DEVELOPMENT OF STATISTICAL LITERACY IN UNDERGRADUATE STUDENTS

Diana Keosayian and Elizabeth Johnson
Wilkes University, Wilkes-Barre PA
George Mason University, Fairfax VA
diana.keosayian@wilkes.edu

INTRODUCTION

Being statistically literate enables an individual to "consume and critically digest the wealth of information being produced in today's society" (Rumsey, 2002). Recent modifications to this definition reflect the growing belief that statistical literacy extends beyond quantitative literacy or numeracy and includes the ability to read, interpret, and communicate using data. This has led to reforms in the method of teaching undergraduate statistics classes (Cobb, 1992; GAISE Report 2005). Research on statistics education has revealed that statistical anxiety has not only been linked to the interpretation of data (Balaglu, 1999), but may be more closely related to verbal reasoning than to mathematical logic (Zerbolio, 1999). Although this connection has been made, minimal research has been directed toward how verbal reasoning impacts statistical anxiety and statistical literacy skills among undergraduate college-level students (Collins & Onwuegbuzie, 2002).

METHOD

This pilot study seeks to examine the relationships between verbal reasoning, statistical anxiety, and statistical literacy. Students enrolled in undergraduate statistics classes at a Northeastern U.S. university were evaluated on their statistical literacy skills and level of statistics anxiety during the first week of a semester. To determine their high school academic backgrounds, students were asked about any prior Statistics classes, their SAT critical reading score and the number and type of any Advanced Placement courses attempted. Next, they completed a variety of assignments designed to assess their ability to interpret and evaluate data. Their verbal reasoning skills were measured using a performance assessment item, which was graded with a rubric developed to evaluate their ability to interpret a graphical display. Statistical literacy was measured with selected items from Schield's (2008) Statistical Literacy Skills Survey. Finally, statistical anxiety levels were assessed via two subscales of the Statistical Anxiety Rating Scale (STARS): worth of statistics and interpretation anxiety (Cash, Cruise & Bolton, 1985).

REFERENCES

Balaglu, M. (1999). A comparison of mathematics anxiety and statistics anxiety in relation to general anxiety. *Eric Document Reproduction Service No. 436703*.

Cash, R. W., Cruise, R.J., and Bolton, D. L. (1985). *Development and validation of an instrument to measure statistical anxiety.* Paper presented at the annual meeting of the Statistical Education Section. Proceedings of the American Statistical Association.

Cobb, G. (1992). "Teaching Statistics," in *Heeding the Call for Change*, ed. L. Steen, MAA Notes No. 22, Washington: Mathematical Association of American, 3-34.

Collins, K. M. T., and Onwuegbuzie, A. J. (2002, April). *Relationship between reading ability and achievement in a graduate-level research methodology course.* Paper presented at the annual meeting of the American Educational Research Association, New Orleans, LA.

GAISE College Report (2005) <http://www.amstat.org/education/gaise/GAISECollege.htm

Rumsey, D. J. (2002). Statistical literacy as a goal for introductory statistics courses. *Journal of Statistics Education, 10*(3).

Schield, M, (2008). Statistical Literacy Skills Survey. Project Kaleidoscope and Project Quirk.

Zerbolio, D.J. (1999). A bag of tricks for teaching about sampling distributions. In M.E. Ware and C.L. Brewer (Eds.) *Handbook for Teaching Statistics and Research Methods (*2nd ed.). New Jersey: Lawrence Erlbaum Associates.