A FALLACY IN STUDENT ATTITUDE RESEARCH:
THE IMPACT OF THE FIRST CLASS

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Student attitudes have been shown to be an important measure in short-term learning and long-term retention of material. However, instruments like the Survey of Attitudes Toward Statistics (SATS) fail to show an increase in student attitudes over time. Most researchers give students the test after the first week of classes, not recognizing the impacts of the first class or first few classes on students' attitudes and first impression. This study quantifies the impact of the first class on student attitudes, using a randomized trial design where half of the students in each class take the SATS before and half after the first class, on almost 500 students who studied statistics in different areas or contexts. Preliminary results are included here. Additional results will be discussed during the presentation.

This paper presents an overview of the study. The complete manuscript for this study is under review elsewhere.

BACKGROUND

Student attitudes have been shown to be an important measure in short-term learning and long-term retention of material (VanHoof et al., 2006) and student behavior (Aiken, 2002). Gal and Ginsburg (1994) and Garfield et al. (2002) affirm the role of statistics attitudes in assessing the effectiveness of pedagogy.

The goal of this study is to establish the impact of the first class on student attitudes.

METHODS

Instructors of introductory statistics courses at one University were invited to participate in the study. Students were randomized to take the Survey of Attitudes Towards Statistics (SATS) before or after first class. The surveys were taken via Surveymonkey, and reminder emails were sent to students who did not respond after a first attempt.

The SATS is a well-validated and frequently used instrument to measure student's attitudes towards statistics. It was developed by Schau et al. (1995). There are six subscales:

- Affect – "I Like Statistics"
- Cognitive Competence – "I Understand Statistics"
- Value – "Statistics is Important"
- Difficulty – "Statistics is Hard" (higher # is easier)
- Interest – "I am Interested in Statistics"
- Effort – "I Will Work (or Worked) Hard"

The impact of the first class on student attitudes was quantified in our study by comparing the average score before the first class with the average score after the first class. The difference between these two measures is the estimated impact of the first class.

RESULTS

Table 1 presents demographics of the students who participated. Table 2 presents the pre and post averages, as well as the estimated increase due to the first class.

Table 1: Demographics Overall and By Course

Time	Pre	Post
# sections	32	
# randomized	436	422
# incorrect time	109	1
# Excluding incorrect	337	421
# (%) response	192 (57%)	179 (43%)
Gender (%Male)	52%	45%
Class Year		
Freshman	**75%**	**65%**
Sophomore	11%	12%
Junior	9%	14%
Senior	5%	9%
Race		
White	**81%**	**82%**
Black	4%	2%
Hispanic	4%	4%
Other	11%	12%
Major		
Arts	2%	3%
Business	67%	52%
Communication	1%	5%
Comp Science	0%	2%
Engineering	5%	5%
Mathematics	5%	10%
Nursing	4%	5%
Science	9%	12%
Social Science	3%	4%
Undeclared	4%	2%
Previous Stat	32%	42%

Table 2. Results by SATS Subscale

	OVERALL		
Time	**Pre (std)**	**Post (std)**	**Incr (p-val)**
Affect	**4.51 (1.13)**	**4.76 (1.20)**	**0.25 (0.042)**
Cognitive Competence	**5.30 (0.97)**	**5.51 (1.03)**	**0.22 (0.045)**
Value	**5.32 (0.87)**	**5.46 (0.93)**	**0.13 (0.139)**
Difficulty	**3.63 (0.72)**	**3.97 (0.87)**	**0.34 (<0.001)**
Interest	**5.02 (1.23)**	**4.94 (1.23)**	**-0.08 (0.545)**
Effort	**6.56 (0.58)**	**6.42 (0.85)**	**-0.14 (0.084)**

From Table 2, we see that the student average increased in terms of how much they liked statistics (Affect), felt they understood about statistics (Cognitive Competence) and anticipated ease of the course (Difficulty, where higher scores actually mean students find it easier). Future publications will apply these results to published results from other studies to examine the fallacy of the impact of teaching on student attitudes.

DISCUSSION

It appears that the first day of class affects student attitudes. Often, researchers exclude the impact of the first day, as surveys are given only after the first encounter between teacher and student. This leads to incorrect conclusions, including some studies not being published since a smaller, not statistically significant result is observed. In truth, however, the student's attitudes may have changed. There is a lot of variation in how much change occurred by instructor (results not shown here). Some research questions might wish to focus on what happens during the semester and not on the first day, in which case the results of this study are irrelevant.

FUTURE RESEARCH

Future research will use these data to compare attitudes with content learning as well as examine the relationship between student attitudes and long-term retention. Other future work will examine the differences in instruction that lead to changes in attitudes on the first day and throughout the semester.

REFERENCES

Aiken, L. R. (2002). *Attitudes and related psychosocial constructs: Theories, assessment and research*. Thousand Oaks, CA: Sage Publications.

Gal, I., & Ginsburg, L. (1994). The role of beliefs and attitudes in learning statistics: Towards an assessment framework. *Journal of Statistics Education, 2*(2).

Garfield, J., Hogg, B., Schau, C., & Whittinghill, D. (2002). First courses in statistical science: The status of educational reform. *Journal of Statistics Education, 10*(2).

Schau, C., Stevens, J., Dauphinee, T. L., & Del Vecchio, A. (1995). The development and validation of the Survey of Attitudes Toward Statistics. *Educational and Psychological Measurement, 55,* 868-875.

Vanhoof, S., Sotos, A.E.C., Onghena, P., Verschaffel, L., Van Dooren, W., & Van den Noorgate, W. (2006). Attitudes toward statistics and their relationship with short- and long-term exam results. *Journal of Statistics Education, 14*(3).