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CAN USING AI TOOLS TO DO STATISTICS BROADEN PARTICIPATION IN STEM?

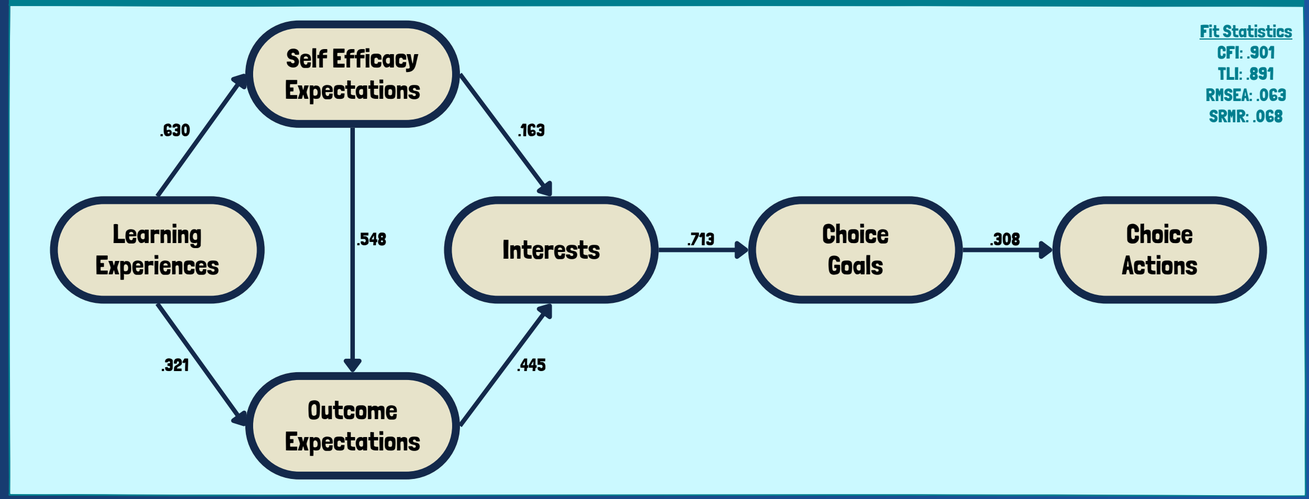
Introduction

- Modern statistics courses often rely on programming to teach data interaction. However, many students struggle with syntax and technical barriers, limiting their engagement with data.
- Generative AI can bridge this gap. With Rtutor.AI, students use plain language to generate code, create plots, and fit models. This interaction mimics the skills of statistical programming, without requiring programming knowledge or experience.
- We frame this work within Social Cognitive Career Theory (SCCT), which models how students make career goals and choices. By understanding how students change over time, we can evaluate whether AI tools like Rtutor.AI can promote deeper engagement and participation in STEM.

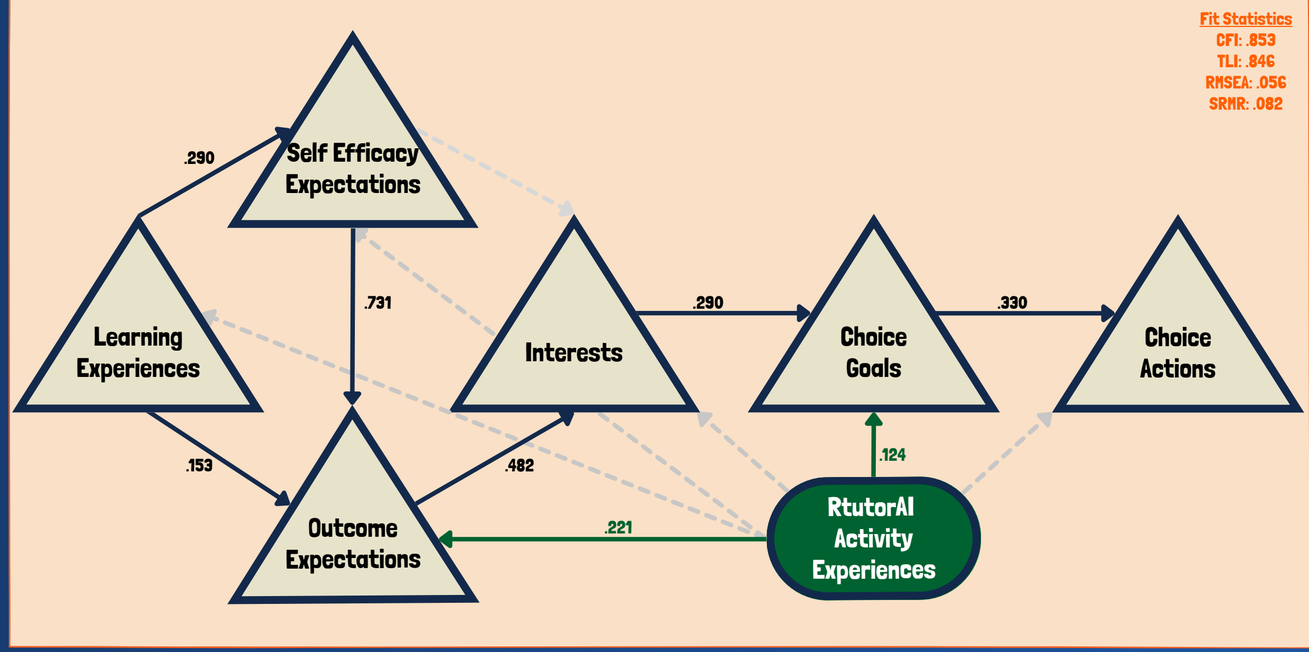
Methods

- Participants: 525 students from an introductory general-education statistics class
  - 292 In-person; 233 Online
  - 67% freshmen, 21% sophomore, 9% junior, 3% senior
  - 22% social sciences; 17% undeclared; 13% physical sciences; 11% business; 9% humanities; 8% agricultural; 5% STEM
  - 36% first generation college student
  - 72% women; 27% men
  - 86% US or Canada High School Graduate
- Tool: Rtutor.AI, a generative AI platform for statistics
- Activities: Students completed nine weekly data assignments utilizing Rtutor.AI to create data visualizations, compute summary statistics, fit statistical models, and produce inferential estimates and tests
- Surveys: Collected at pre-course (T1) and post-course (T2)
- Measure reliabilities
  - Learning Experiences: .879
  - Self Efficacy Expectations: .870
  - Outcome Expectations: .715
  - Interests: .848
  - Choice Goals: .895
  - Choice Actions: .712
  - RtutorAI Activity Experiences: .886
- Analysis: Social Cognitive Career Theory (SCCT) Framework
  - T1: Structural Equation Modeling (SEM)
  - Change at T2: Latent Change Score Modeling (LCSM)

SCCT Framework (T1)



Latent Change Score Model



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