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Internal and External Comments on Course Evaluations and Their Relationship to Course Grades

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Abstract: *The validity of student evaluations of courses and the relationship between evaluations and course outcomes has frequently been examined. Since many course evaluations give students an opportunity to provide answers to open-ended questions in addition to giving Likert scale ratings, it is important to understand the relationship between these responses and course outcomes. This study examined the relationship between student responses to open ended questions (specifically whether they attributed their achievement to factors within their control or factors not within their control) and their outcomes in the course. The results of the study indicate that students that identified external factors (e.g. the professor) as responsible for their success in the course had significantly higher course outcomes than students that identified external factors as responsible for their failure in the course. No differences were detected in course outcomes for students that made external comments on their course evaluations versus those that made internal comments.*

Keywords: course evaluations; course grades; evaluation; Likert scale; open ended questions; student achievement; student failure; student failure;

Introduction

A person's locus of control refers to the beliefs they hold about the relationship between their actions and outcomes (Lefcourt, 1991). Locus of control can be internal or external to the person in question. An individual with an internal locus of control will typically perceive their successes and failures as a result of their own actions, while an individual with an external locus of control will typically ascribe their successes and failures to factors like luck or a powerful other (Lefcourt, 1991). Research has indicated that an individual's beliefs about the locus of control can vary based upon the context examined

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and that the locus of control in one context may not relate to attitudes and/or behaviors in a different context. Ang and Chang (1999) looked at an individual's perception of locus of control for social outcomes and outcomes on particular tasks and the relationship of the locus of control in both areas to their individual goals. The results of the study indicated that participants' internal and external locus of control for particular tasks were predictive of their achievement goals, but not their social goals. Similarly, participants' internal and external locus of control for social outcomes were predictive of their social goals, but not their achievement goals. This suggests that an individual's locus of control in a specific area is related to their goals and/or behaviors in that area, but not in other areas.

Thus, locus of control scales specific to a variety of contexts such as health contexts (Hill & Bale, 1980; Wallston & Wallston, 1981), professional contexts (Spector, 1988), and academic contexts (Crandall, Katkovsky, & Crandall, 1965) have been developed. An individual's beliefs about the causes of outcomes in their lives are often neither entirely internal nor entirely external, so locus of control scales typically measure an individual's locus of control on a continuum. One end of the continuum represents an individual with a wholly internal locus of control and the other end an individual with a wholly external locus of control. Previous research has examined the relationship between internal locus of control and positive health behaviors (Graffeo & Silvestri, 2006), lower levels of depression (Njus & Brockway, 1999), and increased self-esteem (Chubb, Fertman, & Ross, 1997).

In academic situations, locus of control is related to student perceptions and beliefs. In an examination of approximately a hundred pre-service teachers, Akinsola (2008) discovered that participants' locus of control was related to their perceptions of their competence and attitudes towards problem solving. Participants in the study with an internal locus of control perceived that they were more competent in problem solving than students with an external locus of control. An individual's beliefs about the locus of control in academic situations can also affect their perceptions of the roles of student and professor in the classroom. In a case study of four college students, Wang (2005) found that two students with a highly internal locus of control felt personally responsible for their learning in the course. In their comments, they blamed their own behaviors or beliefs for their difficulties in the course. In contrast, the students with a highly external locus of control felt the instructor was primarily responsible for making sure that learning would occur in the course. Both of the external students blamed the instructor when they did not understand aspects of the course or the material.

Internal locus of control has also been shown to be related to positive academic behaviors like increased effort (Carbonaro, 2005) and better use of particular learning strategies (Kesici, Sahin, & Aktruk, 2009). Students with an external locus of control believe that course outcomes will be affected most by external factors, thus there is little reward for extra effort. Students with an internal locus of control, however, believe that course outcomes can be changed by hard work or seeking out help and will therefore be more likely to put in additional effort (Hunter & Barker, 1987).

Based on the relationship between locus of control and academic behaviors it is not surprising that locus of control is also related to academic outcomes. Flouri (2006) found that a more internal locus of control at age 10 was related to higher educational attainment at age 26. Nordstrom and Segrist (2009) found that students with a more internal locus of control were more likely to intend to enroll in graduate school than students with an external locus of control. In a study of approximately 3,000 freshmen college students, Gifford, Briceño-Perriott, and Mianzo (2006) found that locus of control was a significant predictor of cumulative college GPA. Freshman that were classified as having a more internal locus of control had a significantly higher GPA than those students classified as having a more external locus of control. Similar findings have resulted from studies by Wood, Saylor, and Cohen (2009) and Agnew, Slate, Jones, and Agnew (1993).

The purpose of this study was to examine the relationship between what factors (internal versus external) students identify as contributing to their achievement in an introductory mathematics course and their course outcomes.

Student ratings on evaluations have been shown to be related to a variety of course and instructor variables. For instance, instructors of science courses receive lower course evaluations than instructors of humanities courses (Marsh & Roche, 1997) and instructors with small enrollments tend to receive better evaluations than instructors of classes with larger enrollments (Liaw & Goh, 2004). Based on these results, it would be expected that student variables like locus of control would influence course ratings as well.

A study by Grimes, Millea, and Woodruff (2004) examined the relationship between course evaluations and locus of control, in a macroeconomics course. Students' locus of control was measured using Rotter's I-E scale. Then each student completed an evaluation of the course. Students were asked to evaluate their learning, the course, and the instructor with responses to Likert scale questions. In this study, students with a highly internal locus of control were more likely to give the instructor a positive rating than students with an external locus of control.

Ramanaiah and Adams (1981) examined the relationship between expected grade in the course and course evaluation ratings for approximately two hundred undergraduate students in an introductory psychology course. Rotter's I-E scale was administered to the students at the midpoint of the semester in order to classify the students as either having an internal or an external locus of control. Although Rotter's I-E scale produces a continuous score, Ramanaiah and Adams used the group median score to divide the participants into two groups; one with an internal locus of control and the other with an external locus of control. At the end of the semester, student evaluations of the course and instructor and their expected grade in the course were collected. Then, correlations between expected grade in course and ratings of the instructor and the course were computed for both groups of students. The results of the study indicate that there were no significant differences in the relationships between course evaluations and expected course grades for students with an internal locus of control and those with an external locus of control. In other words, the results of this study indicate that the relationship

between expected grades and how a student evaluates a course does not depend on the students' locus of control.

There are two main difficulties with this study. First, in order to make comparisons between groups, Ramanaiah and Adams classified students as either internal or external based on their score on the locus of control continuum. Since individuals have neither completely internal nor completely external locus of control beliefs, classifying participants in this way may have influenced the results. Second, while locus of control is typically thought of as a stable personality characteristic, previous research has indicated that an individual's locus of control can be changed by events (Legerski, Conwall, & O'Neil, 2006) or interventions (Roberts, Zachorchemny, & Cohen, 1992). Thus, an academic event (e.g. failing a test that the student studied very hard for) could change an individual's perception of locus of control. So, beliefs about the locus of control measured in the middle of the semester might not necessarily reflect beliefs about locus of control at the end of the semester.

Methods

Sample

The study was conducted at a 4-year public university in the South. The student body is around 11,000 students primarily women (90%) and has a large percentage of minority students (38%). The university offers four introductory mathematics courses (a quantitative literacy course, two college algebra courses, and a statistics course). These courses are typically taken by non-majors seeking to satisfy the university's general education requirement for mathematics. Each course has a departmental syllabus with a common grading policy and a common final exam. This made it possible to use course grade and the grade on the final exam as outcome variables despite the fact that the participants did not all have the same instructor.

Approximately eight hundred students were enrolled in the seventeen sections (3 quantitative literacy, 2 lower level college algebra, 4 upper level college algebra, 8 statistics) of the courses offered in the spring semester of 2006. Approximately four hundred students consented to participate in the study, however only two hundred students completed the entire second measure. The participants that did complete the entire second measure ranged in age from 18 to 56 with an average age of 21.48. Approximately 96% ($N = 192$) of the participants were female and approximately 38% of the participants were minorities ($N = 75$).

Recruitment and Study Design

Students were recruited through visits to their mathematics classes during the first two weeks of the semester. Participants in the study were asked to complete two measures and to give the researcher permission to obtain their academic record and course

outcomes. The first measure concerning the participants' background was administered during the recruitment visit. The second measure concerning participants' experiences in the course was administered during a visit in the final two weeks of the semester. The measures included both quantitative and qualitative data. At the end of the semester students' grades on the departmental final exam and their grade in the course were also collected. No compensation was given to students that chose to participate in the study.

Coding Locus of Control

In the second measure participants were asked to answer the following open-ended question, "What would have helped you to be more successful in this course?". The responses to this question were analyzed in order to determine whether the factors the participant listed were internal or external to their locus of control.

In order to classify the comments as either internal or external, a coding scheme based on the Intellectual Achievement Responsibility (IAR) measure (Crandall, Katkovsky, & Crandall, 1965) was developed. Academic behaviors that indicated either an internal or external locus of control were identified from the questions in the IAR. Some of the internal behaviors included in the IAR are studying, paying attention, being careful, making effort, and inherent skill. Some of the external factors given as choices in the IAR are instructions, luck in the form of an easy test or question, or the behavior of an external person like a friend or teacher.

The behaviors identified from the IAR were then used to code the participant answers. Since the question was open-ended, it was possible for a response to indicate both an internal and external locus of control. For example, the response, "I feel confident in this math course and I feel like my teacher helped me to be very successful. I could have studied [sic] a little more." was coded as both an internal and external.

In addition to classifying student comments as internal and/or external, comments were also classified as either positive or negative. A positive comment would be one in which a student attributed their success in the course to a particular factor (either internal or external). A negative comment would be one in which a student attributed their failure to a particular factor. This additional classification was included because research has shown that students may also perceive one set of factors as responsible for their successes and another set of factors as responsible for their failures Lei (2009).

In total, ninety-four comments were coded as being internal. Seventy-eight were internal negative and eighteen were internal positive. Two comments were coded as both internal negative and internal positive. Ninety-eight of the responses were coded as external. Thirty-five responses were external positive and sixty-three were external negative with one response being coded as both external positive and external negative. When comparisons between groups were done, any comments that were coded as being members of both groups were not included in the analysis to prevent the groups from being dependent.

Some of the responses were also coded as undetermined. For these responses, the coder was unable to determine the intent of the participant from the sample. Only fifteen of the two hundred responses could not be classified. A sample of the responses for each type of code is given in Appendix A. Each response was coded by two separate coders for reliability. Cronbach alphas computing coder reliability ranged from 0.62 to 0.93.

Outcome Variables

Measures of course outcomes were recorded for the participants that received a grade in the course. The course grade for each participant was recorded. Approximately 96% of the participants ($N = 191$) took the final examination and received a grade in the course. The course grades ranged from 0 to 4 with $A = 4$, $B = 3$, $C = 2$, $D = 1$, and $F = 0$. The average course grade for the participants was a 2.9. The score on the department final exam was also used as an outcome variable. Participants' scores on the departmental final exams ranged from 17.65% to 100% with an average of 64.6%.

Results

The relationship between demographic information (i.e. age and ethnicity) and the outcome variables (i.e. course grade and final exam grade) were examined. Since no significant relationships were determined, these variables were not included in the regression models. The relationships between gender and the outcome variables were not examined since so few participants were male.

Comparisons between groups

A t-test was computed to look for differences in course outcomes for students that made external comments on their course evaluations and those that made internal comments. No significant differences in either the mean final exam grade ($M = 65.41$, $M = 63.53$, $t(170) = .67$) or the mean course grade ($M = 3.02$, $M = 2.88$, $t(170) = .85$) between the two groups were detected.

A t-test was computed to look for differences in course outcomes for students that made positive external comments and those that made negative external comments. Students that made negative external comments had a significantly lower mean score on the final exam ($M = 61.80$, $SD = 18.79$) than students that made positive external comments ($M = 72.75$, $SD = 15.32$); $t(89) = -2.87$, $p < .01$. Students that made negative external comments also had a significantly lower mean course grade ($M = 2.77$, $SD = 1.04$) than students that made positive external comments ($M = 3.47$, $SD = .71$); $t(89) = -3.48$, $p < .001$.

Predicting outcomes using comments

Since it was possible for a student comment to have more than one code associated with it, regression models were computed to determine the relationships between the codes assigned to students' comments and students' grades on both the final exam and the course. Comments that could not be classified as either internal or external were not included in the regression model. There were four possible codes that could be assigned to students' comments; internal positive (IP), internal negative (IN), external positive (EP), external negative (EN). These four codes were used as the independent variables in

the model. Each of the independent variables was assigned either a 0 or 1. For example, a comment that was coded as both internal negative and external positive would have the following values for each of the four independent variables: IP = 0, IN = 1, EP = 1, EN = 0. The dependent variables were the student outcomes in the course.

A regression model was computed with internal positive, internal negative, external positive, and external negative comments predicting the score on the final exam (see Table 1).

$$\text{final exam grade} = 58.76 + 15.51 (\text{IP}) + 2.59 (\text{IN}) + 13.49 (\text{EP}) + 3.15 (\text{EN})$$

The model was significant ($F(4,190) = 4.88, p < .001$) and both internal positive and external positive comments were significant predictors of the final exam grade(see Table 1).

Table 1: Regression predicting final exam grade from student comments

Variable	Parameter Estimate	T obs.	Signif. T
internal positive (IP)	15.51	2.95	0.004
internal negative (IN)	2.59	0.68	0.498
external positive (EP)	13.49	3.21	0.002
external negative (EN)	3.15	0.76	0.447
$r^2 = 0.09$			

A regression model was computed with internal positive, internal negative, external positive, and external negative comments predicting the grade in the course (see Table 2).

$$\text{course grade} = 2.80 + 0.94 (\text{IP}) - 0.13 (\text{IN}) + 0.65 (\text{EP}) - 0.04 (\text{EN})$$

The model was significant ($F(4,190) = 6.48, p < .0001$) and both internal positive and external positive comments were significant predictors of the course grade (see Table 2).

Table 2: Regression predicting course grade from student comments

Variable	Parameter Estimate	T obs.	Signif. T
internal positive (IP)	0.94	3.08	0.002
internal negative (IN)	-0.13	-0.61	0.546
external positive (EP)	0.65	2.65	0.009
external negative (EN)	-0.04	-0.15	0.883
$r^2 = 0.12$			

Discussion

Based on the results of previous studies (Agnew, Slate, Jones, and Agnew, 1993; Gifford, Briceño-Perriott, & Mianzo, 2006; Wood, Saylor, and Cohen, 2009) we expected that students that credited their success or failure to internal factors would have higher course outcomes than students that explained their achievement using external factors. However, the results of this study did not detect significant differences in mean course outcomes between the two groups. This result may be partially explained by the results of a study by Lei (2009) which found that students were likely to attribute their success to external factors and their failures to internal factors. This analysis did not consider whether the comments were positive or negative, only whether they were external or internal.

Differences in course outcomes were detected between students that made positive external comments and those that made negative external comments. Students that made negative external comments had lower final exam scores and lower course grades than students that made positive external comments. A study by Grimes, Millea, and Woodruff (2004) found that students with a highly internal locus of control were more likely to give the instructor a positive rating than students with an external locus of control. This result indicates that students with an internal locus of control are generally more satisfied with the instruction in a course than students with an external locus of control. Thus a positive comment about the instructor might not be related to an external locus of control. In this study, 22 of the positive external comments (11%) were related to the instructor. A larger sample of students would allow the student comments about the instructor to be separated from other internal and external comments.

In the regression analyses, it was determined that student comments on course evaluations had high predictive values for course outcomes. Further, positive comments (both external and internal) were positively related to both the letter grade in the course and the final exam score. For both models internal positive comments contributed most to predicting the final exam grades and course grades. This implies that students that make internal positive comments will likely have both higher exam grades and higher grades in the course. Since an internal locus of control is usually related to positive academic outcomes this is not a surprising result. It is surprising that negative internal comments are not significant predictors of course outcomes and positive external comments are significant predictors. This suggests that the attribution a student's success in the course to a particular factor is more important than whether the factor is internal or external. It is also interesting to note that negative comments (either internal or external) are negatively related to course grade but positively related to final exam grade.

The primary limitation of this study was that only half of the participants completed the open-ended question on the second measure. A larger sample of student responses would allow the student comments to be further compared by the specific factor (e.g. instructor, course structure) that they attributed their success and/or failure to rather than only classifying the factor as internal or external. In addition, a larger sample might produce a larger number of positive internal comments, allowing for comparisons between the positive internal group and other groups. The low response rate is commonly observed in

open-ended course evaluations (Darby, 2007). Since online course evaluations have been shown to have a higher response rate for open-ended questions than paper evaluations (Laubsch, 2006), one possible resolution to this difficulty would be to administer the open-ended questions online.

The use of teaching evaluations by instructors to improve their teaching and administrators to justify tenure and promotion decisions emphasizes the importance of understanding the relationship between student ratings of a course and course outcomes like student learning and course grades. The results of this study showed evidence of a relationship between the type of comments a student makes on course evaluations and course outcomes. However, the cause of this relationship is not known and merits further exploration.

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Appendix A – Coding examples

Internal positive

“Nothing, I did pretty good.”

“Nothing, I think I made pretty close to a perfect score.”

“I am making an A so I wouldn’t change anything.”

Internal negative

“working fewer hours”

“working additional homework problems to practice for tests”

“If I had read ahead and prepared much more earlier before getting to class”

External positive

“Nothing, I felt absolutely prepared from previous math courses.”

“Nothing. ___ is a great teacher. He/she teaches well and I am successful.”

“The instructor made the class unlike the traditional maths classes, therefore I was able to grasp the techniques easily and work on my own better.”

External negative

“If the instructor explained a little bit more, and if he/she wasn’t so boring.”

“More interactive learning, hands on work”

“Make math more fun and meanful [sic] as in related to real life situation and why we use this kind of math for.”

Unclassified

“not having to take this course”

“Actually get help from a mathematic to improve to a greater level.”

