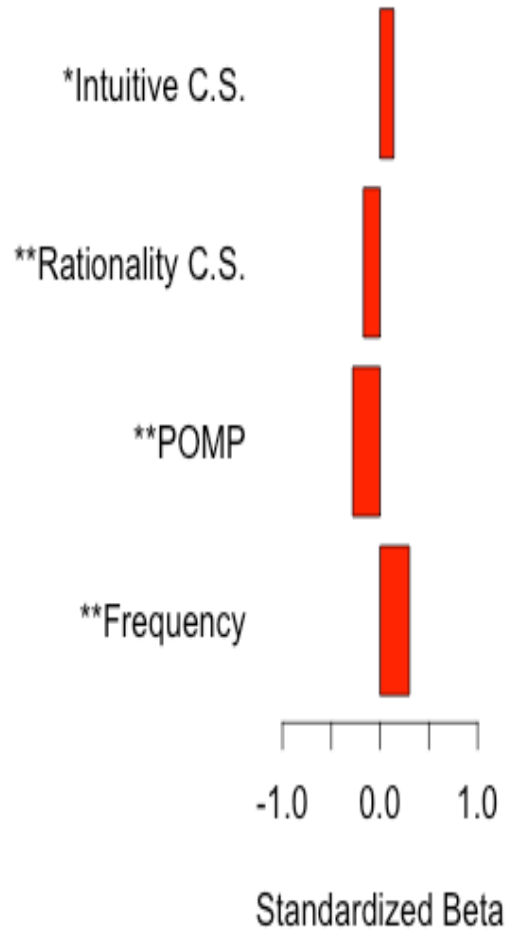


Note: ** p < 0.01; * p < .05. = significant; = non-significant

Multivariate Results

GF

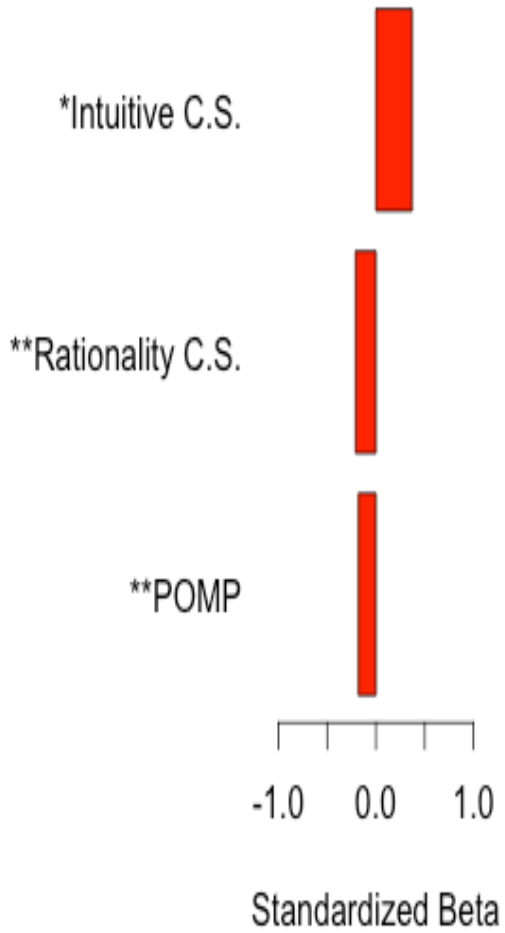
R = .61**, Adjusted R^2 = .34**



Note: ** p < 0.01, * p < .05

PB

R = .57**, Adjusted R^2 = .31**



	GFM	PB
Constant	5.33	13.39
Frequency	.30**	-
POMP	-.28**	-.18**
Rationality	-.17**	-.21**
Intuitive	.14*	.37**
CRT	-.13	-.07
Extraversion	.08	-
Gender	.07	-.08
Intelligence	.04	.02
Neuroticism	-	.06
Openness	.02	-

Note: Standardized Betas

Conclusions

- The association between gambling fallacy susceptibility and paranormal belief is moderately-strong, but not perfect
- Gambling frequency predicts GF
- Cognitive factors play a role in fallacious belief susceptibility
  - Probabilistic reasoning
  - Rational cognitive style
  - Intuitive cognitive style
- Fallacy believers have a similar profile
- Interventions designed to reduce GF should target all susceptibility factors