ONLINE LECTURE AS AN ALTERNATIVE METHOD OF INSTRUCTION IN COLLEGE CLASSROOMS: MEASURING THE EFFECTS OF ALTERNATING IN-CLASS WITH ONLINE LECTURES IN TWO SECTIONS OF AN UNDERGRADUATE INTRODUCTION TO BEHAVIOR ANALYSIS COURSE

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Online instruction is becoming increasingly common at universities; however, there is little single subject research concerning the effectiveness of the online lecture format. We investigated whether online lecture could replace in-class lecture in two sections of an undergraduate Introduction to Behavior Analysis course without detrimentally affecting student learning. Using an adapted alternating treatments design, online and in-class lecture formats were counterbalanced across the two course sections. Experimenters collected data on lecture attendance/access, percent correct on the weekly quiz, and student report on lecture format preference. The data show that, within the context of this class, students performed equally in the weekly quiz regardless of lecture format; further, that this is consistent when looking at individual student data and mean data. However, although students stated a preference for online lecture in the questionnaire, a greater percentage of students attended in-class lecture than accessed online lecture.

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CHAPTER 1

INTRODUCTION

Engaging learners away from the university campus is not a new phenomenon. Distance learning, defined as education where the student does not attend the university campus and where there is two-way communication between student and teacher, has been part of the higher education system in America for over 120 years. The origins of distance learning may be traced back to 1840 and the Englishman Isaac Pitman. Pitman offered the opportunity to learn shorthand by mail; students were required to transcribe passages of bible verse that they mailed to Pitman for correction (Bower & Hardy, 2004). In 1852, Pitman's training program crossed the Atlantic and was introduced in the United Sates by the Phonographic Institute in Cincinnati, OH (Casey, 2008). Distance learning flourished, and in 1892 the University of Chicago offered the first distance learning programs at the college-level (Casey). Distance learning provided educational opportunities for people who were geographically distant from universities, and for people from diverse economic backgrounds who could not otherwise afford the time or money for full-time education. Since this time, distance learning has become increasingly popular with students and institutes of learning. In *Going the Distance: Online Education in the United States* (formerly the Sloan Online Survey), Allen and Seaman (2011) reported that in the fall of 2010, 31.3% of all students in degree granting postsecondary institutions were enrolled in at least one online class, and that over two-thirds of academic leaders believe that online education is as effective as face-to-face learning. Moreover, they reported that 65.5% of academic officers described online learning as an integral part of the long-term institutional strategy for growth and development.

The current trend for universities to offer online courses continues unabated, and the

number of free courses offered has grown exponentially in the last year. edX and Coursera are two open-source companies that were founded in the spring of 2012. The not-for-profit initiative edX, started by Harvard University and Massachusetts Institute of Technology, offers 24 courses, and the for-profit Coursera established by two Stanford University professors currently offers over 200 courses from 37 different institutions. Although students study the same educational content as fee based courses, successful completion of the course does not provide the student with a degree or course credit. Nonetheless, these classes maintain the tradition of distance learning, providing education across socio-economic groups; to those who are unable to afford a university education; and to those whose geography, family, or employment commitments prohibit on-campus attendance.

The growing numbers of students able to access university level classes has, in part, been made possible through technological advancements. Increasingly sophisticated technology has transformed distance learning over the years, changing methods of instruction from correspondence courses by mail, to radio and television broadcasts, to the multimedia approach of today's courses, including the widespread use of computer technology and web-based instruction (Bower & Hardy, 2004). The internet provides a platform for a wide range of synchronous and asynchronous teaching techniques. Synchronous applications are those methods in which content is delivered in real time such as live webcasts of lectures, live-chat messaging, and Skype meetings. Asynchronous methods deliver content at a time decided on by the student. Examples include pre-recorded online lecture presentations, online games, and group discussion threaded message boards. This multi-faceted approach provides for a flexible and convenient learning environment for today's higher education students.

The widespread availability of computer technology has enabled universities to use

computer-based applications as a convenient course management tool (Dziuban, Hartman, & Moskal, 2004; McFarlin, 2008). Moreover, in recent years, centralized funding for state universities has contracted. In Texas, state funding per semester hour has decreased from $112.23 in 2003, to $84.61 in 2012, $66.53 when adjusted for inflation (Texas State University, 2013). This contraction in budgets has resulted in universities implementing strategies to reduce cost per capita spending, while maintaining student learning outcomes. In addition, increasing student enrollment and the pervasive problem of limited facilities ensures that university personnel continually look for methods to contain costs while maintaining or increasing efficient and effective learning. Universities have therefore increasingly explored, and turned toward, alternative and innovative methods of instruction in higher education to help faculty to meet the demands of doing more with less.

Blended learning courses (also called hybrid or mixed-mode instruction) are courses that use the traditional approach of face-to-face instruction, technology based distance learning, and reduced in-class instruction (Dziuban et al., 2004). In addition, the online content of blended course ranges between 30% and 79% of the total course content (Allen & Seaman, 2011). Osguthorpe and Graham (2003) note that blended courses provide the opportunity to arrange the course to take advantage of the strengths and to avoid the weaknesses of each learning paradigm. Thus, students are able to benefit from the advantages of face-to-face interaction with instructors and classmates, and enjoy the time-flexibility of web-based instruction and assignments. The ratio of online to face-to-face interaction for each course is determined by the educational goals, availability of technology, student profile, and instructor knowhow. The 2010 report from the U.S. Department of Education, asserts that blending online and face-to-face instruction provides better student learning outcomes than face-to-face instruction alone. Moreover, Dziuban et al.

(2004) contend that reduction in student/instructor contact in the classroom (or 'in-seat time') also provides financial benefit for universities. Thus, from an economic perspective, blended learning also enables the university to reduce the cost of the delivery of instruction.

However, increased use of technology and reduction in costs will become irrelevant in the long-term if they prove detrimental to student learning outcomes. Provision of online or blended classes will prove sustainable in the long-term only if the method of delivery provides for successful student learning outcomes measured by student grades, student perceptions of learning, and student retention rates. Therefore, additional research is needed to ascertain which instructional components of a course can be successfully transferred to an online format without a detrimental effect on student learning outcomes. In addition, if aspects of online instruction prove to be equally as effective as face-to-face instruction, it is important to determine student preferences for various aspects of online instructional delivery, and whether the experience of online instruction changes students' perceptions of online delivery.

A review of research concerning characteristics of students who take online classes appears to be inconclusive. Dutton, Dutton, and Perry (2002) contend that older non-traditional students are more likely to take online classes, but that gender is not a factor in course selection. However, Ary and Brune (2011) contend that female students are more likely to enroll in online classes than males, and that students in online classes have higher pre-course GPAs and higher ACT scores than those who take traditional classes. It is possible that enrollment in online classes may be a result of the way in which students perceive online instruction. Sahin and Shelly (2008) contend that computer expertise correlates to student's perception of the usefulness of the course, and satisfaction with the course. Further, Dziuban, Moska, and Joel (2005) note that older students are less likely to be technologically proficient while traditional students utilize

computer technology more readily, and this affects their perceptions of the course. Moreover, Sankaran, Sankaran, and Bui (2000) reported that students' stated perceptions about internet course delivery were linked to final course grades. Finally, Williams, Aubin, Harkin, and Cottrell (2001) noted that although students earned the same or higher grades when taking online classes, students reported that they were less confident in their expertise with the material.

Increasingly, universities are providing funding for instructors to evaluate alternative modes of instructional delivery in order to create more motivated and engaged learners, and simultaneously improve student outcomes. Next Generation Course Redesign (NextGen) at the university in which this research took place is one such program. NextGen assists instructors and faculty to restructure the delivery of their content from traditional lecture format to classes that include experiential learning, small group work and online assignments. Further, instructors are required to break down their course content into component parts to provide general and specific learning objectives against which student learning may be measured. The introductory course in behavior analysis in which this research took place is a NextGen course. The course already incorporates scientifically proven instructional techniques, and continual assessment and alteration of course design and delivery ensure that instructional approaches meet the changing needs of the students. As such, determining the methods of instruction that maximize student learning outcomes, and analyzing the effects of changing component parts of the course, is a high priority.

Behavior analysis has a long history of research into educational best practice. In 1968 Skinner's *The Technology of Teaching* bought behavior analysis squarely into the realm of formal education, and in the same year Keller (1968) predicted the changing role of the instructor in education in the seminal article, "Goodbye Teacher." Despite the advantages for effective

learning for all students offered by the application of techniques outlined by Skinner (1968) and Keller, these technologies have not been adopted widely in the education system. However, the high drop-out rate from high school and the low percentage of students who graduate from university in four years provide evidence that there remains a clear need to determine empirically-based instructional techniques that provide successful learning outcomes for all students.

Behavior analysts have continued to work within the realm of formal education to improve student learning outcomes. Researchers have developed whole systems of instruction (e.g., Binder, 1996; Johnson & Street, 2004; Keller, 1968; Skinner, 1968), made suggestions regarding course design (e.g., Lloyd et al., 1972; McMichael & Corey, 1969; Rehfeldt et al., 2010), and evaluated particular instructional techniques (e.g., Alba & Pennypacker, 1972; Boyce & Hineline, 2002; Cihon, Sturtz, & Eshleman, 2012; Coyne, 1978; Neef, McCord, & Ferreri, 2006; Munro, & Stephenson, 2009; Tudor, 1995).

Outside of behavior analysis, meta-analyses of research into computer based instruction suggest that it can replace in-class instruction without detrimentally affecting student learning; indeed, much of the research reports favorable student outcomes when blending online and face-to-face instruction (U.S. Department of Education, 2010; Kulik & Kulik, 1991; Kulik, Kulik, & Cohen, 1980). However, this research employs between group research design comparing student learning outcomes and perceptions between two or more groups of students. Instruction varies between the groups such that different groups of students experience different instructional formats; thus, students experience either the in-class or the online instruction. One limitation of this research is that students often self-select the course format and, therefore, presumably select their lecture format of choice. As a result, there may be differences in

individual learner characteristics that inadvertently influence the conclusions that can be drawn regarding the comparative effectiveness of online or in-class lectures. Dziuban et al. (2005) note that students from different generations have "a fundamental difference in the way they approach knowledge acquisition" (p. 2), with younger generations making more use of technology and having greater levels of technological proficiency. Public universities have seen an increase in the enrollment of non-traditional students (defined as those student who are returning to university after a period of time away from formal education, are responsible for dependents, work in excess of 35 hours a week, and/or commute to campus), and this trend is projected to continue to rise (Institute for Educational Sciences, 2013). With the enrollment of increasing numbers of non-traditional students, perhaps as a result of the ongoing impetus for skills retraining and life-long learning, it will be important to ensure that changes in instructional design benefit all the students in the classroom.

The use of single subject design, where the student comes into contact with both online and in-class instructional formats, provides information about the learning outcomes of every student. Data for the individual student can be compared across the different units of the course to determine if changing the instructional format affects learning outcomes at the individual level. In addition, single subject design enables comparisons between individual data and the performance of the group as a whole, and permits analysis of data between groups to determine how changing the instructional format of one component of the course affects the learning outcomes of a the class as a whole. Moreover, by counterbalancing lecture formats for each unit between the groups, the difficulty of the course content and other instructional variables can be ruled out as influences. In this way, single subject design controls for student self-selection of course lecture format based on individual preference, and brings students who would

traditionally opt out of online based instruction into contact with the contingencies.

Kellerstedt (n.d.) counterbalanced online with in-class lecture formats in two sections of an undergraduate Introduction to Behavior Analysis class. The course was divided into 12 weekly units, and weekly quiz scores on each of the units evidenced student learning outcomes. The individual and group data showed that student performance was equivalent for both instructional delivery formats. However, one limitation was that attendance at in-class lecture or access of online lecture was not tracked; therefore, any conclusions as to the relative effectiveness of online lectures are limited.

The purpose of this study is to replicate and extend Kellerstedt (n.d.). In the current study, experimenters collected data on attendance at in-class lecture, and access of online lecture. In addition, student perception of the different lecture formats was assessed weekly and at the end of the semester through questionnaires. The specific research questions were, within the context of a blended course: (a) can in-class lecture be replaced by online lecture without detrimentally affecting student learning outcomes as measured by weekly quiz scores; (b) do group means replicate the performance of individual students such that individual student scores on weekly quizzes change in the same way as group means; (c) what percentage of students attend in-class and access online lectures; and (d) do students report a preference for in-class or online lecture formats, and does that preference change during the semester after they have sampled each lecture format?

CHAPTER 2

METHOD

Setting and Participants

The research was conducted in two sections of an Introduction to Behavior Analysis class in a public, state university in Texas. Students self-enrolled in one of five available sections of the course offered. The course could satisfy a component in the university's core curriculum, or as the first in a series of behavior analysis classes culminating in a bachelor of science in applied behavior analysis (ABA; or minor in ABA). Each of the five sections of the Introduction to Behavior Analysis course were clearly identified as Next Generation Course Redesign (NextGen) classes on the course description on the university class listing; therefore, students were aware that the course would include an online and experiential component. However, information at the time of enrollment did not specify that the online component included online lecture. The class schedule for both sections was the same and consisted of three, 50 min sessions per week during a regular 14 week semester. Classes were conducted in a computer laboratory on the university's main campus.

Sixty-seven students who attended the final exam (and therefore can be said to have completed the course) provided consent for their data to be included in the research - 33 in Section 1 and 34 in Section 2. This represents 92% of students enrolled in Section 1 and 89% enrolled in Section 2. Students did not receive extra credit or other privileges for consenting to participate. Although an introductory course, the students were enrolled as freshmen (40), sophomores (17), juniors (7), seniors (2) and post bachelorette (1). In addition, students had varying previous experience of, and instruction in, psychology.

The same teaching fellow (TF), a third year behavior analysis graduate student, instructed

both sections of the course. Both sections had the same two teaching assistants (TA) with a third TA helping in the Section 2; the TAs were also behavior analysis graduate students. The university defines TFs as having, "direct student contact in a formal instructional setting and are charged with primary responsibility for teaching a course for credit under the direct supervision of a faculty member or chair" (Toulouse Graduate School, University of North Texas, n.d.). TAs are defined by the university as, "graduate students who do not have primary responsibility for teaching a course for credit; they perform under the instructor's direct supervision and provide general assistance to the instructional process, such as grading, tutoring, etc." (Toulouse Graduate School, University of North Texas, n.d.).

The instructional design and content of the course had been developed over many years by department faculty, teaching fellows and teaching assistants. The course was constantly reviewed and revised based on student learning outcomes, university requirements, and research on instructional design and teaching.

The instructional content was the same for both sections of the course. Over the semester the course was divided into 14 units with material covering an introduction to behavior analysis, and basic principles and procedures. Twelve of the units (see Table 1) followed the same weekly schedule comprised of a reading assignment, homework, lecture, in-class discussion (ICD) and quiz. The textbook for the class was *Principles of Everyday Behavior Analysis* (Miller, 2006), the instructor assigned additional readings for Units 1 and 2 available on Blackboard Learn™ course management platform (Blackboard, Washington, DC, http://www.blackboard.com). Homework, also available via Blackboard Learn and completed electronically, consisted of 50 fill-in-the-blank questions. Students had an unlimited number of attempts to complete the homework, and needed a minimum score of 90% correct by 12:30 am on the morning of the

lecture in order to earn 10 points of course credit. The lecture for each unit was given either in-class on Monday by the TF, or was available on Blackboard Learn between 7am on Monday and 7am on Wednesday. Students did not earn points for attendance or accessing the lecture. During the ICD on Wednesdays the TF and TAs reviewed and extended the material covered by the homework and lecture through a series of discussion questions and written exercises. The TF and TAs provided tutoring and graded the exercises during the class. Students were required to answer all sections of the ICD correctly to gain the five points available. A 10-question, fill-in-the-blank quiz, given during Friday's class and accessible only on the computers in the classroom, concluded each unit. The quiz covered material from that week's unit, component elements of the week's material, and questions to ensure that students were discriminating between the week's concept and concepts covered in previous weeks (e.g., in the unit for differential reinforcement, the quiz included questions about extinction and positive reinforcement). During the class in which students took the quiz, TAs were available to tutor students who were not satisfied with their first quiz grade. Students were able to take a second quiz covering the same material; it should be noted that, although students were encouraged to go to tutoring, it was not a requirement for taking the second quiz attempt. Students could score a maximum of 15 points on the quiz, with the higher of the two attempts used to calculate the final course grade. The course also required that students take a cumulative mid-term exam and a cumulative final exam, and complete a semester-long behavior change project (see Appendix A for a copy of the course syllabus).

Experimental Design

Online and in-class lecture format alternated each week, and were counterbalanced across

the two sections of the Introduction to Behavior Analysis course in an adapted alternating treatments design (Sindelar, Rosenberg, & Wilson, 1985).

Independent Variable

The independent variable was the method of lecture delivery: in-class lecture delivered on Monday during the scheduled 50 minute class period, and online lecture, available from Monday at 7 am to Wednesday at 7 am, accessed on Blackboard Learn. The two lecture formats included the same Microsoft PowerPoint® presentation (Microsoft Corporation, http://www.microsoft.com)presentation, and were presented and narrated the TF.

Dependent Variable and Data Collection

The dependent variables were weekly quiz score, student attendance at lecture, student access of online lecture, and weekly and end of semester questionnaire results. Experimenters collected data on individual student scores on the first attempt of the weekly, 10-question, fill-in-the-blank quiz completed on Blackboard Learn during the Friday class period of each week.

Experimenters also took attendance at each in-class lecture via a student sign-in sheet. A statistics tracking feature on Blackboard Learn automatically recorded student access of the online lecture. This feature recorded when students accessed the online lecture, and the time and date of access; however, data were not available for duration of access. In addition, experimenters administered a questionnaire each week to gather data about attendance at, or access of, the weekly lecture, and student preference for lecture format (see Appendices B and C). Where computer generated data were not available for online lecture access (Section 1 Unit 5 and Section 2 Unit 2), experimenters used responses to the weekly questionnaire to determine

whether students accessed the online lecture. Finally, experimenters collected data from the end of semester questionnaire completed by students during the last class period of the semester.

Procedure

Delivery format of the lecture alternated weekly between in-class and online, with the method of delivery counterbalanced across sections (see Table 2). The first lecture was online for both sections; this provided the opportunity to ensure that students were conversant with the technology necessary to access the online lecture, and to provide additional time for those students who needed help accessing the lecture. Thereafter, Section 1 accessed online lectures for Units 3, 5, 7, 9, and 11, while Section 2 accessed online lectures for Units 2, 4, 6, 8, 10 and 12.

In-class lectures occurred in the classroom during the normal class time on Monday. The TF delivered the lecture using a PowerPoint with embedded opportunities for student choral responding. Students attending the lecture signed a sign-in sheet to create a record of their attendance.

Students could access online lectures via Blackboard Learn between Monday at 7 am and Wednesday at 7 am. Settings on Blackboard Learn provided automatic release and withdrawal of the lecture at preset times. The online lecture used Adobe® Captivate® software (Adobe Systems Incorporated, San Jose, CA, http://www.adobe.com/) to present the same PowerPoint presentation together with an audio soundtrack narrated by the TF. Data concerning which students accessed the lecture were available through Blackboard Learn. However, the data provided only the number of times that the student accessed the software, and the date and time the student accessed the lecture; data were not recorded on duration of viewing, the context

within which the student accessed the lecture, or whether the student attended to the lecture.

At the start of each Wednesday class a brief questionnaire was distributed to students (see Appendices B and C). In order to encourage truthful responses, the TF and TAs left the classroom while the students completed the questionnaire, and a student collected the completed questionnaires and sealed them in an envelope. In addition, the TF informed the students that the questionnaires would be locked in a filing cabinet until the end of the semester; each week the envelope containing the questionnaires was secured in the office of the TF's advisor.

Independent Observer Agreement and Treatment Integrity

The computer graded quiz answers automatically and entered the grades on the grade book; therefore, independent observer agreement was not taken on quiz grading, or score entry.

A TA assessed treatment integrity (TI) by checking the availability of the online lecture, through reviewing the preset release and withdrawal times on Blackboard Learn. TI was calculated by comparing the actual date and time of release with Monday at 7 am, and actual time of withdrawal to Wednesday at 7 am (as specified on the syllabus), and grading as correct or incorrect. Corrects were then divided by corrects plus incorrects, and multiplied by 100. Across the 12 units TI was 100% for the release of lectures, and 100% for the withdrawal of lectures.

Social Validity

The experimenter distributed a short questionnaire on the last day of class to ascertain which lecture format students preferred, and to determine which aspects of the class the students found helpful. (See Appendix D.)

CHAPTER 3

RESULTS

Figure 1 displays the mean quiz scores by unit and lecture format. The data indicate that for five of the twelve units, those students who accessed the online lecture attained higher mean quiz scores (range, 79% to 86.8%) than those students who attended the in-class lecture (range, 72.8% to 82.3%). Additionally, for six units the mean quiz score for students who attended the in-class lecture was higher (range, 64.7% to 87%) than those who accessed the online lecture (range, 46.25 to 84.6%).

For nine of eleven units, the mean quiz scores for students who attended the in-class lecture (range, 64.7% to 87%) were higher than for those who did not attend or access the lecture (range, 55.0% to 81.8%). For ten of the twelve units, the mean quiz scores for students who accessed the online lecture (range, 72.3% to 86.8%) were higher than the mean quiz scores for those students who did not attend or access the lecture (range, 55.0% to 84.3%). The mean scores for Unit 2 suggest an advantage for students attending the in-class lecture (M = 64.7%; range, 15% to 100%) or not accessing/attending the lecture (M = 60.5%; range, 25% to 90%) over those who accessed the online lecture (M = 46.3%; range, 15% to 100%). However, the mean quiz scores for Unit 2 were considerably lower in comparison to mean quiz scores overall. Additionally, for Unit 5, those students who accessed the online lecture scored slightly higher (M = 86.25%; range, 30% to 100%) than those who did not attend or access the lecture (M = 84.33%; range, 10 to 100), and those who attended the in-class lecture (M = 81.4%; range, 30% to 100%). Furthermore, for Unit 6, students who did not access either lecture format (M = 81.1%; range, 45% to 90%) slightly out performed those attending (M = 80.0%; range, 25% to 100%)or accessing (M = 78.2%; range, 25% to 95%) lectures. The lecture format for both sections was

online for Unit 1; therefore, a comparison between lecture formats was not possible.

Quiz scores were also graphed for each individual student to ensure that mean quiz scores were representative of individual student performance. The graphs in Figure 2 show data that are typical for high performing students (top panel), low performing students (middle panel), and students who showed varying levels of performance throughout the course (bottom panel). The data suggest that higher quiz scores were not consistently associated with either lecture format regardless of typical patterns of student performance. These data are commensurate with the mean data presented in Figure 1.

Data on attendance at in-class lecture and access of online lecture (Figure 3) suggest that for nine of the twelve units a greater percentage of students attended the in-class lecture (M = 76.5%; range, 54.4% to 97%) than accessed the online lecture (M = 61.9%; range, 29.4% to 93.9%). The number of students attending the in-class lecture followed a general downward trend over the 12 weeks; whereas for the online lecture, students accessing the lecture increased over the first three units, followed a downward trend to Unit 8, and then followed a general upward trend through Unit 12.

Weekly and end of semester questionnaire results concerning student lecture format preference (Figure 4) suggest that for Units 1 and 2 (first two weeks of the course), 52% of students in Section 1 and 66.6% of students in Section 2 preferred in-class lecture; however, by Unit 3 (week three of the class) 56.8% of students (59.2% in Section 1 and 54.1% in Section 2) stated a preference for online lecture. From Units 4 to 12, the percentage of students who reported a preference for online lecture remained higher than the percentage of students who reported a preference for in-class lecture, peaking at 70.9% in Unit 6 (75.0% in Section 1 and 72.4% in Section 2) before dipping to 60% in Unit 9 (63.6% in Section 1 and 57.1% in Section

2). Preference for online lectures remained stable thereafter. The end of semester questionnaire results show that 60.4% of students reported a preference for online lecture (60.9% in Section1 and 60.0% in Section 2) while only 39.8% of students reported a preference for in-class lecture (39.1% in Section 1 and 40.0% in Section 2).

Seventeen students consistently reported preference for the online lecture format in each questionnaire completed, while five students consistently reported a preference for in-class lecture. Four students initially reported a preference for online lecture and then consistently reported a preference for in-class lecture, while 13 students initially reported a preference for in-class lecture and then consistently reported a preference for online lecture. Six students reported a preference for online lectures, then switched their preference to in-class lectures, and then switched their preference to online lectures again. Nine additional students reported a preference for in-class, then online and then in-class again. Twelve students reported a change in preference four or more times over the course of the semester. One student completed only one questionnaire and their preference data are not included.

Figure 5 displays the relation between the preference for lecture format reported by students in the weekly questionnaire and student attendance/access by lecture format. These data indicate that reported preference for a lecture format does not necessarily translate into attendance/access of the preferred lecture format. Moreover, while there is a general preference for the online lecture format from Unit 3 on, attendance or access did not seem to trend accordingly.

CHAPTER 4

DISCUSSION

The mean quiz scores between experimental conditions differed by less than 10 percentage points in ten the eleven units (in Unit 1 both sections had the online lecture and therefore comparison is not possible); further the difference was less than five percentage points in eight of the eleven units. In Unit 2 the difference in mean scores was more than 10%. A difference in quiz scores of 10% may be seen as educationally significant (Neef, Perrin, Haberlin, & Rodrigues, 2011) as this variance would result in a different grade being assigned (e.g., the difference between a B to an A grade is often ten percentage points). Therefore, it may be argued that in only one week did lecture format provide an educationally significant difference in weekly quiz scores. The data for the individual and mean quiz scores therefore suggest that lecture format produced little variation in quiz performance. Thus, the findings of this research replicate that of previous research that also suggests that lecture format produces little difference in student learning outcomes (U.S. Department of Education, 2010; Kulik & Kulik, 1991; Kulik et al., 1980).

Interestingly, for both lecture formats, quiz scores for Unit 2 were lower than quiz scores for the other units. The lecture for Unit 2 contained some content not previously covered in the reading or homework. As this additional material was not included in the homework, the reduction in contact with the material and practice using the keywords, may in part, help to explain the lower mean quiz scores in this unit.

Tiemann and Markle (1990) contend that learning has three components: instruction, practice and application. The structure of the Introduction to Behavior Analysis classes is such that students contact all three components each week within the reading, homework, lecture and

ICD before assessment via the weekly quiz. It is possible that, for some students, completion of the reading, homework and ICD were sufficient for the students to attain high quiz scores regardless of lecture format or access. Smith et al. (2009) noted that student understanding of course material increased when students were given the opportunity to discuss isomorphic questions in class, even when no one in the group knew the answer to the question. Therefore, the ICD may have acted as an additional influential variable, as during the completion of the ICD students were encouraged to discuss the material with their peers and the TF and TAs. However, the data generally show that the mean quiz score for those students who accessed or attended the lecture for ten units scored higher on the weekly quiz than those who did not. Unit 6 was an exception. In Unit 6, students who did not access or attend the lecture scored higher than those who did (albeit by just 2%). Completion of the other components of the class may provide an explanation of why this occurred. Future research might investigate the relative benefits of each component of the class structure or the interactive nature of various course components.

Data on attendance at the in-class lecture, and access of the online lecture show that for nine of the twelve units a greater percentage of students attended the in-class lecture than accessed the online lecture. Perception of instructor knowledge of attendance/access may have affected whether or not a student attended/accessed the weekly lecture. Students signed-in to class at in-class lectures, but no visible record was taken for online lectures, and students may not have been aware that the instructor could track access to online lectures via Blackboard Learn™ course management platform (Blackboard, http://www.blackboard.com). Future research could investigate methods to provide feedback to students that the instructor can track online access, such as providing a password at the end of the lecture that students type into a box

on their screen, completion of which automatically marks a complete/incomplete column in the grade center.

Boyce and Hineline (2002) note the punishing effects of lectures that proceed at a pace that is either too fast or too slow for individual students. It may be that the downward trend in in-class attendance for the current study can be attributed to the pace of the class (dictated by the instructor and the 50-minute class period). Furthermore, after a downward trend from Unit 3 to Unit 8, the number of students accessing the online lecture increased again. It is possible that online lectures may have negated the punishing effects Boyce and Hineline suggested. For example, students may have accessed the online lecture more frequently after contacting the self-pacing contingency in which they could skip or replay slides as required. However, the midterm test was held between Units 7 and 8; anecdotal reports note an upward trend in attendance and assignment completion immediately after the midterm exams. Moreover, in the context of the current study, for two units it is possible that some students who did not watch the lecture reported that they did (Unit 2 in Section 2 or for Unit 5 in Section 1). Electronic data were not available for the aforementioned sections and units to determine whether students had accessed the lecture. Therefore, student self-report data from the weekly questionnaire was used to determine whether students accessed the lecture; it possible that the difference between the scores might be exacerbated.

Future research might include active student responding on slides, and data collection on the duration of lecture access, to provide data on student access of online lecture. Other research might include a mastery criterion for each unit/concept. In such a system, within the lecture, students would answer questions on each concept (or key term) until reaching a mastery criterion, and additional instructional material could be presented to aid concept mastery.

The advantages of online lecture include the flexibility of access in terms of time and location. Data collected from Blackboard Learn illustrate that students accessed the lecture at times other than the scheduled class period on Monday. For the 11 lectures for which data were available from Blackboard Learn, students accessed the lecture on at least two of the three days that the lecture was available. Moreover, students also accessed the lecture throughout the day, and at multiple times during the period in which the lecture was available. Conversely, the in-class lectures were available during only the scheduled class time and therefore provided no such flexibility. While having multiple opportunities to access the lecture may be beneficial to some students, the more structured schedule of the in-class lecture may be particularly important for other students, especially those with poor time management skills. As 40 of the 67 students were freshmen, it is possible that many students in each section did not have the required time management skills to benefit from the time-based flexibility offered by the online lecture. Instructors might want to explore the possibility of reaching all types of learners by providing in-class lecture times and supplementing the instruction with recorded, permanent products (online lectures) that are readily available throughout the course. In this scenario, students could have the option to select one or both lecture formats depending on their needs or preferences.

In addition to a more structured schedule, another advantage of in-class lecture is the student/instructor interaction. The in-class lecture provides students the opportunity to ask questions of the instructor, and the active responding element of the lectures provides the instructor with feedback as to whether students require further clarification of the material. It is possible that this interaction reinforced attendance at in-class lecture. In addition, it is possible that students found interaction with their peers reinforcing. Future research might investigate the use of technology in synchronous methods of online lecture delivery that would provide the

additional opportunities for feedback and active student responding in online formats. For example, one feature offered on Blackboard Learn is Blackboard IM. This live instant messaging feature provides a system that class members could be required to use while viewing the lecture. In this scenario, all class members and the instructor would be online at the same time, thereby providing similar opportunities to those that occur in-class.

Current research shows that students who select online courses may have different characteristics than those who select traditional classes (Ary & Brune, 2011; Dutton et al, 2002; Dziuban et al., 2005), and that this may lead to self-selection of course format. It is possible that although counterbalancing the lecture formats prevented self-selection of lecture format across the whole semester, students self-selected lecture format on a weekly basis. Nevertheless, toward the end of the semester, both lecture attendance and access of online lecture decreased. Lloyd et al. (1972) found that using a point contingency increased lecture attendance in an undergraduate class. Prior research suggests the importance of the lecture (regardless of format) as a component of instructional design. Future research should investigate whether adding a point contingency, or access to an assignment with points, might control for self-selection of lecture format, or predispose student preference toward a new lecture format.

One limitation of the electronic collection of data for the online lecture is that the mechanism provides information only on the dates and times the student opened the lecture. It does not provide information on how much of the lecture the student watched, whether the student engaged in the material (orally answered questions, read the examples, etc.) or the context in which the student accessed the lecture. Research has shown the benefit of active student responding (Gardner, Heward & Grossi, 1994; Marmolejo, Wilder & Bradley, 2004; Tudor, 1995), and placing point contingencies on assignment completion (Lloyd et al., 1972;

Rehfeldt et al., 2010). Future research could address the limitations of this study while simultaneously including the findings of previous research by embedding active student responding within the lecture, adding an assessment at the end of the lecture, and/or placing contingencies on lecture completion.

Data from the student questionnaires show that from week three students reported a preference for online lecture over in-class lecture. It is interesting to note that from week five onward, the percentage of students reporting preference for online lecture is relatively stable up to, and including the end of semester questionnaire. For each section of the course, online lecture had been assigned twice by the time students completed the weekly questionnaire for Unit 3; data from Blackboard Learn and the weekly questionnaires indicate that by the end of Unit 3 only six of the sixty-seven students had not accessed an online lecture. Further, only four students had not attended in-class lecture. Thus, by Unit 3, the majority of students had experienced both lecture formats, and were able to compare online and in-class lecture within the context of this course. In their work on preference assessment, Deleon and Iwata (1996) contend that in order for an individual to choose a stimulus as preferred, it is essential that they come into contact with that stimulus. It is possible that merely experiencing the online lecture, and coming into contact with the contingencies changed student preferences. It is interesting to note that while 17 students reported a consistent preference for online lecture throughout the semester, many students (30) changed their preference throughout the semester. The variables by which students reported preference for one lecture format or another could not be isolated in this study. Perhaps students preferred one lecture format over another based on their perceived difficulty of the unit content or truly did not have a consistent preference for one format over another.

Interestingly, in the end of semester questionnaire, on 5-point Likert Scale (where 1 was

not at all helpful and 5 was *very helpful*) students rated in-class lecture at 4.3 (range, 1 to 5) and online lecture at 4.0 (range, 1 to 5). Therefore, although they rated online as more highly preferred, they rated in-class lecture as more helpful. Current literature concerning student perception of online versus in-class lecture indicates that students state that they prefer in-class instruction regardless of quiz and exam grades (Stephenson, Brown, & Griffin., 2008; Williams et al., 2001). However, Sahin and Shelley (2008) report a correlation between computer expertise and satisfaction in distance education. It possible, therefore, that as students become more technologically proficient, they will report greater satisfaction with online learning.

Cihon et al. (2012) suggest that students often report dissatisfaction with instructional techniques with which they are unfamiliar, even when these techniques have a positive effect on student grades. Conversely, Neef et al. (2011) suggested that some students report preferences for techniques that have little or no positive effect on grades. Future research could investigate how to structure course contingencies when introducing new teaching techniques to produce a positive correlation between student perception and effect on student learning outcomes. With the increase in importance of student 'consumer satisfaction' in many universities measured through end of semester student evaluations and retention rates, matching student performance to student preference will be of ongoing importance.

Data from the weekly questionnaire on lecture format preference and actual student behavior of attending or accessing the lecture shows some disparity. Over the course of the semester a larger percentage of students reported that they preferred online lecture than in-class lecture, while a larger percentage of students attended in-class lectures than accessed online lectures. As previously discussed, the discrepancy might be because students felt more accountable for their behavior of attending in-class lectures, and a greater anonymity when

accessing (or not accessing) online lectures. It is also possible that students preferred the flexibility of time and location, and the ability to self-pace through an online lecture, as opposed to fixed time and instructor paced in-class lecture. Further attendance at in-class lecture may have been reinforced through interaction with the TF and TAs, and peers. Another equally plausible explanation would be that in-class lectures were available at only one time. Students who perceived the benefits of lectures to their course grade may have attended; perhaps these students would not have attended in-class lectures if an online option were available. Future research could investigate how to design a blended course in order to maximize the benefits of online and in-class instruction. Thus incorporating the flexibility of time and location, and self-pacing of online instruction, and the interaction with instructors and peers that are an integral part of in-class instruction.

The data from the current study suggest that, within the context of this course, online lecture and in-class lecture produced similar student learning outcomes. Perhaps the direction future researchers should now take is to design the optimal blended or online learning environments, rather than determining the differential effectiveness of online and in-class course formats. For example, researchers might investigate how to increase student access to online lectures, explore the effects of embedding active student responding within online lectures, or how to arrange contingencies for completion of online lectures. Advances in instructional design, technologies of teaching, and assessment of student learning outcomes provide the platform for curricula and instructional strategies, perhaps computer based, that teach more than just the regurgitation of facts. In a context in which blended and online instruction will likely be readily available to all, continued research in this area can ensure that courses will utilize only those techniques that support and enhance student learning outcomes, continuing to develop more

precise assessment tools and continually monitoring and shifting student preference for empirically derived instructional strategies.

Table 1

Title of Units Covered in the Course

Unit Number	Unit Title
1	Introduction to Behavior Analysis
2	Basic Concepts
3	Measurement and Visual Analysis
4	Positive Reinforcement
5	Reinforcer Effectiveness
6	Negative Reinforcement
7	Extinction
8	Differential Reinforcement
9	Ratio Schedules
10	Interval Schedules
11	Shaping
12	Punishment

Table 2

Counterbalance of Lecture Formats Across Sections

	Section 1		Section 2	
Unit	Online	In-class	Online	In-class
1	X		x	
2		x	x	
3	X			x
4		x	x	
5	X			x
6		x	x	
7	X			x
8		x	x	
9	X			X
10		x	x	
11	X			X
12		x	x	

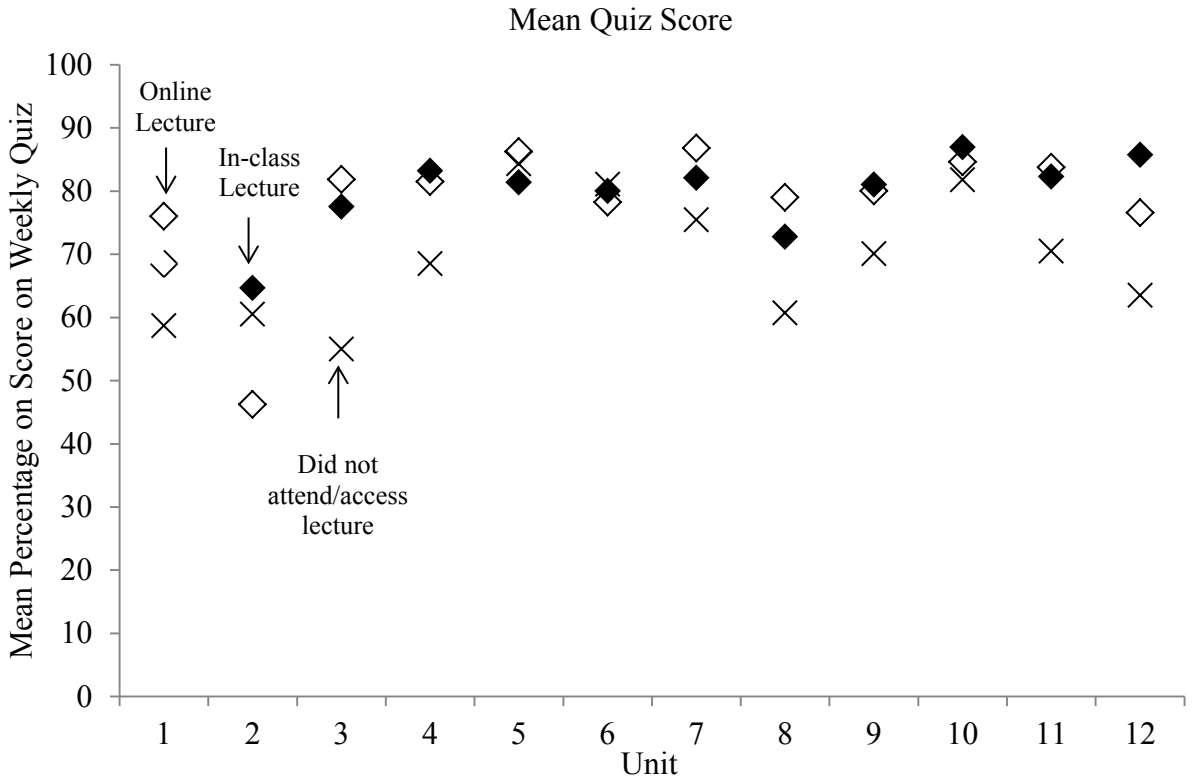
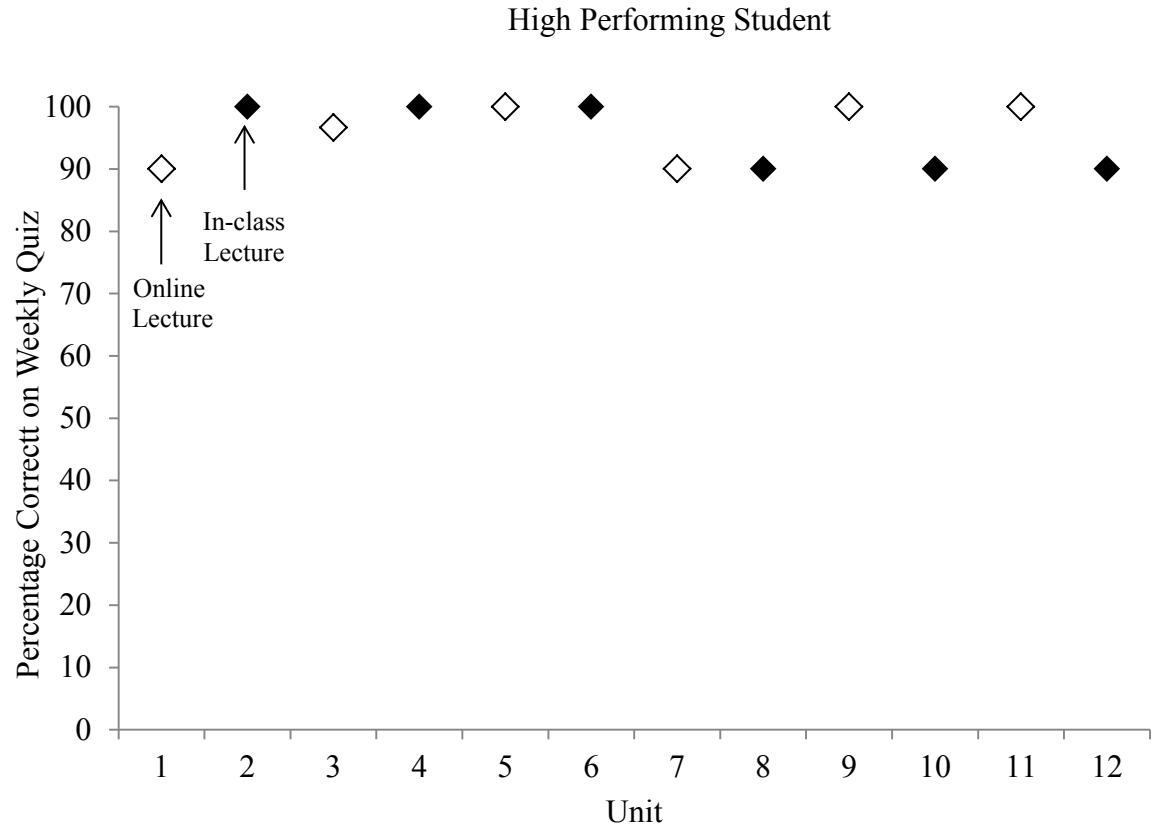


Figure 1: Mean percent quiz scores by unit for online and in-class lecture formats for those students who attended or accessed the lecture. And, mean percent quiz score for those students who did not attend or access the lecture.



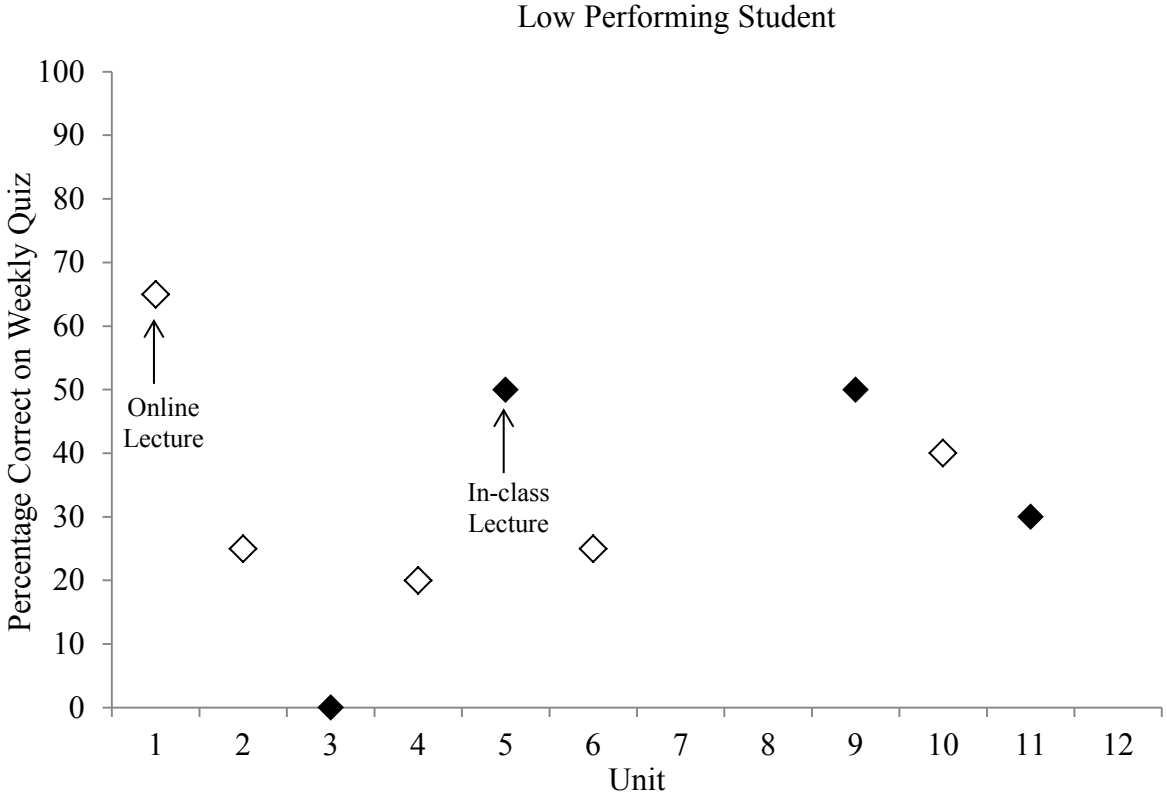


Figure continues

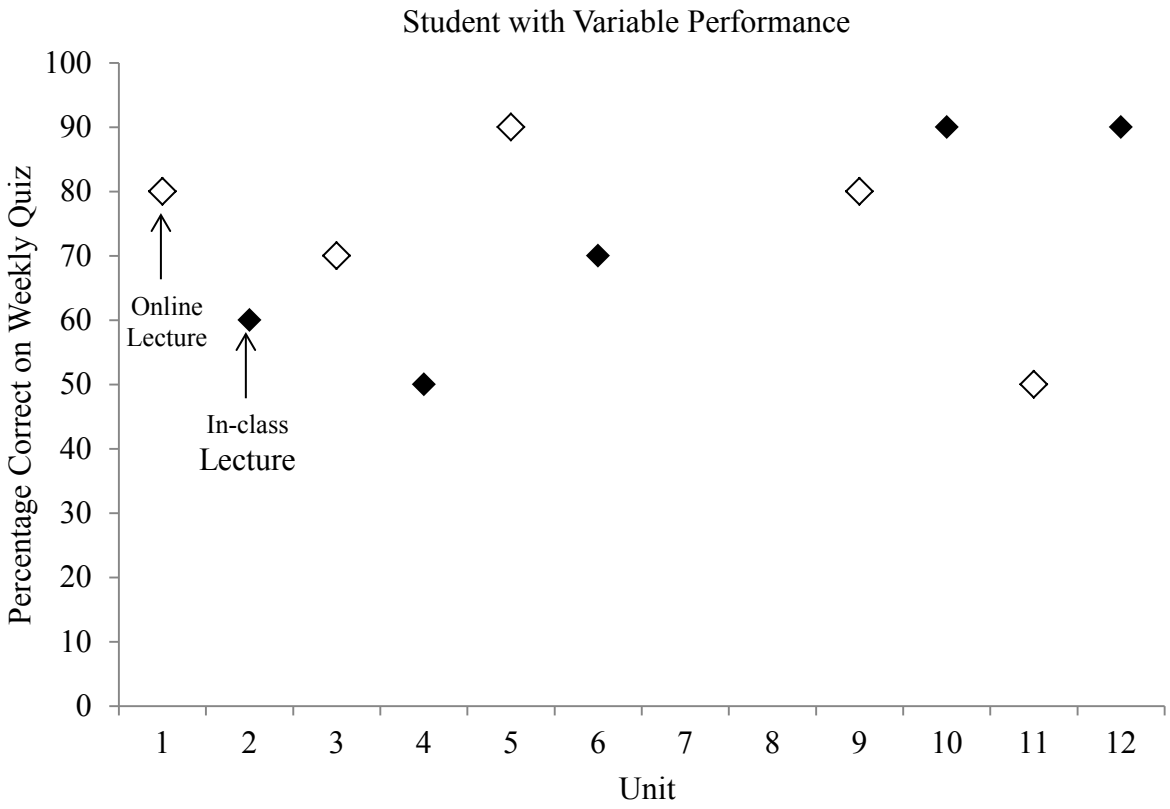


Figure 2: Graphs typical of high performing students, low performing students, and students with variable performance.

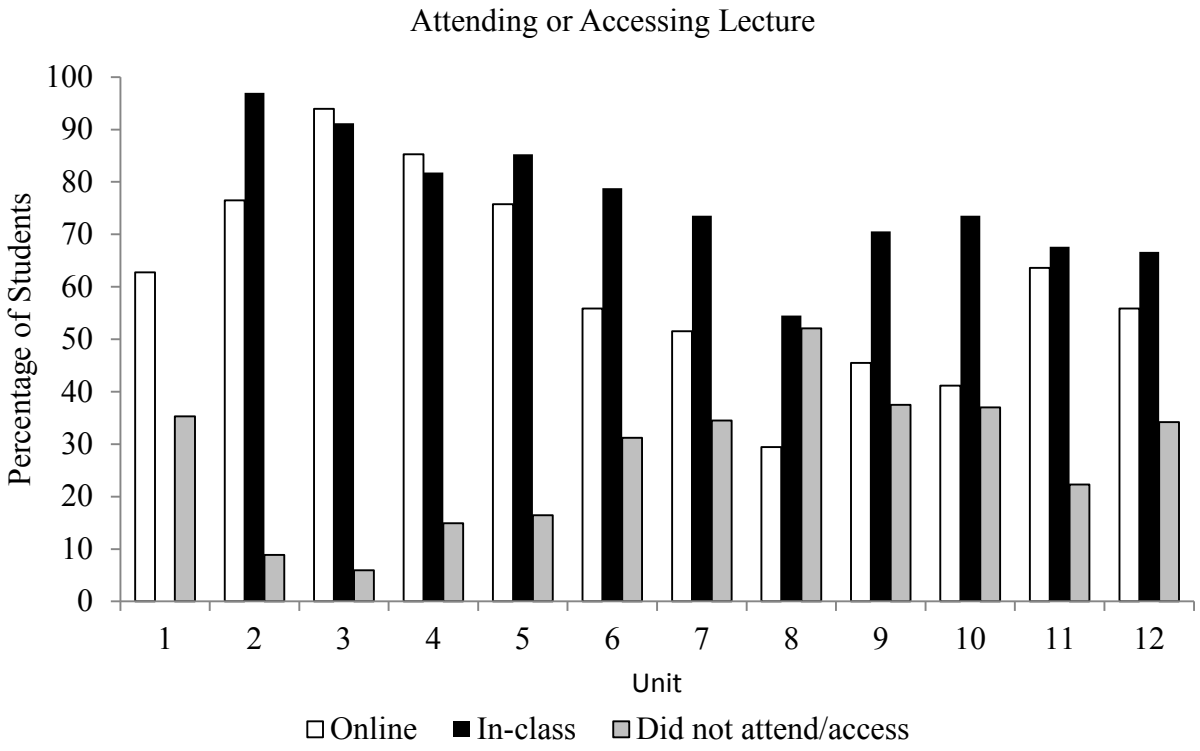


Figure 3: Percentage of students who attended the in-class lecture, accessed the online lecture by unit, or did not attend/access the lecture (note that both sections had the online format for Unit 1, therefore the data is a percentage across both sections).

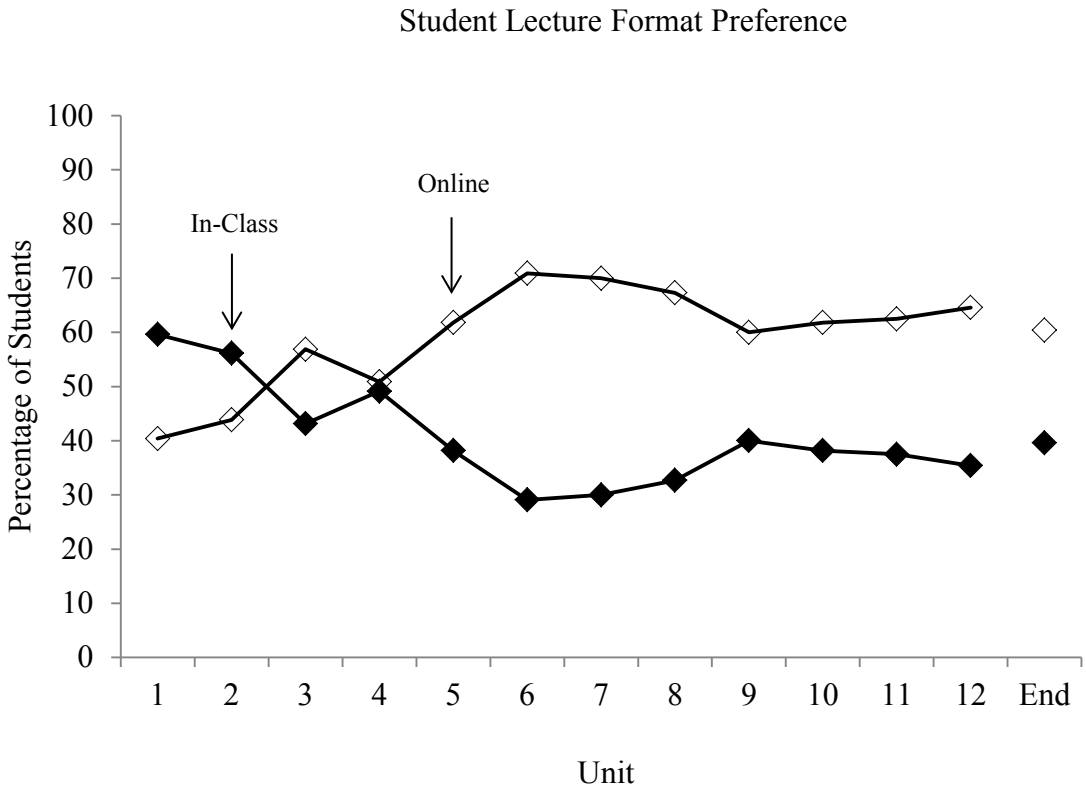


Figure 4: Percentage of students reporting lecture format preference for Units 1 through 12 on the weekly questionnaire, and student report of lecture format preference on the end of semester questionnaire.

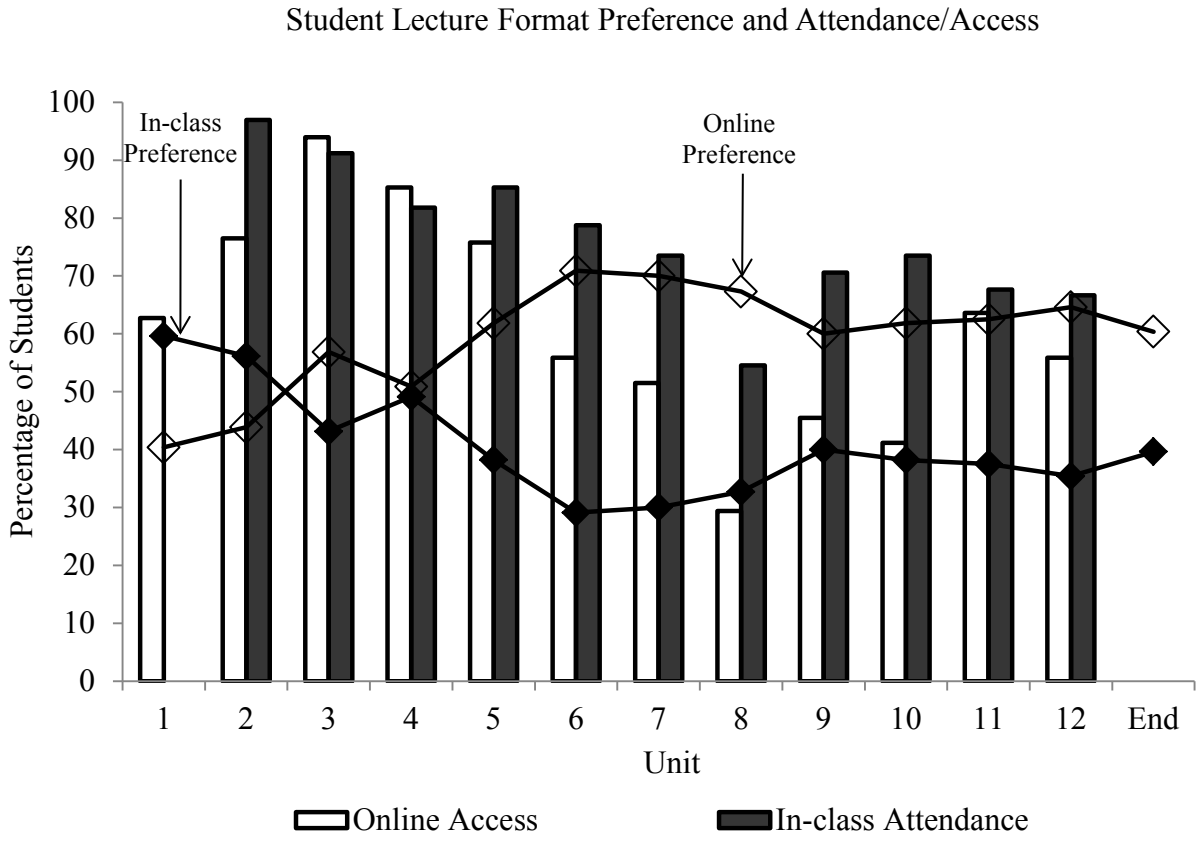


Figure 5: Bar graph illustrating percentage of students who attended the in-class lecture, accessed the online lecture by unit. Data paths show lecture format preference stated by students on the weekly and end of semester questionnaires..

APPENDIX A

COURSE SYLLABUS

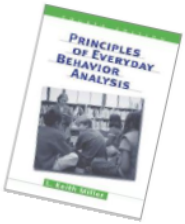
BEHV 2300-004

Behavior Principles 1
Credits: 03

Department of Behavior Analysis
[redacted]

Fall, 2012

Required Materials:



- Principles of Everyday Behavior Analysis - 4th edition L. Keith Miller
- Internet to access additional readings, complete homework and hand in assignments
- Dry erase marker

Course Webpage: [redacted]

Instructor: [redacted]

TAs: [redacted]

[redacted]

Office:	*Location:*	[redacted]360D
	Hours:	M/W/F – 10:00am – 11:50 am other times by appointment
	Phone:	940-565-3538
Class:	M/W/F	9:00 – 9:50AM
	Location:	[redacted]270

Course Description: This course is an Introduction to the field of Behavior Analysis. Behavior is examined as a part of the natural world, with primary focus on principles describing relations between operant behavior and its consequences. The principles of reinforcement, extinction, differential reinforcement and punishment are related to naturally occurring events and to experimental and intervention procedures. Basic measurement concepts are introduced.

COURSE COMPONENTS

Homework

Students will complete thirteen homework assignments on Blackboard Learn worth 10 points each. Homework will include brief scenarios in which students will be asked to identify various components of the scenario and label the processes or procedures using behavior analytic terminology. To earn the 10 points for the homework for each unit, students must complete the homework by 12:30am the morning of the lecture for the unit, **and score *90%* or more**. (13 @ 10 pts. each = 130 pts. total).

Lecture/Discussion

A lecture introducing the material for each section will occur during each week. Lectures will encourage active student responding. Questions and discussions are encouraged. Guided notes for each lecture are available on Blackboard Learn; students are encouraged to print a copy to complete during each lecture. Lectures alternate between on-line format and in-class format. Students must refer to the weekly schedule for details of which lectures will be available on-line. On-line lectures will be available from 7am on Monday until 7am on Wednesday of the relevant week.

In-Class Discussions (ICD)

Students will be asked to engage in fourteen in-class discussions worth 5 points each where students will discuss their behavior change projects, case studies, and scenarios in class (14 @ 5 pts. each = 70 pts. total). ICDs will be available on Blackboard, students must print the ICD and bring it to class. If you are absent on the day of the ICD, you will earn a score of zero.

Quizzes

Students will take twelve quizzes worth 15 points each. The quizzes will primarily cover material from the week's lecture and readings, but may also include any material from lectures and readings from the previous weeks during the semester. During each quiz dry erase boards will be available for scratch paper. You will, however, need to supply your own dry erase markers. Each quiz may be taken 2 times during the class period. Tutoring is recommended and will be available prior to taking the quiz a second time. The ***BEST*** quiz score is the one that will be recorded as your grade. If you are absent on the day of a quiz, you will earn a score of zero. (12 @ 15 pts. each = 180 pts. total).

Behavior Change Project – 120 Points

Purpose: Students will be required to complete a behavior change project. The purpose of the behavior change project is to have students practice applying the principles and procedures discussed within class. In addition to the application of these principles and procedures, students will be required to take data, create graphs and write about the methods and outcomes of their project.

Structure: The behavior change project will be completed in groups of 3-4 students who all choose to increase an existing or establish a new target behavior. The instructor will provide a list of suggested behaviors. If the group decides to select a different behavior than those given by the instructor, the instructor must approve the behavior.

Assessment: The behavior change project is composed of four progress checks each worth 10 points and a final report worth 80 points. To receive points for the progress checks, students will need to complete both the individual and group component. Students will use the four progress checks along with the feedback they receive on those progress checks to write the final group report. A rubric for each progress check and final project can be found on Blackboard Learn. Each of the individual assignments must be uploaded on Blackboard Learn by the due date. Group assignments must be typed and handed in at the

beginning of class/uploaded to blackboard on the day that it is due. Throughout the semester, time within class will be allocated to working on the behavior change project. It will be necessary, however, for you to meet outside of class with your group to complete your project. Due dates for all four progress checks and final project can be found on the syllabus calendar. Assignments handed in after the due dates will not be accepted. Group members who turn in their assignments will not be penalized if another group member does not turn in his or her assignment.

Midterm (100 points) & Final Examinations (100 points)
Students will take a midterm and final exam, students who are absent on the day of the exam will score a zero.

Extra Credit
The instructor may provide several extra credit opportunities throughout the semester. Students will be able to earn up to 15 extra credit points (or the equivalent of one quiz grade) for the entire semester. All extra credit opportunities must be turned in to the instructor by the end of class on November 30th , 2012.

Make-ups
Each student has three make-ups for the entire semester. These make-ups can be used to receive credit for missed work. You can use make-ups for any combination of the following assignments:

- Homework - complete the homework and email the instructor
- ICD - complete the ICD and bring it to office hours for grading
- Quiz - arrange with the instructor to take the quiz during office hours

Grades

Course Grades
12 Quizzes @ 15 points each = 180 points
13 Homework assignments @ 10 points each = 130 points
14 In-Class Discussions @ 5 points each = 70 points
4 Behavior Change Project Progress Checks @ 10 points each = 40 points
1 Behavior Change Project paper @ 80 points = 80 points
1 Midterm Examination @ 100 points = 100 points
1 Final Examination @ 100 points = 100 points
Total Points = 700

***Extra Points Possible* = 15**

Grade Ranges ([points earned/700] x 100%):
A = 90%-100% B = 80%-89% C = 70%-79% D = 60%-69% F = below 60%

Accommodations for Students with Disabilities:
[redacted] is on record as being committed to both the spirit and letter of federal equal opportunity legislation; reference Public Law 92-112 – The Rehabilitation Act of 1973 as amended. With the passage of new federal legislation entitled Americans with Disabilities Act (ADA), pursuant to section 504 of the Rehabilitation Act, there is renewed focus on providing this population with the same opportunities enjoyed by all citizens.
As an instructor, I am required by law to provide "reasonable accommodations" to students with disabilities, so as not to discriminate on the basis of that disability. Student responsibility primarily rests with informing faculty of their need for accommodation and in providing authorized documentation through designated administrative channels. Information regarding specific diagnostic criteria and

policies for obtaining academic accommodations can be found at [redacted] Also, you may visit the Office of Disability Accommodation in the [redacted] or call us at [redacted]

Student Conduct: Each student automatically certifies that any material submitted for grading is his/her own independent work. UNT policies require reporting of plagiarism or any suspected violations that constitute possible academic misconduct. Students are responsible for being familiar with the Code of Student Conduct.

Policy on Academic Dishonesty: Students in all Behavior Analysis courses are expected to maintain academic integrity at all times. Students committing acts of dishonesty including cheating and plagiarism are subject to receiving an "F" in the course. For a more detailed discussion on academic dishonesty, please refer to the Code of Student Conduct and Discipline on pages 108-109 of the undergraduate catalog. The information is also available at: [redacted]

Group work is encouraged; however, in the past there have been situations in which group work could have been considered cheating or plagiarism. "Legitimate" group work takes advantage of consultation with your peers, provides you with ideas, suggestions, corrections, etc., which you take into consideration in the development of your unique and individual product. Examples include reading the text and writing answers to the study guide items, then working closely with other students to compare study guide answers, and to attempt to resolve different understandings. Failing to do the reading and memorizing answers that another student has written for the study guide is not legitimate group work; it is cheating. Drafting the assignments, then comparing specific aspects of your product to others' is appropriate. Copying someone else's work products (or making your work available to another student to copy) is not legitimate; it is cheating. Always, if you are unsure about boundaries of legitimate group work, please (1) ask for clarification from the instructor, and (2) make full disclosure so that there is no question about your intentions. We are very happy to talk about these boundaries and work with you to maximize your learning and maintain individual accountability.

University Class Drop Dates:

Thursday September 12, 2012	Last day to drop without instructor approval
Tuesday October 9, 2012	Last day to drop with an automatic grade of W
Wednesday November 7, 2012	Last day to drop with either W of WF
Thursday November 29, 2012	Last day to withdraw (drop all classes)

5 Tips for Success:

1. Read before you complete the homework – reading first makes the homework easier, and our data shows that students who do the homework get better quiz scores
2. Print out the guided notes to complete during the lecture – research shows that guided notes ensure you have complete and correct lecture notes
3. Maximize your points for the behavior change project by using the rubric on Blackboard
4. Check the weekly class schedule so you don't miss any deadlines
5. Come to office hours – for free tutoring or if you have any questions, queries, comments or concerns

Weekly Class Schedule

The instructor reserves the right to adjust and modify this schedule based on the needs of the students

Session	Activities
Wednesday August 29, 2012	**Syllabus**
Friday August 31, 2012	**BCP:** introduction and group selection
Unit 1: Intro to Behavior Analysis **September 3, 2012**	**Labor Day - No Class** **Homework** Readings: • Miller Lesson 1 • Attitudes of Science – Located on Blackboard On-line homework: Due by 12:30am September 3rd ***ONLINE Lecture: Intro to Behavior Analysis available from 7am Monday September 3rd - 7am Wednesday September 5th***
September 5, 2012	**ICD #1**: Completed in class
September 7, 2012	**Quiz #1:** Unit 1: Introduction to Behavior Analysis
Unit 2: Basic Concepts **September 10, 2012**	**Homework** Readings: • Miller Lesson 2 Definitions of Everyday Behaviors • Skinner (1938) - pp. 23-25 – Located on Blackboard Online Homework #2: Due by 12:30am September 10th **IN-CLASS Lecture:** Basic Concepts
September 12, 2012	**ICD #2**: Completed in class ***BCP**: Select a target behavior, start writing behavioral definition*
September 14, 2012	**Quiz #2:** Unit 2: Basic Concepts

Session	Activities
Unit 3: Measurement & Visual Analysis **September 17, 2012**	**Homework** Reading: • Miller Lesson 6 Visual Analysis of Behavioral Exp Online homework #3: due by 12:30am September 17th. **ONLINE Lecture:** Measurement & Visual Analysis
September 19, 2012	***BCP:*** *Progress Check 1: Individual component due, uploaded to blackboard by 8am Wednesday October 19th.* **ICD #3:** Completed in class
September 21, 2012	***BCP:*** *Progress Check 1: Group component is due uploaded to Blackboard Learn by 8am September 21st* **Quiz #3:** Measurement & Analysis
Session	**Activities**
Unit 4: Positive Reinforcement **September 24, 2012**	**Homework** Reading: • Miller Lesson 8 Reinforcement of Everyday Behaviors Online homework #4: Due by 12:30am September 24th **IN-CLASS Lecture:** Positive Reinforcement
September 26, 2012	*BCP: Progress Check 2: Individual component due, uploaded to Blackboard Learn, by 8am Wednesday September 26th* **ICD #4:** Completed in class
September 28, 2012	*BCP: Progress Check 2: Group component due uploaded to Blackboard Learn by 8am September 28th* **Quiz #3:** Unit 3: Positive Reinforcement
Unit 5: Reinforcer Effectiveness **October 1, 2012**	***BCP:*** *Start collecting 2 weeks of baseline* **Homework** Reading: • Miller Lesson 12 Reinforcer Effectiveness Online homework 5: Due by 12:30am October 1st **ONLINE Lecture:** Reinforcer Effectiveness
October 3, 2012	**ICD #4:** Completed in Class
October 5, 2012	**Quiz #4:** Unit 4: Reinforcer Effectiveness

Session	Activities
Unit 6: Negative Reinforcement **October 8, 2012**	**Homework** Reading: • Miller Lesson 24 Escape and Avoidance Online homework #6:: Due by 12:30am October 8th **IN-CLASS Lecture:** Negative Reinforcement
October 10, 2012	**ICD #5:** Completed in class
October 12, 2012	**Quiz #5:** Negative Reinforcement
Unit 7: Extinction **October 15, 2012**	*BCP: Start collecting 2 weeks of intervention data* **Homework** Readings: • Miller Lesson 9 Extinction of Everyday Behaviors Online homework #6: Due by 12:30am October 15th **ONLINE Lecture:** Extinction
October 17, 2012	***BCP:*** *Progress Check 3: Individual component due, uploaded to blackboard by 8am Wednesday October 17th* **ICD #6:** Completed in class
October 19, 2012	***BCP:*** *Progress Check 3: Group component due uploaded to Blackboard Learn by 8am Friday October 19th* **Quiz #6:** Extinction
Midterm & Tutorials **October 22, 2012**	**Midterm Review:** Units 1 – 7 **Midterm Exam:** Units 1 – 7
October 24, 2012 **October 26, 2012**	***BCP:*** *Tutorials for BCP.* *Bring your group project as it stands to date and your individual data to the tutorial*
Unit 8: Differential Reinforcement **October 29, 2012**	**Homework** Reading: • Miller Lesson 10 Differential Reinforcement of Everyday Behavior Online homework #8: Due by 12:30am October 29th **IN-CLASS Lecture:** Differential Reinforcement
October 31, 2012	**ICD #8:** Completed in class
November 2, 2012	**Quiz #8:** Differential Reinforcement

Session	Activities
Unit 9: Ratio Schedules **November 5, 2012**	**Homework** Reading: • Miller Lesson 13 Ratio Schedules Online homework #9: Due by 12:30am November 5th **ONLINE Lecture:** Ratio schedules *BCP: Progress Check 4: Individual component due, uploaded to Blackboard Learn, by 11:59pm Tuesday November 6th.*
November 7, 2012	**ICD #9:** Completed in class *BCP Progress Check 4: Group component due, uploaded to Blackboard Learn by 8am November 7th*
November 9, 2012	**Quiz #9:** Ratio schedules
Unit 10: Interval Schedules of Reinforcement **November 12, 2012**	**Homework** *Reading:* • Miller Lesson 14 Interval Schedules of Reinforcement *Online homework #10:* Due by 12:30am November 12th **IN-CLASS Lecture:** Maintenance & Generalization
November 14, 2012	**ICD #10:** Completed in class
November 16, 2012	**Quiz #10:** Maintenance & Generalization
Unit 11: Shaping **November 19, 2012**	**Homework** *Readings:* • Miller Lesson 11 Shaping Everyday Behaviors *Online homework #10*: Due by 12:30am November 19th **ONLINE Lecture:** Shaping ***BCP: Final Paper due, uploaded to Blackboard Learn by 9am November 19th***
November 21, 2012	**ICD #10:** Completed in class **Quiz #10:** Shaping
November 23, 2012	**Thanksgiving – no class**

Session	Activities
Unit 12: Punishment **November 26, 2012**	**Homework** *Readings:* • Miller Lesson 22 Punishment by Contingent Stimulus • Miller Lesson 23 Punishment by Contingent Withdrawal *Online homework #12:* Due by 12:30am November 25th **IN-CLASS Lecture:** Punishment
November 28, 2012	**ICD #13:** Completed in class
November 30, 2012	**Quiz #13:** Punishment *Deadline for extra credit end of class*
Unit 13: Coercion **December 3, 2012**	**Homework** *Reading:* • Coercion - Reading on Blackboard Learn *Online homework #13:* Due by 12:30pm December 3rd **IN-CLASS Lecture:** Coercion **ICD #13:** Completed in class
Unit 14: Culture **December 5, 2012**	**Homework** *Reading:* • Skinner (1938) - pp. 412-425 **IN-CLASS Lecture:** Culture **ICD #14:** Completed in class BCP: Graded paper returned
December 7, 2012	**Reading day – no class**
Final **Monday December 10th, 2012** 9am class: 8:00am-10:00am.	**Final:** Units 1- 13

APPENDIX B

QUESTIONNAIRE DISTRIBUTED IN WEEKS WITH IN-CLASS LECTURE

Name: _____ **Date:** _____

Please be honest! I will only be looking at these forms after the final
Your answers will help improve the class for future students

1) Did you attend the lecture this week?

☐ Yes

☐ No

2) Did you complete the guided notes?

☐ Yes

☐ No

3) Which lecture format do you prefer? (it's OK to change your mind from previous weeks!)

☐ Online lectures

☐ In-class lectures

APPENDIX C

QUESTIONNAIRE DISTRIBUTED IN WEEKS WITH ONLINE LECTURE

Name: _____ **Date:** _____

Please be honest! I will only be looking at these forms after the final
Your answers will help improve the class for future students

For EACH question please check ONE box that best describes your behavior this week!

1) How many times did you open the on-line lecture presentation
   - ☐ Once
   - ☐ More than once
   - ☐ I did not open the presentation

2) Looking at all the times you opened the presentation combined:
   - ☐ I read/listened to every slide*/the whole presentation* two times or more
   - ☐ I read/listened to every slide*/the whole presentation* once, and many/some slides more than once
   - ☐ I read/listened to every slide/*the whole presentation* once
   - ☐ I read/listened to more than half of the slides
   - ☐ I read/listened to less than half of the slides
   - ☐ I did not read/listen to any of the slides

3) If you did not read/listen to any of the online lecture please check one box below
   - ☐ I forgot this week's lecture was online
   - ☐ I had problems accessing the on-line lecture
   - ☐ Other Please specify (if you'd like to) _____

4) Did you complete the guided notes?
   - ☐ Yes, I completed all or part of the guided notes
   - ☐ No I did not complete the guided notes

5) Were there any problems with the sound quality/picture quality in the presentation?
   - ☐ No
   - ☐ Yes

   If yes please give a brief description

   _____

6) Which lecture format do you prefer? (it's OK to change your mind from previous weeks!)
   - ☐ Online lectures
   - ☐ In-class lectures

APPENDIX D

QUESTIONNAIRE DISTRIBUTED TO STUDENTS ON THE LAST DAY OF CLASS

BEHV 2300 2012
EUID:_____ Lecture Format 1

Social Validity Questionnaire

1) How helpful were the readings?

1	*2*	*3*	*4*	*5*
Not at all helpful				*Very helpful*

2) How helpful was the homework?

1	*2*	*3*	*4*	*5*
Not at all helpful				*Very helpful*

3) How helpful were the in-class lectures?

1	*2*	*3*	*4*	*5*
Not at all helpful				*Very helpful*

4) How helpful were the online lectures?

1	*2*	*3*	*4*	*5*
Not at all helpful				*Very helpful*

5) How helpful were the guided notes?

1	*2*	*3*	*4*	*5*
Not at all helpful				*Very helpful*

6) How helpful were the ICDs?

1	*2*	*3*	*4*	*5*
Not at all helpful				*Very helpful*

7) How helpful was the tutoring between quizzes?

1	*2*	*3*	*4*	*5*
Not at all helpful				*Very helpful*

8) To what extend did you use the tutoring between quizzes?

1	*2*	*3*	*4*	*5*
Not at all				*Every week*

9) How helpful was the Behavior Change Project

1	*2*	*3*	*4*	*5*
Not at all helpful				*Very helpful*

BEHV 2300 2012
EUID:_____ Lecture Format 2

10) How helpful were the office hours?

1	*2*	*3*	*4*	*5*
Not at all helpful				*Very helpful*

11) To what extend did you use the office hours?

1	*2*	*3*	*4*	*5*
Not at all				*Every week*

12) On average, how long did you prepare/study for each week's class?

13) Please rate the helpfulness of the following aspects of the course:

	Not at all helpful				*Very helpful*
Syllabus	*1*	*2*	*3*	*4*	*5*
Text book	*1*	*2*	*3*	*4*	*5*
Supplemental Readings	*1*	*2*	*3*	*4*	*5*
Grading rubrics/templates	*1*	*2*	*3*	*4*	*5*
Feedback on assignments	*1*	*2*	*3*	*4*	*5*
In-class lectures	*1*	*2*	*3*	*4*	*5*
Online lectures	*1*	*2*	*3*	*4*	*5*

Which lecture format did you prefer? _____

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