MEASURING STATISTICS ANXIETY AND RELATED CONCEPTS: VALIDATION OF THE STATISTICS ANXIETY SCALE

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INTRODUCTION

The emphasis on data and its understanding in the 21st century has made statistics an essential component in all areas of life (Cox & Efron, 2017). To adequately prepare students for this demand statistics education has expanded in high schools and even more so in colleges. Students however often react with fear and anxiety when confronted with statistics (Onwuegbuzie & Wilson, 2003).

STATISTICS ANXIETY AND RELATED CONCEPTS

In the present study, we examined Statistics Anxiety in a sample of 275 and found that, in our well-fitting structural equation model, Mathematics Anxiety predicted Statistics Anxiety (β = .76, SE = .04, p < .05) while both Statistics Anxiety (β = .12, SE = .01, p < .05) and Statistics Attitudes (β = .22, SE = .01, p < .05) predicted grades. Moreso, Statistics Anxiety also had an effect on grades through Statistics Attitudes (β = -.38, SE = .02, p < .05). Our results also indicated that Statistics Anxiety is a unique concept, although there is an overlap with other anxiety-related constructs, therefore, it should be evaluated independently.

MEASURING STATISTICS ANXIETY

The only assessment specific to Statistics Anxiety is the Statistics Anxiety Scale (SAS; Vigil-Colet et al., 2008). The SAS consists of three different subscales (Interpretation Anxiety, Examination Anxiety, and Fear of Asking for Help). We found that the SAS displayed good convergent validity (r = .57) but was not able to discriminate between Statistics Anxiety and Mathematics Anxiety (r = .70). We also modeled the originally proposed three-factor (χ^2(249, N = 275) = 727.59, p < .01, CFI = .89, RMSEA = .08, SRMR = .06, AIC = 16054.78, BIC = 16324.66) and proposed two additional models in which, based on item content, the Interpretation Anxiety subscale was split into two different scales. In one of our models, the four factors were correlated with each other(χ^2(261, N = 275) = 190.40, p < .01, CFI = .96, RMSEA = .08, SRMR = .04, AIC = 9158.52, BIC = 9313.25) and in the second we generated a second-order model where the four factors loaded onto the higher-order factor of Statistics Anxiety (χ^2(243, N = 275) = 593.56, p < .01, CFI = .92, RMSEA = .07, SRMR = .06, AIC = 15932.74, BIC = 16224.22). The best fitting and least parsimonious model was the four-factor correlated model.

CONCLUSION

Although Statistics Anxiety affects performance in classes, measures to assess this construct have not been well validated. In this study, we provided support for the effect of Statistics Anxiety on grades and showed how the concept is related to, although independent of, other constructs such as Statistics Attitude, and Mathematics Attitude. We also demonstrated the unclear factor structure of the only measure, the SAS, which assesses Statistics Anxiety independently. These results underline the need for the construction of accurate measures for the assessment of Statistics Anxiety.

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