Exploring the Influence of Personality on Learning Statistics

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Introduction

Statistics is inherently about accepting and quantifying uncertainty and ambiguity in inference and decision making.

However, personality traits like ambiguity tolerance and openness vary among individuals and can affect learning.

Past research highlights how attitudes and anxiety impact statistical understanding, but there's little exploration of how personality traits like ambiguity tolerance and openness influence statistics education outcomes.

Do personality traits impact statistics learning?

Methods

The data from this study was collected using the students from a large introductory level statistics course.
552 participants completed an online survey that had items from the following measures:

- **OCEAN25**: 25-item five factor personality measure (O'Keefe et al., 2012)
- **MSTAT-II:** Multiple Stimulus Types Ambiguity Tolerance Scale (McLain, 2009)
- **STARS:** The Statistics Anxiety Rating Scale (Cruise et al., 1985)
- **SATS:** The Survey of Attitudes Towards Statistics (Schau et al., 1995)
- **GSE:** The General Self-Efficacy Scale (Schwarzer & Jerusalem, 1995)
- **GOALS-S:** The Goal Orientation and Learning Strategies Survey (Dowson, 2004)

Correlational analysis and multiple linear regression was used to analyze the relationships between these constructs and students' performance on a 40-item measure of conceptual knowledge in statistics ($\alpha = .79$).

Results

Which factors explain variability in conceptual knowledge?
Principal component rotation of all personality factors, and multiple linear regression

- Personality Factors: $p < .001$; partial $r^2 = .069$
- Statistics Anxiety: $p = .003$; partial $r^2 = .022$
- Attitudes Towards Statistics: $p < .001$; partial $r^2 = .029$

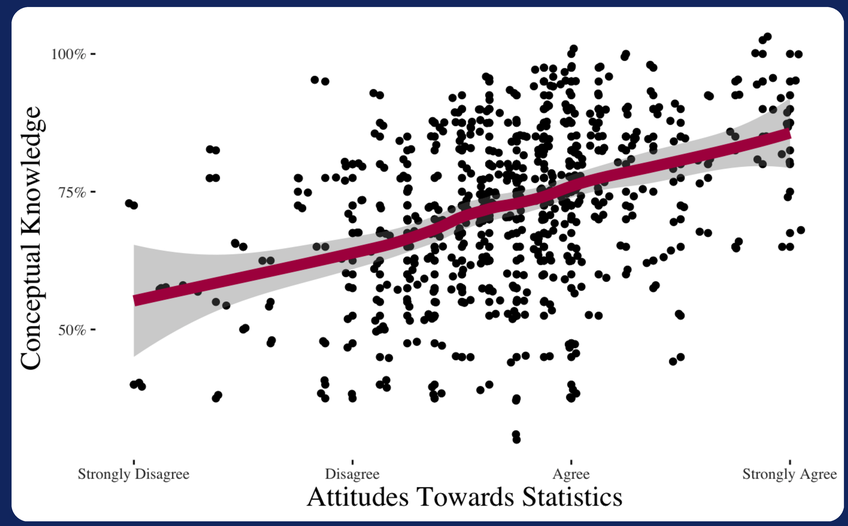
Is Ambiguity Tolerance related to Statistics Anxiety?
Simple linear regression, and correlational analysis

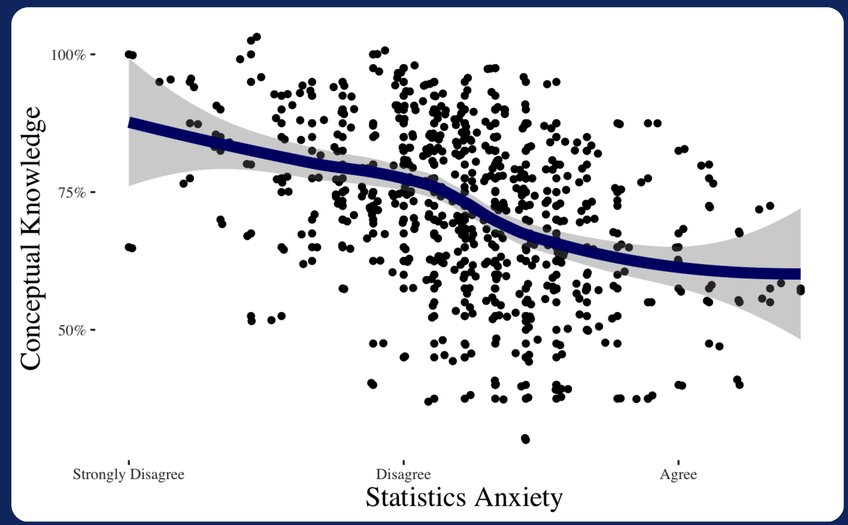
- $p < .001$; partial $r^2 = .068$

Is Ambiguity Tolerance related to Attitudes towards Statistics?
Simple linear regression, and correlational analysis

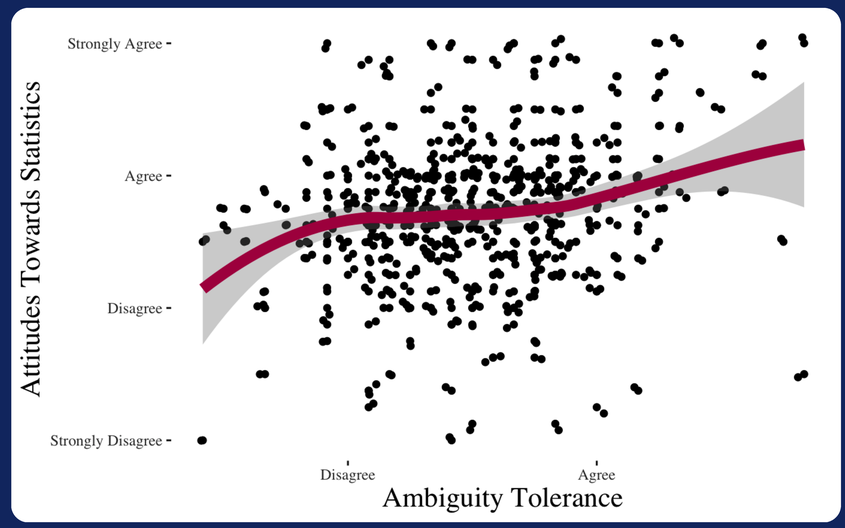
- $p < .001$; partial $r^2 = .037$

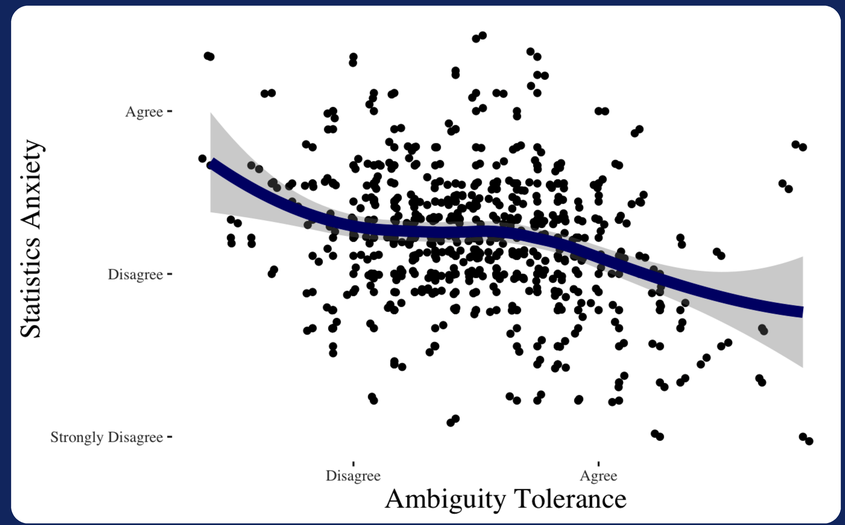
What is related to Statistical Conceptual Knowledge?





Is Ambiguity Tolerance related to Statistics Anxiety and Attitudes?





While statistics anxiety and attitudes towards statistics play a role in developing conceptual knowledge, stable personality factors such as ambiguity tolerance underly their impact on students' learning.