**Research Article Critique: Worry, Intolerance of Uncertainty, and Statistics Anxiety**

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# Introduction

Williams’ article takes as its focus the relationships between intolerance of uncertainty, worry, and the various types of anxiety graduate students experience associated with statistics courses. This anxiety, which leads, she says, following the literature on the subject, to the students putting off taking statistics courses for as long as possible, can be defined as “a feeling of anxiety when taking a statistics course or doing statistical analysis; that is gathering, processing, and interpreting data” (Williams, p. 48). Taking graduate students from three sections of an introductory statistics course at a large public university, her strategy was to conduct a pair of surveys, one at the start of the semester, the pretest, and one at the end, posttest. The responses were then evaluated through statistical analysis to respond to her three hypotheses: “intolerance of uncertainty is significantly correlated with worry in statistics students at pretest; worry is significantly correlated with six types of statistics anxiety at pretest; and student levels of intolerance of uncertainty, worry, and statistics anxiety will be significantly reduced from pretest to posttest” (Williams, p. 52).

# Review

**Literature Review**

William’s does a good job of presenting the purpose of her research. To reiterate, the purpose of the research is to establish the relationship between intolerance of uncertainty, worry, and statistics anxiety, each of which is laid out in detail by the author. She even goes so far, in an in depth literature review, as to define the six established forms of statistics anxiety: worth of statistics; interpretation anxiety; test and class anxiety; computation self-concept; fear of asking for help; and fear of statistics teachers. Each of these is evaluated in the pre- and posttest.

We are then presented with a brief look at worry and anxiety in one section, and worry, anxiety, and intolerance of uncertainty in another. All of this before even mentioning the purpose behind the present study or the hypotheses. As such, when the time does come to delve into the mechanics of her project, readers can be comfortable in their grasp of the relevant concepts being examined.

In measuring intolerance of uncertainty, worry, and anxiety, the author made use of the Intolerance of Uncertainty Scale-12, the Penn State Worry Questionnaire,and Statistics Anxiety Rating Scale respectively, all of which are inclusive assessments, and have been broadly explained in the article, giving readers a good impression of their use and legitimacy.

It came as a relief that Williams saw fit to go into such detail regarding all of the above, particularly statistics anxiety, which made up the largest single section of the article. All the nuances which go into recognizing and defining such things as anxiety (and such a particular instance of anxiety at that), worry, and intolerance (such a particular instance of intolerance), is somewhat daunting, and so to be presented with such a well rounded overview makes understanding what comes later, and appreciating and relating to it, all from the perspective of a student, all the easier.

**Procedure and Discussion**

When it comes to the actual mechanics of the study, Williams’ paper falls somewhat short, though not too far, as the results and discussion together make up the shortest portion of the article. This is not altogether unexpected, as it tends to be the case that a more in-depth setup is required when presenting such a specific study as this. Of course not all readers are going to be as familiar with such concepts as intolerance of uncertainty, and the six forms of statistics anxiety as they are, oor may be expected to be, with statistical methods. And so, the relative lack of detailed explanation of the tables of numbers and figures included in these final pages is forgivable, if not still somewhat unfortunate.

Naturally, this sort of thing might be expected when considering that this is research aimed specifically at those who would be expected to have a firm enough grasp of statistical analyses, and ought to be able to take a great deal of information from the tables included. Williams only includes two here, but they do a fair enough job of conveying the necessary information. Text might do a better job for some readers, but this complaint is hardly detractive on the whole. It is more of an ease of access complaint. But a paper can only be so long, and so technical, before it begins to drag and grow thin, so, in the end, perhaps, the result is for the better.

With this, an admirable amount of work went into describing events in as much detail as possible, without dragging it out too far beyond readers’ degree of patience. Readers are clearly told what is being looked into and how each factor relates to some other, and the dependent and independent variables are clear and reasonable. And the final discussion of the study itself was clear, and gave an honest account of the studies successes and failures, pointing to the hypotheses which were supported, as well as those that were not, and recognizing the potential danger of generalizing from the presented results.

**Conclusion**

A final point which stands mentioning here is the uncertainty regarding the legitimacy of surveying students. One might wonder about the authenticity of the self report—the very fact that the students’ attitudes towards the subject skewing in some way their ability to impartially convey their true feelings, both before and after. That being said, that the results were not entirely supportive of the hypotheses, namely that intolerance of uncertainty and worry were not significantly lowered, and only three of the types of anxiety studied had a strong correlation to worry, as opposed to the predicted six, suggests that there is at least some reason for comfort regarding the results.

So, in the final analysis, the research presented here seems sound and legitimate. Williams is clearly an efficient researcher and scholar. The review portion of her article is certainly more in depth than the sections describing the actual study and its results, yet said results are nonetheless made clear through the use of accurate and concise tables which convey the relevant data, though a better overview of them in the text itself may be desirable for some readers. But none can claim to be lost as to what exactly is being examined and how it will be. There is no shortage of information regarding the precise forms of statistics anxiety, the relevant mechanics of worry, or the modes of “intolerance of uncertainty.” The instruments used, such as they are, are similarly well defined, so there can be no question there, either, regardless of one’s desire for a more detailed look at them in the exact instances of their use. The overall effort and result was a clearer and informative research article.

It’s difficult to say what ought to be changed, as the critiques I presented here each come with their own caveats. What other method beyond survey can properly relate a student’s experience of worry, anxiety, and intolerance? Unfortunately the very nature of the topic makes some of its shortcomings inevitable. Introspection, even in psychology, has always been viewed somewhat skeptically. So too for the very nature of statistical analysis. Are there better methods? I might,in the future, consider making use of Bayesian methods, for example. But of course, Williams does well to curb any overvaluation of the significance of the research she has done, although this caution may be sidestepped by making use of more efficient methods, should they exist.

So, again, overall what has been presented is simply good research. Or as good as one might expect research of its kind to be within the current parameters of what is doable, or what is widely done and known, within the realm of statistics. Do not take it at face value, and certainly continue to carry out further research (an example of which Williams’ happens to be), but it is a good step in that process.

**References**

Williams, A. S. (2013). Worry, intolerance of uncertainty, and statistics anxiety. *Statistics*

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