

What Causes The Most Anxiety In An Introductory Statistics Course Interpreting, Asking For Help, Statistics Exams? A Rasch Analysis Of The Statistical Anxiety Scale

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INTRODUCTION

- The purpose of this study is to examine the psychometric properties of the Statistical Anxiety Scale (SAS).
- One of the most popular measures for assessing statistical anxiety (Chew et al., 2018) in addition to examining the situational, dispositional and cognitive antecedents of statistics anxiety (Cui et al., 2019). Vigil-Colet (2008) created the SAS, which is a short form of the STARS.
- There is a gap in the literature in researching statistical anxiety in community college students.
- There is a focus on validating the scale with community college students as well as developing an item hierarchy to understand what items are endorsed by the participants as causing them more anxiety.

METHODS AND MATERIALS

- Community college students (N = 108) who were in an introductory statistics course were given a survey. Average age was 27 years old. The sample included 25.2% males, 73.8% females, and 1% did not respond.

- Participants responded on a 5-point Likert Scale that had a range from 1 (no anxiety) to 5 (considerable anxiety). High scores in each of the three factors, indicated high levels of statistical anxiety in the respective factor.

Screening Measures:

- The SAS is a 24-item measure used to evaluate factors of statistics anxiety. It has three subscales.
 - examination anxiety
 - asking for help anxiety
 - interpretation anxiety
- The Visual Analog Scale (VAS) is used to describe discomfort on the spectrum of anxiety and confidence.

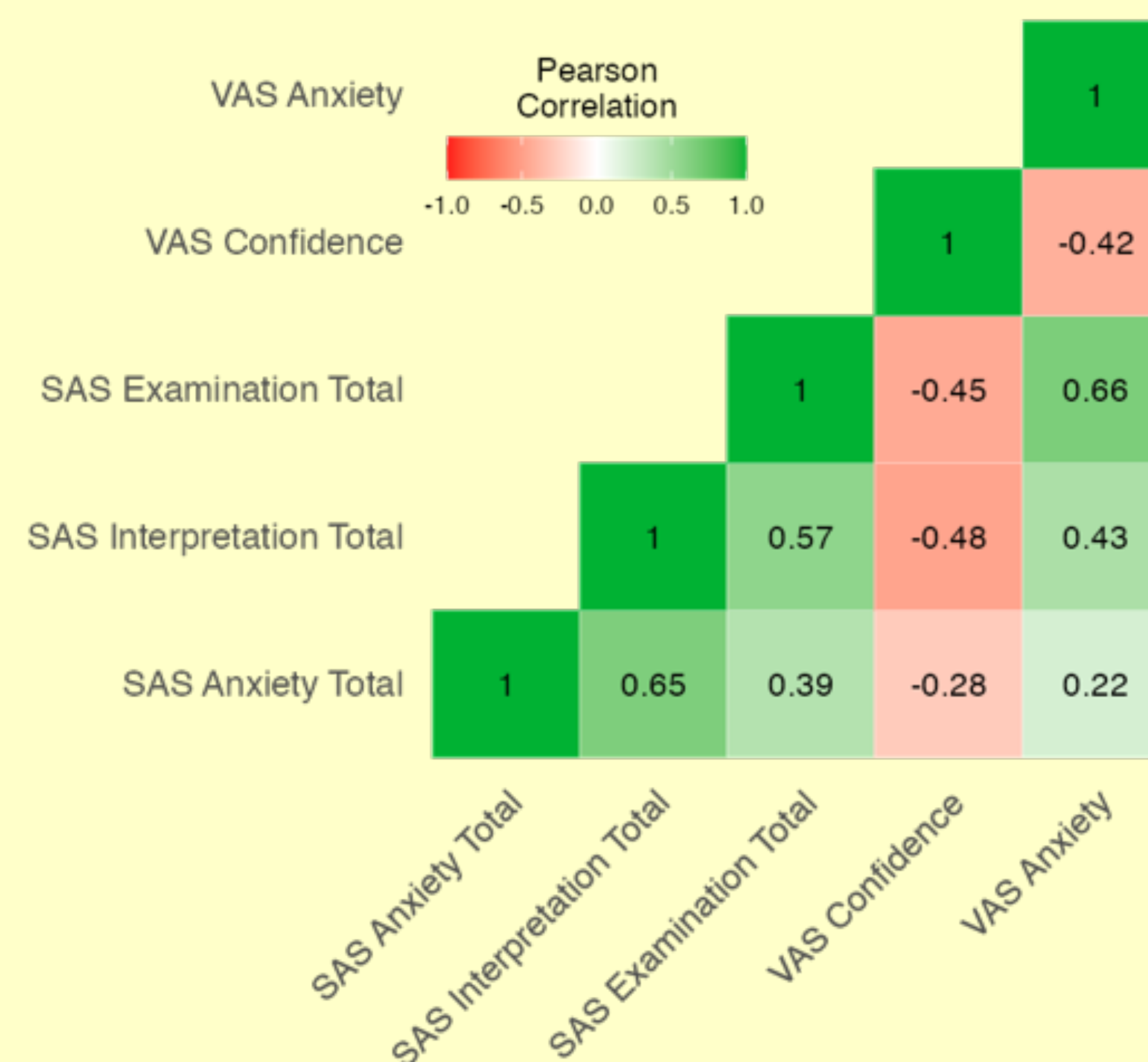
Analysis Strategy

- A Rasch analysis was used to analyze categorical data and a correlation matrix was used to explore validity.

RESULTS

EXAMINATION ANXIETY		ASKING FOR HELP ANXIETY		INTERPRETATION ANXIETY	
14. Waking up in the morning on the day of a statistics test.	0.28	17. Asking one of your teachers for help in understanding a printout.	0.473	19. Seeing a classmate carefully studying the results table of a problem he has solved.	0.274
11. Walking into the classroom to take a statistics test.	0.05	24. Asking a private teacher to tell me how to do an exercise.	0.245	18. Trying to understand the odds in a lottery.	0.166
13. Getting to the day before an exam without having had time to revise the syllabus.	0.03	23. Going to the teacher's office to ask questions.	0.126	10. Reading an advertisement for an automobile which includes figures on gas mileage, compliance with population regulations, etc.	0.150
01. Studying for an examination in a statistics course.	-0.02	21. Asking a teacher for help when trying to interpret a results table.	-0.074	16. Copying a mathematical demonstration from the blackboard while the teacher is explaining it.	0.089
15. Realizing, just before you go into the exam, that I have not prepared a particular exercise.	-0.02	03. Going to ask my statistics teacher for individual help with material I am having difficulty understanding.	-0.081	06. Reading a journal article that includes some statistical analyses.	0.035
09. Doing the final examination in a statistics course.	-0.03	07. Asking the teacher how to use a probability table.	-0.128	02. Interpreting the meaning of a table in a journal article.	-0.220
20. Going to a statistics exam without having had enough time to revise.	-0.14	12. Asking the teacher about how to do an exercise.	-0.133	08. Trying to understand a mathematical demonstration.	-0.220
04. Realizing the day before an exam that I cannot do some problems that I thought were going to be easy.	-0.16	05. Asking a private teacher to explain a topic that I have not understood at all.	-0.427	22. Trying to understand the statistical analyses described in the abstract of a journal article.	-0.275

- A principal component analysis was applied to the items and showed the three dimensions of the scale. The scores of the subscales all had good reliability: examination anxiety ($\alpha=.88$), asking for help anxiety ($\alpha=.96$), and interpretation anxiety ($\alpha=.89$).
- Through Rasch analysis is a psychometric procedure through which we obtained an item hierarchy for the three scales.
- This item hierarchy can be interpreted as z-scores. Items further away from zero are interpreted as more difficult/easy to endorse depending on direction.
- This hierarchy reveals the items the community college students were more hesitant to endorse (cause the most anxiety) and the items that were easy to endorse (did not cause anxiety).



CONCLUSION

- Items that caused the most anxiety for each of the three subscales were: fear of asking a private tutor for help, understanding the statistical analyses described in the abstract of a journal article, and realizing too late they cannot do the problems
- The SAS scores were found to be valid and reliable with a community college student population.
- Examining the psychometric properties and validity the CSSE, and SAS with a population of community college students can be useful to community college educators who can use the measure to gauge the confidence in the students learning the topics as well as their anxiety in their classroom.
- In addition to allocating teaching resources and course preparation time.

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