

WOULD YOU DO YOUR HOMEWORK FOR A CHANCE TO
IMPROVE YOUR QUIZ SCORE?

Karl J. Zimmerman

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APPROVED:
Traci Cihon, Committee Chair
Shahla Ala'i-Rosales, Committee Member
Todd Ward, Committee Member
Rick Smith, Chair of the Department of
Behavior Analysis

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Students who complete homework generally do better on measures of academic performance such as quizzes, exams, and overall course grades. We examined the effects of contingent access to second quiz attempts on the percentage of undergraduate students completing homework to mastery. The study was conducted in an Introduction to Behavior Analysis course that, historically, had only 70% of students on average completing homework. An adapted multiple baseline design across sections was used for four sections of the course. Students could access a second quiz attempt contingent by meeting the following criteria: the student received a 16 out of 20 on the first quiz attempt or by meeting the mastery criterion of the homework (45 out of 50). We also examined the relation between homework accuracy and scores on first quiz attempts. Two sections did not show a difference in homework completion with and without the second quiz attempt contingency. One section showed more sensitivity toward the contingency once it was withdrawn, and one section never had the removal of the contingency and had the highest percentages of students completing their homework. When analyzing the relation of homework accuracy to the corresponding first quiz attempts, homework accuracy appeared to be related to higher scores on first quiz attempts across all sections. Quiz scores were typically a letter grade higher for students who completed homework compared to students who did not complete homework to mastery. Although there are limitations to the current study, the results suggest the second quiz contingency may impact homework completion.

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Karl J. Zimmerman

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WOULD YOU DO YOUR HOMEWORK FOR A CHANCE TO IMPROVE YOUR QUIZ SCORE?

Many students are not adequately prepared for the transition from high school to college. Students are missing key skills such as selecting which courses to take or the sequence of courses needed to graduate (Venezia, Kirst, & Antonio, 2003). Moreover, the American College Testing (ACT; 2012) reported that only 25% of high school students are proficient in core subjects such as English, reading, mathematics, and science at the transition to post-secondary education. Approximately 30% of these first year college students drop out before their second year of college even begins (ACT, 2013). Although the ACT may not be a predictor of college student's academic behaviors (e.g., studying and homework completion), the high school grade point average may be a better predictor of student's academic behavior in the initial years in college (ACT, 2013). If high school students are not coming into post-secondary education with the necessary prerequisite academic or independent living skills, they are likely encounter failure within the first few weeks of their college careers. Increasing the probability of these students' academic success their first semesters in post-secondary education could help more students continue their college careers.

Michael (1991) noted that most measures of student academic success are derived from the grades student earn on homework assignments and quizzes/test scores. Students lacking the prerequisite skills for core subject areas such as reading and math (ACT, 2012) will likely not perform well on the aforementioned measures of academic success. Many researchers have examined different variables or strategies that promote student success in the classroom (Allday, Bush, Ticknor, & Walker, 2011; Chase & Houmanfar, 2009; Chase et al., 2013; Dougherty & Dougherty, 1977; Glynn, 1970; Theodore et al., 2009; Neef et al., 2007; Neef, Perrin, Haberlin, & Rodrigues, 2011; Witt, Noell, LaFleur, & Mortenson, 1997). There is a solid foundation in

the behavior analytic literature to suggest that Active Student Responding (ASR; Barbetta, Heron, & Heward, 1993; Gardner, Heward, & Grossi, 1994; Gauci, Dantas, Williams, & Kemm, 2009; Jerome & Barbetta, 2005; Kellum, Carr, & Dozier, 2001; Narayan, Heward, Gardner, Courson, & Omness, 1990; Tudor & Bostow, 1991), Direct Instruction (DI; Becker & Gersten, 1982; Gettinger, 1993; Hicks, Bethune, Wood, Cooke, & Mims, 2011; Klahr & Nigam, 2004), and interteaching (Boyce & Hineline, 2002; Saville, Zinn, & Elliott, 2005; Saville & Zinn, 2006; Saville & Zinn, 2009; Sheppard & MacDermot, 1970) are correlated with better class performance and student learning outcomes. Most of these studies linked interventions to quiz scores and all of the interventions took place in the classroom setting. Students lacking independent living skills (Venezia, Kirst, & Antonio, 2003) who also have deficits in core academic subjects may be at even higher risk for failure if course grades are heavily based on homework.

Homework has been defined as work assigned that will be completed outside of the classroom (Harris Cooper, 1989) and it has remained a critical component in every aspect of the educational system. While homework is often more closely associated with elementary and secondary education systems (Cooper & Valentine, 2001), some post-secondary courses either require homework for course points or professors strongly suggest that students complete homework in preparation for subsequent class sessions or for quiz or exam preparation (Rehfeldt, Walker, Garcia, Lovett, & Filipiak, 2010; Ryan & Hemmes, 2005). In a college course that includes a high frequency of homework assignments for which the points earned constitute a large portion of the students' final grades different contingencies may affect student performance than those that have been studied within the classroom setting.

Michael (1991) offered an analysis of why college students may have difficulties completing homework. Teachers utilize aversive techniques to control student behavior, however, through careful planning and course structuring (e.g., frequent deadlines, exams covering larger percentage of grades, and homework pertaining to reading material and lecture material), instructors can minimize the averseness of the coursework. He concluded that college students face a number of competing contingencies that may impact homework completion. In brief, his analysis is easily linked to Rachlin and Green's (1972) seminal work regarding smaller sooner and larger later contingencies. Namely, college students frequently face a number of choice contingencies arranged in a way that creates a choice opportunity to behave toward smaller sooner rather than larger later reinforcers. For some it may be the choice to study for one class now and leave the other class until later due to the deadlines associated with the high stakes assignments in each course; while for others it may be a question as to participate in a co-curricular activity rather than completing homework for their courses; and even worse are the students who choose to go to the bar, watch a movie, or play video games in lieu of completing homework for their courses. Different interventions than ASR, DI, and interteaching may be needed to help students who respond differentially to these choice contingencies to succeed during their post-secondary education.

The competing contingencies for completing out of class assignments that students face are often beyond the scope of what course instructors can control. Few instructors have the ability to alter the schedules of reinforcement associated with the repertoire of responses college students have available to them. So, while the literature suggests that various dimensions of schedules of reinforcement can be manipulated to alter student responding in the desired direction (in essence forcing larger later rather than smaller sooner choices [cf., Neef, Bicard, & Endo, 2001]), this is

generally not an option for college instructors. Instead, some instructors follow educational best-practice suggestions such as requiring frequent and repeated practice of component skills (Binder & Watkins, 2013; Twyman, 1998) or more frequent quizzing (Johnson & Kiviniemi, 2009) and others combine this with requiring mastery of the material before students can move on to subsequent coursework (Martin, Pear, & Martin, 2002; Pear & Crone-Todd, 1999). Nevertheless, students may still be insensitive to these contingencies and will neglect to do homework due to the alternative responses that are available, the associated schedules of reinforcement, or weak prerequisite and/or independent living skills.

Epstein (1983) reported that elementary school students with skill deficits in reading and math tend to have more dependence on parental help to complete homework assignments. The dependence on parental help may inhibit independent study skills (self-control with competing contingencies) that are required as the student progresses through the educational system. With the increasing political demands for students to pass state and national tests, many teachers are teaching students to pass the state required tests rather than taking the time to teach independent learning skills (Menken, 2006; Phelps, 2011). These changing contingencies in elementary and secondary education may prevent some students from beginning their post-secondary education with the necessary study skills. Once in college, students enter into an environment in which most instructors emphasize independent work (consider the progression from elementary to secondary school in which homework not only becomes more difficult, but more and more work outside of the classroom is required for successful class completion [cf., Muhlenbruck, Cooper, Nye, & Lindsay, 2000]) and the stakes become even higher when the students enter university settings.

The confluence of deficits in core academic skills, the lack of independent study skills and some students' tendencies toward smaller sooner rather than larger later behavior patterns may put students who are asked to engage in frequent out of class point earning or study activities at even more risk for academic failure in post-secondary settings. Austin (2000) found that most research on homework completion has focused primarily on elementary aged and high school aged students. The behavior analytic studies that have been conducted with these populations have examined variables such as contingency contracts, parent training, and general classroom management (Goldberg, Merbaum, Even, Getz, & Safir, 1988; Harris & Sherman, 1974; Olympia, Sheridan, Jenson, & Andrews, 1994). Again, these interventions are often not optimal or feasible in college classroom settings.

Alternatively, one variable that post-secondary instructors can manipulate is the points that are contingent upon homework completion. Rather than simply suggesting students complete homework as part of their own self-study for quizzes and exams, instructors can make points available for homework completion. Ryan and Hemmes (2005) investigated the role of point contingencies associated with homework completion on the percentage of homework completion in college courses. They arranged an alternating treatment design to compare the percentage of students completing homework with or without point contingencies for doing so. The results showed that more students completed homework assignments when points were contingent upon homework completion and that those students who completed more homework received higher quiz grades. Homework completed accurately may be even more related to student success than homework completion alone. Harris and Sherman (1974) compared homework to no-homework conditions on elementary school students' classroom performances but investigated how the accuracy of homework completion affected classroom performance. They used negative

reinforcement contingencies (i.e., allowing students to leave school early) for accurate in-class activities corresponding to the homework assigned. The results suggest the importance of accurate homework completion because the increase in homework alone was not sufficient to increase class performance. Once the accuracy criterion was employed; however, class performance increased.

Although these studies are suggestive of the important role homework plays for academic success, not all researchers have found similar results. For example, Rehfeldt et al. (2010) compared the percentage of homework completion, with and without point contingencies, to the corresponding quiz score for graduate students. The authors used an alternating treatment design in which the students were given points for homework completion on weeks that the point contingency was in place. During the weeks that the contingency was in effect, students were not given points for homework completion. Students submitted more work during the weeks in which points were given for homework submission than they submitted the weeks in which there were no points given for homework submissions. Quiz scores, however, were not affected by the contingency. Students scored similarly on the quizzes regardless of the point contingency.

Harris and Sherman (1974), Ryan and Hemmes (2005) and Rehfeldt et al. (2010) all offer useful strategies for instructors who are going to include homework in their course design. Harris and Sherman and Ryan and Hemmes both found that homework completion increased when points were tied to homework completion and both found positive effects of homework completion on quiz scores. Rehfeldt et al. also found that point contingencies increased homework completion but did not see the replication of the effect on quiz scores. From the studies reviewed thus far, one might conclude that if an instructor is going to assign homework, it should be linked to points for the course and that accuracy may be an important variable on

which points are contingent. However, Ryan and Hemmes had very few students who did not complete homework during the point condition and Rehfeldt et al. noted that because graduate students were their participants, most completed (though maybe did not submit) their homework in both conditions. A question then that has not been answered is what to do for the students who are not sensitive to the point contingencies associated with homework completion or for whom these contingencies do not outweigh other smaller sooner contingencies that may affect homework completion.

Recently, behavior analysts have begun to explore specific variables related to college students' procrastination (or making smaller sooner rather than larger later choices [Perrin et al., 2011; Ward, personal communication, May 5, 2014]). Researchers are relating these studies directly to Michael (1991) and Rachlin and Green (1972) for explanations as to why students are more likely to behave toward procrastination (or allocating responding toward smaller-sooner contingencies rather than larger-later contingencies). Perrin et al. (2011) investigated the effect of contingent completion of practice quizzes to access more practice quizzes on procrastination with graduate students. The authors used a multiple baseline design in which students were allowed noncontingent access to five practice quizzes during baseline. During the contingent completion phase, students were required to finish the first practice quiz to gain access to the second practice quiz, and so on. The authors found that the implementation of contingent completion phase decreased student procrastination and quiz scores increased as compared to noncontingent access to practice quizzes.

Ward (2014) is extending Perrin et al. by investigating a module release contingency as compared to noncontingent access to modules on graduate student procrastination. Graduate students were assigned to either an experimental group (release contingency) or a control group

(noncontingent access to the modules). Students in the experimental group were required to complete the entire module in order to unlock subsequent modules. Students in the control group had access to all modules noncontingently. Modules consisted of daily activities that students could attempt multiple times. Student procrastination was measured across how many activities were accessed per day, how many attempts were completed per day, the percentage of total activities completed in the semester, and the percentage of points earned in the semester. Students in the experimental group obtained a higher percentage of points over the duration of the semester and completed a higher percentage of the activities throughout the semester than the students in the experimental group. Students, in the experimental group who received an A in the course accessed the modules sooner and completed the modules before the control group. Although there were no differences in the overall grade between the control and experimental groups, the largest difference occurred for the lower performing students in the experimental group compared to the control group. All of the research in this area points to the suggestion that course instructors should present material and course objectives clearly and effectively (Michael, 1991) and that creating more frequent deadlines or testing on the material more frequently can promote most students behavior away from those patterns associated with procrastination (Malott, 2005).

The recent research on procrastination (Perrin et al., 2011; Ward, personal communication, May 5, 2014) is interesting because it offers strategies that within the college instructor's reach to drive student performance in the desired direction. This is critical given the lack of preparedness with which current students are arriving to the college and university settings. This line of research is moving us closer to answering the aforementioned unanswered question regarding what instructors can do to promote success at the post-secondary level for the students

who are not sensitive to the point contingencies associated with homework completion or for whom these contingencies do not outweigh other smaller sooner contingencies that may affect homework completion.

The Teaching Science laboratory is a research and teaching environment for graduate and undergraduate students of Behavior Analysis who are interested in the development and delivery of effective instruction at the college level. As a result, we frequently research various strategies to improve student performance. As part of the Teaching Science laboratory, several sections of an Introduction to Behavior Analysis course are offered each semester. Three graduate students (Teaching Fellows [TF]) teach these sections of the course, under the supervision of a faculty member in the Department of Behavior Analysis.

The course is designed to include several components and is designed to include many empirically recommended aspects to promote students success. First, students are required to read prior to coming to class and to complete a homework assignment based on key terms in the reading. Homework consisted of 50 fill in the blank questions based on the material covered in the reading (SEE Appendix A for sample of homework questions). Then students attend a course lecture with ASR and optional guided notes. The lecture is given in a PowerPoint format and the guided notes contain the PowerPoint with critical features missing; students fill in the missing portions as the instructor discusses the lecture. Next, students complete an in-class discussion (ICD) activity to mastery through small group, individualized instruction. Finally, students take a weekly quiz comprised of 10 fill in the blank questions worth 2 points each. The questions on the quiz are similar to the questions students complete in the homework assignment (SEE APPENDIX B for sample of quiz questions). Students are allowed to attempt twice and can

receive individualized tutoring between attempts. Students who choose to take a second attempt on the quiz receive the highest grade out of the two quiz attempts as their final score for the quiz.

The course components vary in the timing of their delivery based on what days per week the courses meet. For example, in the class that meets twice per week (see Figure 1), students must complete the reading and homework prior to the first course meeting that week (i.e., Tuesday). Students access the homework via Blackboard Learn and can attempt the homework (50 fill-in-the-blank questions) as many times as needed to meet mastery criterion (45/50 correct or 90%) prior to the first class meeting for the corresponding unit. Although students can attempt the homework as many times as needed, each time the student attempts the homework, the student has to complete the homework in its entirety. The course sequence for sections meeting three days each week is depicted in Figure 2.

In the fall of 2012, only 79% of 196 students enrolled in the Introduction to Behavior Analysis courses completed homework to mastery across the semester. Homework completion data were similar in Spring 2013 when only 77% of 143 students completed their homework to mastery across the semester. Moreover, these data suggested a strong correlation between students who completed their homework to mastery and higher quiz scores. However, it was not unusual for a student to complete his/her first quiz attempt, receive a failing grade, get tutoring and upon taking the second quiz attempt, receive a passing grade. The quiz grade in which the student received may not best represent the link between homework completion and higher quiz scores, but may simply be a byproduct of the tutoring received before the second quiz attempt. Nevertheless, the low percentages of students completing homework posed a concern to the Teaching Science laboratory.

The purpose of the current study then was to identify a strategy based on previous research that would increase the percentage of students completing homework to mastery. Ryan and Hemmes (2005) and Rehfeldt et al. (2010) investigated conditions under which students would be more likely to complete homework assignments (i.e., point contingencies). Our prior course data on student completion of homework suggests that some students were not sensitive to the contingencies for which points were given for homework completion. The current study extends the literature by arranging an alternative contingency to providing points based on homework completion and mastery. Instead, we altered the contingencies in our Introduction to Behavior Analysis Course in an attempt to promote homework mastery for all students by manipulating the availability of the second quiz attempt so that access to it was contingent upon homework completion to mastery. In essence, in addition to getting points for homework completion to mastery, those students who met the contingency could also have a chance to improve their initial quiz score by taking a second try at the quiz. Specifically, we asked 1) what are the effects of contingent access of second quiz attempts on the percentage of students completing homework to mastery and 2) what are the effects of this contingency on corresponding quiz scores?

METHOD

Experimental Course Redesign

We wanted to investigate whether the contingency to access the second quiz attempt would have an effect on homework performance. We implanted two contingencies in order to access the second quiz attempt. The first contingency to access the second quiz was to complete the homework to mastery to gain access to the second quiz attempt according to the following schedule (SEE TABLE 1). Students who completed homework to mastery on time, would receive 10 points for completion of the homework by the due date and would be allowed access to a second quiz attempt. Students who did not complete the homework to mastery on time but completed it before or after the given quiz date, were allowed access to the second quiz attempt; however, these students did not earn points for the homework completion. Students were provided three make-up options for the semester and students who did not complete the homework to mastery on time but completed it before or after the given quiz date could choose to use a make-up and receive the full points for completing the homework to mastery. Students could also access a second quiz attempt if they completed the homework assignment to mastery prior to the day the quiz would be administered. And, students could access the second quiz attempt regardless of homework completion if they achieved a score of 16 or better on the first quiz attempt. The instructor explained these contingencies to the students on the first day of class and gave students a detailed diagram of the contingencies (see Figure 3).

Students who wanted to take a second quiz attempt, outside of the quiz day, had to make an appointment with the TF to schedule a time to take the second quiz attempt. Throughout the semester there were deadlines after which the student could no longer access a second quiz

attempt (see semester schedule in Appendix C for respective units and deadlines). It should be noted that 2nd quiz attempts were not counted as make-ups.

To ensure students took the quiz at the appropriate time, both quizzes had passwords. The two passwords differed to ensure students taking the second quiz met the required contingencies. All students (who attended class on a quiz day) took the first quiz, if the students wanted to take the second quiz (and had met the contingency for taking the second quiz attempt) the students could receive tutoring from the TAs (although tutoring was not required to take the second quiz). Students, who qualified for the second quiz, received the second password from the instructor (once the instructor checked to make sure the student met the contingencies). Students who took the second quiz attempt but who had not met the contingencies were notified (via e-mail) about the contingency to take the second quiz attempts and their second attempt did not count toward his/her grade. This occurred only six times throughout the experiment.

Students were not allowed to make-up quizzes unless the student indicated (either via e-mail or in person) that s/he was not going to make the quiz due to illness or another emergency. If the student indicated that s/he was not feeling well, a doctor's note was required for that student to use a make-up. Each student's decision to miss the quiz was taken on a case-by-case basis. If a student used a make-up for the quiz, the student was allowed to take the second quiz attempt, as long as s/he met one or more of the aforementioned contingencies. All make-up quizzes were taken in the TF's office, under the supervision of a TF or a TA. Tutoring sessions were still available for make-up quizzes after the student completed the first quiz attempt. Almost all students who gave notice prior to the quiz date were given excused absences; however, data were not kept on how many students were given excused absences throughout the semester. Some students gave notice that s/he would not be able to make the quiz after the quiz

had been taken and those students were not allowed to make-up the quiz (receiving a zero for the score, and was counted as a NA for scoring purposes).

Participants and Materials

Students from four sections of an Introduction to Behavior Analysis course were asked if their data could be included in the experimental analysis of the redesigned course contingencies. The experimenter sent an email to each class with a link through www.surveymonkey.com that explained the procedures of the study and allowed students to choose whether or not they consented for their data to be included in the study (see Appendix D). Then, the experimenter sent an email to the students who did not complete the informed consent (see Appendix E). If a student did not respond to the course wide e-mails, leaflets, and personal e-mails his/her data were not included in the data analysis. Students could opt in or out of the study beginning the fourth week of the semester and the option remained available until the final exam. A social validity questionnaire was going to be given on the last day of finals but, due to the university being closed for due to an ice storm, the final was given online and the social validity questionnaire was never given to the students.

The number of students who provided consent ranged from 18 to 28 across course sections. Twenty-eight students from Section 4 participated, 11 students did not consent, and two students did not respond. Twenty-seven students from Section 3 participated, 11 students did not consent, and five students did not respond. Eighteen students from Section 5 participated, 15 students did not consent, and eight students did not respond. Twenty-five students from Section 2 participated, seven students did not consent, and 10 students did not respond. In total, 98 students participated, 44 students did not consent, and 25 students did not respond.

Course Sections 4 and 5 met three times per week (Monday, Wednesday, and Friday) for 50-min periods. Course Sections 2 and 3 met twice per week (Tuesdays and Thursdays) for 80-min periods (see Appendix C for a representative course syllabus for Sections 4 and 5). The syllabi for Sections 2 and 3 contained the same information as the syllabi for Sections 4 and 5; however, the times in which the sections met were different.

Miller (2006) *Principles of Everyday Behavior Analysis* (4th Ed.) was the primary text for the course; students also read four supplemental articles throughout the semester. Students could access all required course materials (except for the textbook) on Blackboard Learn™.

Independent Variable

The independent variables were the contingencies to access second quiz attempts; namely, that in order to get access to a second quiz attempt students had to have completed their homework to mastery prior to the quiz day. We chose to withdraw the contingency in a staggered fashion across course sections rather than adding the contingency throughout the semester in order to decrease the probability of student complaints that were likely to occur if additional contingencies were added mid-semester. For example, from the students' perspective, if we had initially allowed second quiz attempts noncontingently and then placed an added contingency (homework completion) to obtain access to a second quiz attempt, students may argue the added contingency was not fair.

Dependent Variables and Data Analysis

Following the quiz attempts, we collected the data (homework scores, homework completion date, quiz one and quiz two scores) and put those data into Microsoft Excel™ spreadsheets. We did not calculate the non-attempts (defined as a student not attempting either a

homework attempt or quiz attempt) in the mean quiz scores; however, we recorded the non-attempts in the overall class percentage. The highest completion for all the homework attempts was kept as the final score (e.g., if there were three attempts - 25, 33, and 40 - then 40 was the number that was placed in the total correct column). If the student was still working on the homework, a zero was placed in the total correct column until the student completed the the homework.

We assessed the effects of the homework mastery on five levels of homework completion: 1) homework completed on-time, 2) homework complete before the quiz, 3) homework completed after the quiz, 4) homework not completed to mastery, and 5) non-attempts at the homework assignment. Students mastered the homework when they answered 90% of the questions correctly (45/50 correct). Students could attempt the homework as many times as s/he desired. Each time a student submitted a homework attempt, the incorrect answers were identified as earning a 0 points (out of 1 point per question), and the correct answers were indicated as earning point. Students could also see the total score for the homework assignment (e.g., 41 out of 50 possible points).

Homework completed on time was defined as homework completed before the lecture began. Homework completed before the quiz included all homework completed to mastery after the due date, but prior to the lesson's quiz date. We defined homework completed after the quiz as homework that was completed after the due date for the homework and after the originally scheduled quiz. Attempted homework that did not meet mastery criterion was defined as homework not completed to mastery. Finally, non-attempts were defined as homework that a student never attempted.

Aggregate homework completion, at the aforementioned levels, was calculated for each course section. In order to obtain the percentage of homework completion at the various levels we divided each dependent variable count by the total number of students. We calculated the number of students who met the contingency by adding the total number of students who completed the homework on time, before the quiz, and after the quiz and divided the sum by the total number of students. We also calculated the grades across each section, associated with the contingency and contingency withdrawal condition, by averaging the grades of the students meeting mastery criterion and by averaging the grades of the students not meeting mastery criterion.

Experimental Design

The staggered removal of the homework/quiz contingencies paralleled that of a multiple baseline design (Baer, Wolf, & Risley, 1968); however, contingencies were lifted on the basis of the data from the group of students in the course section not based on individual student data. Each course section served as a single tier in the experimental design. We also included a reversal (Baer, 1975) back to the homework mastery to second quiz attempt contingency for Section 4 for the final two units. In order to determine which class would experience the withdrawal of the homework to quiz contingency, one course section (section 4, 3, 5, and 2 respectively) was drawn at random after three weeks. For subsequent withdraws, each week we discussed and analyzed the data before the homework to second quiz attempt contingency was withdrawn from the next class section. Every third week, we conducted a visual analysis of the data (after the homework to second quiz attempt contingency withdrawal from section four) and we used those data (based on stability) to choose which class would have homework to second quiz attempt contingency withdrawn.

Interobserver Agreement (IOA) and Treatment Integrity (TI)

IOA was not conducted because Blackboard Learn™ automatically updated and loaded the quiz scores and homework scores/attempts electronically to the grade center. TI was conducted once a week after all the quiz scores were put inputted (see Table 1). Treatment integrity included viewing student quiz attempts and identifying whether students (taking the second quiz attempt) met the contingencies. Treatment integrity was 99% (range, 98% to 100%) across the entire semester.

RESULTS

Figure 4 depicts the average percentage of students who completed homework both with and without the second quiz attempt contingency across the four course sections. Section 2 had the homework to quiz contingency in place for the duration of the semester. These data suggest the homework completion to mastery contingency was associated with higher overall homework completion to mastery across three out of the four sections. Homework completion for Section 4 was equal in both conditions. The removal of the homework mastery contingency produced lower percentages of homework mastery overall. Section 2 had the homework mastery contingency in effect throughout the entire semester and also had the highest percentages of homework completed to mastery compared to the three sections for which the contingency was withdrawn.

Figure 5 shows the multiple baseline across class sections graph in which the implementation of the independent variable (homework mastery contingency to gain access to second quiz attempts) was staggered across the four class sections. In the first tier (Section 4), the percentage of students completing homework to mastery before the quiz shows a slight upward trend during baseline (range, 71% to 89%). Section 4 was the first section for which the homework mastery contingency was removed, while the homework mastery contingency remained in Sections 3, 5, and 2. After the removal of the homework mastery contingency, the percentage of students completing homework to mastery before the quiz decreased slightly (range, 67% to 89%) while the levels in the other three sections when the experimental contingency was in effect remained stable with slight upward trends.

The second tier in depicts the data for Section 3. In baseline (weeks 1 through 6), the percentage of homework completion varied from 67% to 96% while the homework to mastery

contingency was in place. Unit 3, in which only 67% of students' completed homework to mastery was an outlier; otherwise, the data remained stable. The homework mastery contingency was removed in weeks 7 through 12 and the percentage of students completing homework to mastery before the quiz decreased (range, 44% to 85%). The removal of the homework mastery contingency produced the largest difference between when the homework to mastery contingency was in place and after it was removed in Section 3 as compared to other sections. The percentage of students completing homework to mastery was higher when the experimental contingency was in effect (average = 87%; range, 67% to 96%) than after it was removed (average = 69%; range, 44% to 85%).

The third tier shows the data for Section 5 that had the homework to mastery contingency in place from Units 1 to 9. In this condition, homework completion ranged from 67% to 94%. The first five units had a slight downward trend, while in Units 6 to 9 there was an upward trend. The homework to quiz contingency was withdrawn for the remainder of the units (10-12) and the percentage of students who completed homework to mastery before the deadline showed a downward trend (range, 72% to 89%). Although a downward trend was seen with the withdrawal of the homework mastery contingency, the percentage of students completing homework to mastery did not seem to be affected by the removal of the homework to mastery contingency. When the experimental contingency to access the second quiz attempt was in effect, homework completion averaged 81% (range, 67% to 94%) completion, whereas homework completion after the removal of the contingency averaged 78% (range, 72% to 89%) completion.

Section 2 (fourth tier, figure 5) had the homework mastery contingency in place throughout the entire semester. Section 2 had the highest overall percentage of students meeting

mastery criterion on homework with a range of 84% to 100% of students completing homework to mastery.

Going back to tier 1 (Section 4), in week 11 the homework to mastery criterion was put back in place and the percentage of students' homework completion on the final two weeks was 89% and 64%, respectively. Although the percentage of students completing homework to mastery before the quiz dropped slightly from when the experimental contingency was in effect to the first removal of the contingency, it is not clear whether the contingency of homework completion to mastery was effective for Section 4. When the contingency was put back in place, the last unit's homework completion dropped below previous levels when the experimental contingency was originally in effect.

DISCUSSION

We manipulated the availability of second quiz attempts by making access to the second quiz contingent upon homework mastery for the corresponding unit. Overall, homework mastery increased when the experimental contingency was in place (Figure 4). However, in two sections (Sections 4 and 5) the homework to mastery contingency did not appear to have an impact. Students in Section 4 mastered approximately 79% of homework in both conditions. Students in Section 5 mastered approximately 81% of the homework during the contingent mastery phase and mastered approximately 79% of the homework when the contingency was removed. A 2% increase in homework mastery may not be due to the contingency itself. In contrast, Section 3 had the largest difference between phases. During the contingency phase, students mastered 87% of the homework, when the contingency lifted, the percentage of students completing homework to mastery decreased to 69%. These data are suggestive of the effectiveness of placing the homework mastery contingency to access the second quiz attempt. Section 2 had the homework mastery contingency the entire semester and the percentage of students completing homework to mastery was the highest in Section 2 across the semester. Not only did Section 2 have the highest average percentage of students completing homework to mastery, but Section 2 was also the only section to have 100% homework mastery across the duration of the semester (see Figure 5).

We also examined the relation between homework completed accurately and quiz scores. Higher quiz grades were associated with accurate homework completion, regardless of whether or not the homework to mastery contingency was in effect (see Figure 6). Across all sections, students mastering homework assignments typically scored higher on first quiz attempts by approximately 20% (equivalent to a two-letter grade difference). These findings are consistent with previous literature (Harris & Sherman, 1974; Ryan & Hemmes, 2005) in which homework

completion was positively associated with subsequent quiz scores and classroom performance. Although the homework to mastery contingency seemed to affect students' homework completion for two out of the four sections, these data should be viewed cautiously.

There are several potential explanations as to why data were variable across sections with and without the contingency of homework completion in place. First, the difference in teaching style may explain the differences between the two sections in which the contingency did not appear to have an effect and the two sections in which the contingency appeared to have a stronger effect. Sections 2 and 3, with the highest percentage of students completing homework to mastery, were taught by one TF and Sections 4 and 5 were taught by a different TF. The variations in teaching techniques may account for the differences that were noted between sections. For example, the way in which the homework was given to the students (Sections 4 and 5 were given homework that randomized the questions on each attempt and Sections 2 and 3 were given homework that was not randomized). This inconsistency could explain the difference between sections, and could be a potential confound in the study. The data for Sections 2 and 3, however, seems to suggest that for these sections the homework to mastery contingency was effective in increasing the percentage of students who completed homework to mastery. A second explanation for the differences in performance between the courses could be a result of the points allocated for homework completion (10 points) and the points allocated for the quiz (20 points). Across all sections, the percentage of students who completed homework on time was typically lower than the overall percentage of students who completed the homework (i.e., summation of homework completed on time, before the quiz, and after the quiz). These results seem to suggest the students may not have been sensitive to the point contingency for homework mastery, competing contingencies diminished the value of the point contingency of completing

the homework on time, or that the contingency was withdrawn contingent upon the behavior of the group (all students in a course section) rather than contingent upon individual student behavior. The quiz was worth twice as many points as the homework, and students may have been more sensitive to this contingency or students may not have been sensitive to the contingency at all because their data were lost in a mean percentage of students completing homework not his/her individual homework completion. A third explanation could be that there were multiple contingencies in place (some intended, others unknown). Student procrastination could have played a role in the study. Data were collected on the date in which students mastered the homework and students typically mastered the homework closer to the deadline. However, if student procrastination could explain the results, one would expect to see the same variability across all course sections that experienced the experimental manipulation.

The current study has some limitations. The first limitation is that for two sections (Sections 3 and 2) homework was not administered in the same manner as in the other two sections. The homework questions in Sections 4 and 5 were randomized each time the student attempted the homework, whereas for Sections 2 and 3, the homework questions were not randomized. However, if the randomized questions had an effect on the student's behavior, one would expect the data from Section 3 to have remained relatively stable when the contingency was withdrawn. Once the contingency was withdrawn, the average homework completion decreased for Section 3. These data seem to suggest that students may have been sensitive to the second quiz attempt contingency. Section 2, however, did not have the contingency removed and the difference in homework completion may have been a function of the questions not being randomized. Replication of these findings may provide cleaner results.

A second limitation is that student acceptability of the contingency was not assessed. The social validity questionnaire was not given to the students due to the closing of the school during finals week. Most students were given the final exams online and never received the questionnaire. Understanding if the students enjoyed or disliked the format of the contingency may be helpful in understanding the variability across sections. Student feedback on the acceptability of the intervention is also important for instructors to consider when arranging the course structure.

A third limitation could be the differences in points between homework and quizzes (i.e., in order to receive 10 points students had to have completed 45 out of 50 questions, whereas students had to correctly answer 10 questions to receive a 20 on the quiz). The response effort for the homework completion could have had an effect on the student's behaviors. Future research could manipulate the points that are contingent upon homework completion (the homework completion was worth 10 points, whereas quiz potential points could be 20 points) by making homework worth more points or by manipulating the number of questions in either the quiz or the homework to make them of equal effort. The number of questions (50) may have also caused ratio strain for some students. Future research should investigate whether having fewer homework questions makes the current manipulation more effective while still producing higher quiz scores or by allowing the students to answer only those questions on which they erred (rather than the entire homework assignment).

Fourth, the feasibility of the implementation of the contingency may be difficult for classrooms that are much larger in size. All of the course sections had no more than 45 students, which made checking whether or not students met the criterion to take the second quiz attempt much easier than if the courses had 100 or even 500 students. Even with the relatively small

course sections, some students were still able to take the second quiz without meeting the mastery criteria. Future research should investigate the feasibility of the implementation of the contingency management with larger courses. One idea for future research with a larger class is to allow for adaptive releases on the second quiz attempts. The adaptive release would only allow students to take the second quiz if the student met the criteria. Although the instructor would have to program the adaptive release, it may be more feasible for the implementation of the contingency management for larger class sizes. Another idea for future research could place the homework to mastery criterion contingent upon individual student behavior rather than the average behavior of all students in the course. However, this contingency would be even more difficult to manage for larger class sizes unless adaptive release could be programmed based on the individual behavior rather than that of the group.

While procrastination was not directly assessed in the current study, researchers may want to investigate the methods used in the literature (Perrin et al., 2011; Ward, 2014) in conjunction with the contingencies that were manipulated in the current study. College students face many competing contingencies that may interfere with educational goals (Michael, 1991). Merging the two sets of course contingencies may decrease procrastination as well as increase homework completion to mastery. Splitting homework up in smaller sections (as opposed to having to complete all 50 questions in a row) and requiring students to complete each portion before moving onto the next section may encourage students to begin the activities sooner as well as improve homework accuracy (personal communication, Teaching Sciences Lab meeting discussion, 2013). Decreasing procrastination while increasing accuracy of homework completion may then lead to overall improvements in student academic performance.

The results from the current study extend the literature on increasing college students' homework completion (Ryan & Hemmes, 2005; Rehfeldt et al., 2010) through arranging the contingencies that make it more probable that students will complete homework. Course instructors should be cautious when making decisions upon the results of this study alone. The data from the current study suggests that manipulating quiz availability could have an effect on homework completion within a specific context (the Teaching Sciences lab and the corresponding Introduction to Behavior Analysis course which is designed in a particular fashion). With much of the literature regarding homework completion involving elementary and secondary school students (Carr, 2000) the results provide a means by which an instructor may be able arrange the contingencies for college student success. The demonstrated positive relation between homework accuracy and first attempt quiz scores adds to the current literature (Ryan & Hemmes, 2005; Harris & Sherman, 1974) through a replication of earlier findings. Furthermore, Michael (1991) indicated that it is the instructor's responsibility to analyze the contingencies operating on student behavior and to arrange the environment for student success. As most students are not coming to college prepared to take college coursework (ACT; 2012) and the instructor may have difficulties arranging the environment for each individual. The methods employed in the study offer a possible solution by which the instructor can increase the probability of students completing homework assignments thereby supporting students to be better prepared for quizzes/tests and potentially increasing academic success.

Table 1

Definitions to Gaining Access to the Second Quiz

Homework completed on time	Student received 10 points and had access to second quiz
Homework completed before quiz	Student received 0 points and had access to second quiz
Homework completed after quiz	Student received 0 points and could take second attempt before deadline
Homework not attempted	Student received 0 points and had to complete homework before taking second quiz attempt
Homework mastery not met	Student received 0 points and had to complete homework before taking second quiz attempt

Table 2

Treatment Integrity of Students Taking Second Quiz Attempt

Unit	Met Contingency	Did not Meet	Valid Attempt	Invalid Attempt	Percentage
1	87	11	96	2	98
2	78	20	96	2	98
3	78	20	98	0	100
4	84	14	98	0	100
5	86	12	98	0	100
6	86	12	97	1	99
7	85	13	98	0	100
8	80	18	98	0	100
9	80	18	98	0	100
10	77	21	97	1	99
11	83	15	98	0	100
12	65	33	98	0	100

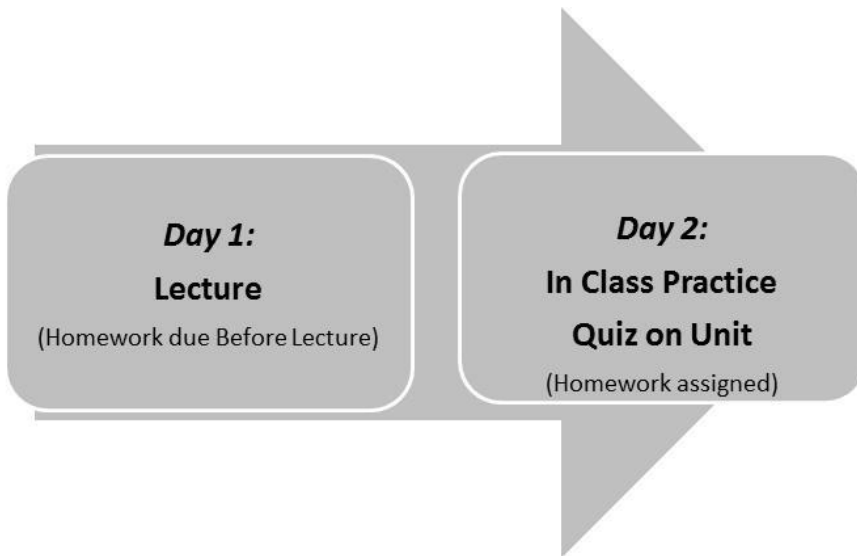


Figure 1. Course structure for Sections 2 and 3.

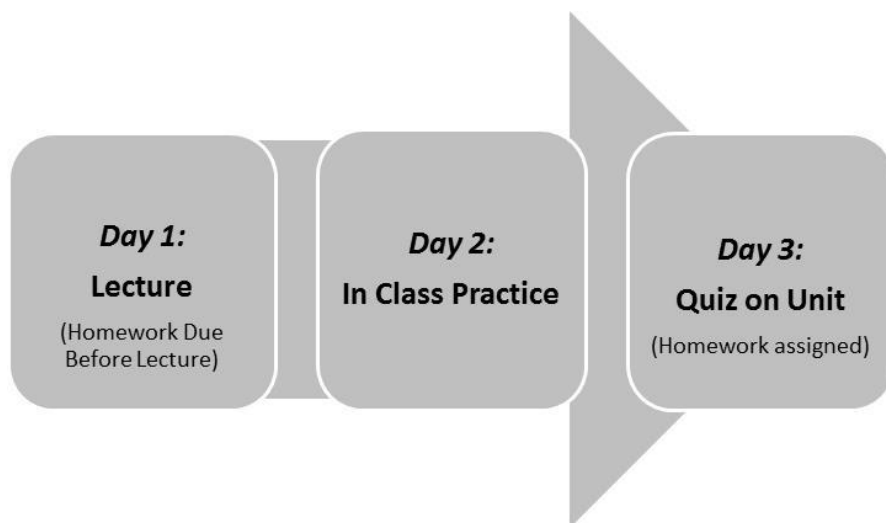


Figure 2. Course structure for Sections 4 and 5.

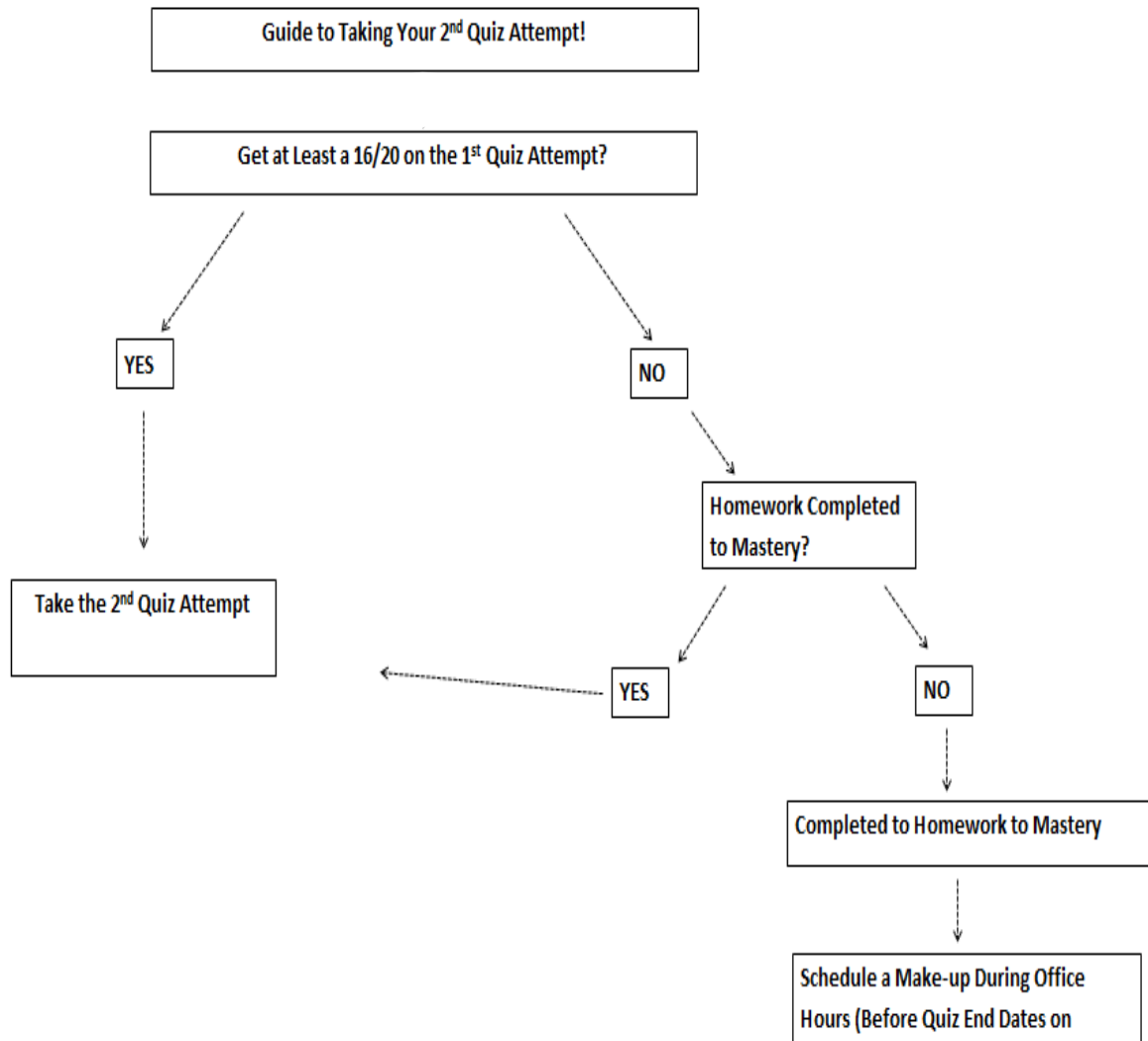


Figure 3. Flow chart given to students to identify how to meet the contingencies of taking the second quiz attempt.

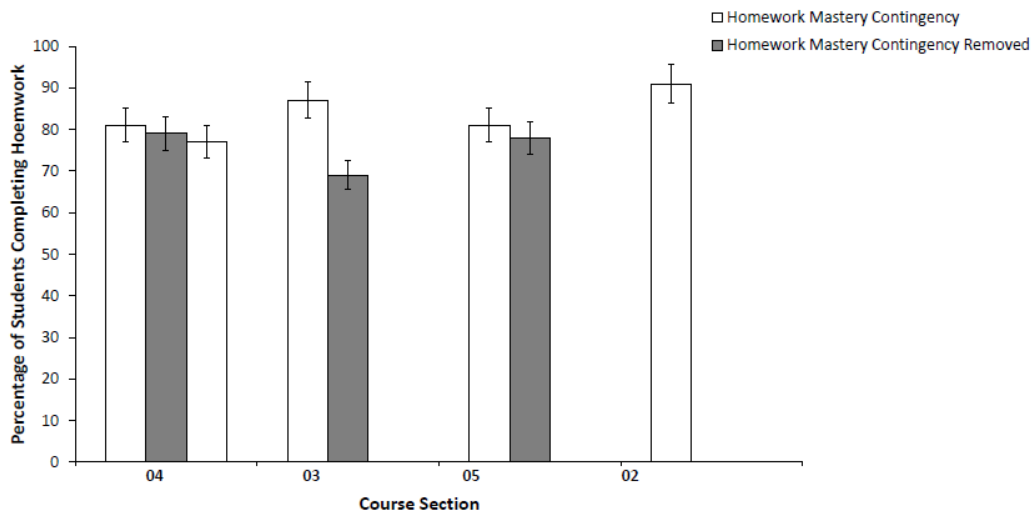


Figure 4. Average percentage of homework completion across sections with the homework mastery to second quiz attempt contingency and withdraw of the homework mastery contingency. The white bars represent the average percentage of homework completion throughout the semester with the homework mastery contingency in place. The grey bars represent the average homework completion throughout the semester without the homework mastery contingency in place. Section 4 had the contingency reinstated for the last two units.

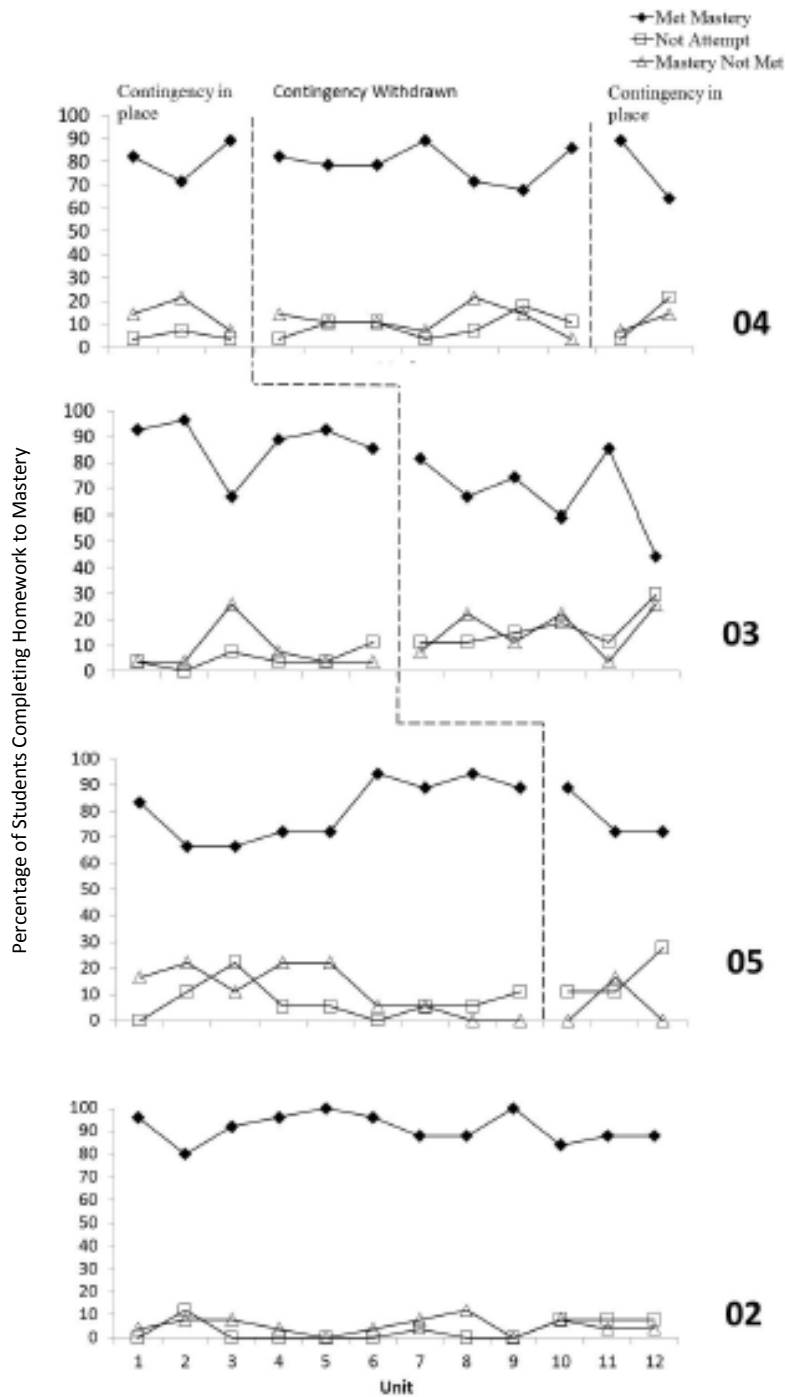


Figure 5. This figure shows the data from the multiple-baseline across class sections. The closed diamonds represent the percentage of students who completed homework to mastery, open triangles represent the percentage of students who completed homework but not to mastery, and the open squares represent the percentage of students who did not attempt

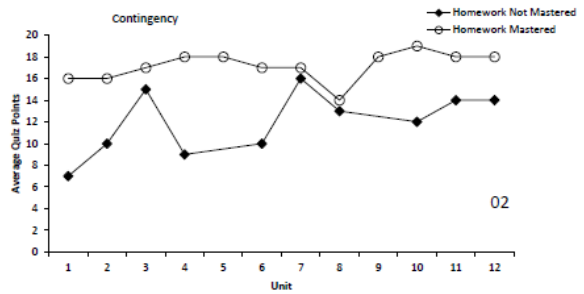
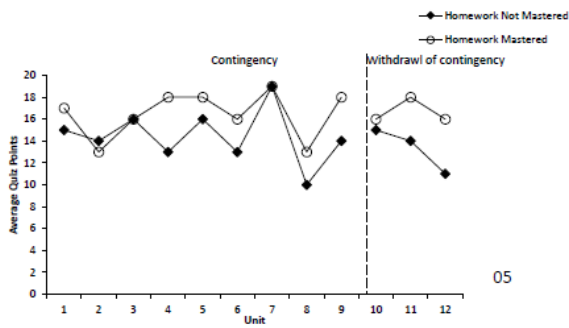
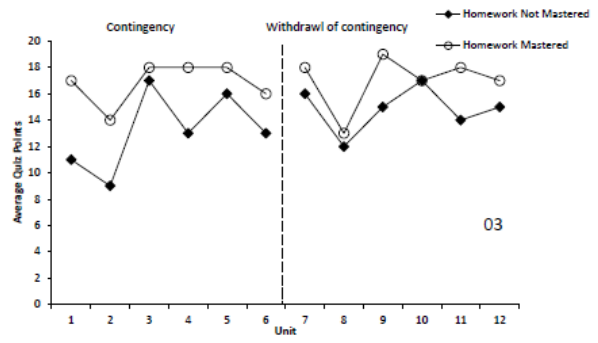
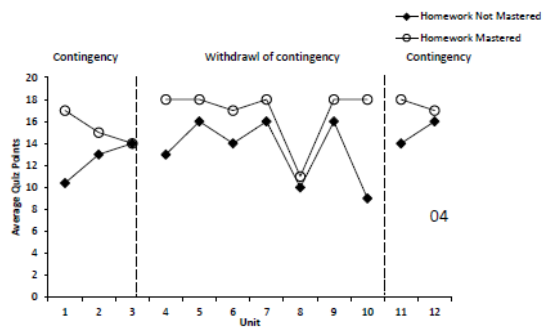


Figure 6. Quiz scores for students' first attempts on quizzes across the semester. The closed squares represent the average quiz score for students who did not complete homework to mastery; open circles represent the average quiz score for students who did complete homework to mastery.

Appendix A

Homework Questions Sample

Question 1 A positive reinforcer is any event that <input type="text"/> a behavior and <input type="text"/> the rate of the behavior.	1 points <input type="button" value="Save Answer"/>
Question 2 <input type="text"/> is the procedure of using a positive reinforcer to increase the rate of a behavior.	1 points <input type="button" value="Save Answer"/>
Question 3 A positive reinforcer must be a consequence. It must come <input type="text"/> (before/after) a behavior.	1 points <input type="button" value="Save Answer"/>
<input type="button" value="For Blank 1"/>	
Question 4 A positive reinforcer is a(n) <input type="text"/> , while positive reinforcement is a <input type="text"/> .	1 points <input type="button" value="Save Answer"/>
Question 5 When using the procedure of positive reinforcement, you do not reinforce a person; you reinforce their <input type="text"/> .	1 points <input type="button" value="Save Answer"/>
Question 6 An event that follows a behavior but does not increase its rate should be labeled a(n) <input type="text"/> .	1 points <input type="button" value="Save Answer"/>

Appendix B

Quiz Question Sample

Multiple Attempts Not allowed. This test can only be taken once.
This Test does not allow backtracking. Changes to the answer after submission are prohibited.

Question Completion Status:

⏪ ⚠ Moving to the next question prevents changes to this answer.

Question 1 of 10 >

Question 1

2 points Save Answer

Positive reinforcement is a procedure with two critical features: 1. An event must the behavior, 2. The rate of the behavior has to .



⏪ ⚠ Moving to the next question prevents changes to this answer.

Question 1 of 10 >

Appendix C
Course Syllabus

BEHV 2300-005

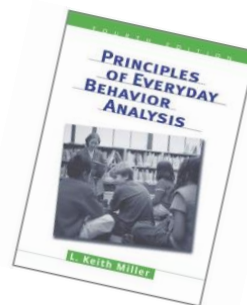
Behavior Principles 1
Credits: 03

Department of Behavior Analysis
[REDACTED]

Fall, 2013

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 for weekly quiz/midterm/final



Course Webpage: <https://learn.unt.edu/>

Instructor: [REDACTED]

TA: [REDACTED]

TA: [REDACTED]

Office: *Location:* [REDACTED]
When: M/W/F: 11:00 – 12:00 PM
other times by appointment
Phone: (940) 565-3538

Class: *M/W/F* 12:00 -12:50 PM
Location: [REDACTED]

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

Reading

Each week the course instructor will assign one or more readings. The majority of readings will be from the course textbook. Other required readings will be posted on Blackboard Learn (BB). See Weekly Class Schedule (attached) for details.

Homework – 130 Points

Students will complete 13 homework assignments on Blackboard 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 each homework assignment, students must complete the homework before the start of the lecture and score 90% or more. Most homework assignments are 50 questions. To earn 90%, a student must correctly answer at least 45 of 50 questions. **Homework MUST be completed (45 or higher out of 50) in order for students to take a second quiz attempt. See quiz section for further details.**

Lecture/Discussion

A lecture introducing the material for each section will occur during each week. Lectures will encourage active student responding (either chorally or using response cards). Questions and discussions are encouraged, and Blackboard Learn™, Release 9.1, offers several venues for doing so (e.g., discussion boards, instant message, etc.). Guided notes for each lecture are available on Blackboard; students are encouraged to print a copy before class to complete during each lecture. No printing will be done in class once the lecture has started.

In-Class Participation (ICP) – 130 Points

Students will be asked to engage in 13 in-class discussions worth 10 points each where students will discuss their behavior change projects, case studies, and scenarios. ICDs will be available on Blackboard to print in class after the lecture.

Quizzes – 240 points

Students will take 12 quizzes worth 20 points each. Each quiz will be comprised of ten fill-in-the blank questions worth two points each, and will be taken in class via Blackboard Learn. 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 of the semester (i.e., they are cumulative). During each quiz dry erase boards will be available for use as scratch paper. You will, however, need to supply your own dry erase markers. There will be two versions of each quiz, and students who are not happy with their first score can take the second quiz during the *same* class period. In order to take the 2nd quiz attempt in the *same* class period, you must meet one or more of the following criteria:

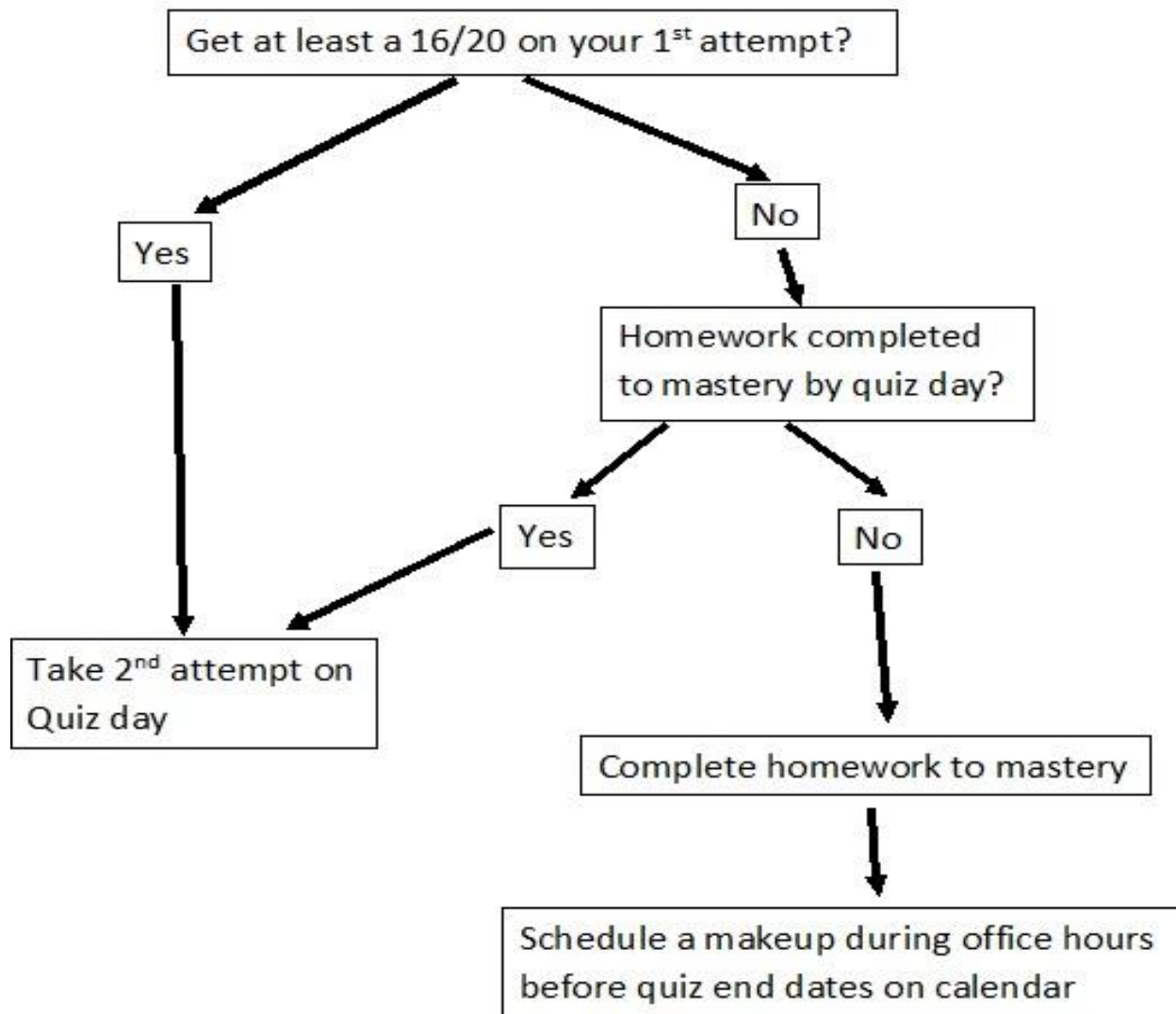
1. Students must score 16 or better on 1st quiz attempt OR
2. Students must have completed the homework to mastery by quiz day.

If you have not completed your homework by quiz day, then you must schedule a time to take the 2nd quiz attempt during office hours. In order to take the 2nd attempt in office hours, you must have:

1. Taken your first attempt on scheduled quiz day
2. Completed the homework to mastery for the quiz you wish to retake AND
3. Scheduled a meeting within the allotted time for quiz makeups (i.e. before Friday September 27, 2013 for quizzes 1-3, before Friday October 25, 2013 for quizzes 4-6, before Friday November 15, 2013 for quizzes 7-9, before Wednesday December 4, 2013 for quizzes 10-12)

In other words, to take the second quiz, your homework for the week must be completed (45 or higher out of 50, or 90%). If the homework was not completed with a 45 or higher before the lecture, students have until the beginning of the scheduled quiz class day (no points will be given for completing homework after the lecture unless a make-up can be applied – see section regarding make ups) to complete the homework to mastery in order to take the second quiz attempt. If students have not completed the homework by the scheduled quiz day, the students can complete the homework (45 or higher out of 50) and take the quiz during office hours. Throughout the semester there will be **IMPORTANT** dates in which students can no longer take second quiz attempts for past units (dates are listed on the schedule below). It is the student's responsibility to attend to these requirements and deadlines for second quiz attempts. Any second quiz attempts taken either on a different date other than the scheduled quiz day, during office hours, or without homework being completed will **NOT** be counted. Tutoring will be available and is recommended, prior to taking a second quiz attempt. 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.

Guide to taking your 2nd quiz attempt!



Behavior Change Project (BCP) – 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 small groups of students who all choose to increase an existing behavior 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 BCP has **four progress checks worth 10 points each and a final paper worth 80 points.** To receive points for the progress check the student must turn in an individual and a group component for that progress check. Students will use the four progress checks (and the feedback received for each check) to complete the final paper. A rubric for each progress check/the final paper will be posted on BB Learn. Each component and the final assignment must be typed and turned in at the beginning of class on the due date as specified by the instructor.

Throughout the semester, time within class may 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, and to meet with the instructor on at least one ICD class day to discuss the project.

Due dates for all four progress checks and the final project can be found on the Weekly Class Schedule. 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 midterm and final exams. *Students who are absent on the day of the exam will score a zero. Students who arrive late to the midterm or final may be refused admittance if other students have already left the classroom.*

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** for the entire semester. All extra credit opportunities must be turned in to the instructor by the end of class on **Friday, November 29, 2013.**

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: Any homework for which you did not earn 90% and, thus, your 10 points.
- In-Class Discussions: Complete the ICD and come to office hours for grading.
- One Quiz: Arrange with the instructor to take the quiz during office hours

All make-ups for Units 1 – 6 must be completed before the midterm; all make-ups for Units 7 – 14 must be completed by **Wednesday, December 4, 2013.**

Grades

Course Grades

12 Quizzes @ 20 points each = 240 points
13 Homework assignments @ 10 points each = 130 points
13 In-Class Discussions @ 10 points each = 130 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 = 820

Extra Credit Possible = 15

Grade Ranges ([points earned/820] x 100%):

A = 90%-100%	B = 80%-89%	C = 70%-79%	D = 60%-69%	F = below 60%
(738-820)	(656-737)	(574-655)	(492-573)	(< 491)

Accommodations for Students with Disabilities:

The University of North Texas 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 his/her 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 <http://www.unt.edu/oda/apply/index.html>. Also, you may visit the Office of Disability Accommodation in the Sage Hall (room 167) or call them at (940) 565-4323.

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: <http://www.unt.edu/catalog/undergrad/policies.htm>

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 an assignment, then working closely with other students to compare answers, and to attempt to resolve different understandings. Failing to do the reading and memorizing answers that another student has written 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:

Tuesday October 8, 2013	Last day to drop course without instructor approval
Tuesday November 6, 2013	Last day to drop a course of withdraw with a grade of W for courses that the student is not passing
Wednesday October 9, 2013	Beginning this date, instructors may drop students with grade of WF for nonattendance
Wednesday November 6, 2013	Last day for a student to drop a course with the consent of the instructor
Wednesday November 13, 2013	First date for student who qualifies to request a grade of I
Friday November 22, 2013	Last day for instructor to drop a student with a grade of WF for nonattendance Last day to withdraw from the semester. Process must be completed in the Dean of Student's Office.

5 Tips for Success:

1. Complete the assigned reading before you do the homework
2. Complete the guided notes and use them when completing the HW assignment to study for the weekly quiz
3. Maximize your points –
Complete all weekly assignments; use your makeups; do extra credit
4. Behavior Change Project (BCP)
Turn in all the individual and group components; use the feedback; ask questions
5. Ask me! Questions, comments, concerns? Come to office hours

Weekly Class Schedule

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

Session	Activities
<p>Wednesday August 28, 2013</p> <p>Unit 1 Introduction to Behavior Analysis Friday August 30, 2013</p>	<p>Syllabus Readings #1: Due Friday, 8/30/2013, before class</p> <ul style="list-style-type: none"> • Miller Lesson 1 • Attitudes to Science – available on Bb Learn <p>Homework Assignment #1: Due Friday, 8/30/2013, before class</p> <p>In-Class Lecture #1: Introduction to Behavior Analysis BCP: Introduction and group selection</p>
<p>Monday September 2, 2013</p> <p>Wednesday September 4, 2013</p> <p>Friday September 6, 2013</p>	<p>Labor Day (NO CLASSES; University Closed)</p> <p>In-Class Discussion #1: Introduction to Behavior Analysis</p> <p>Quiz #1: Introduction to Behavior Analysis</p> <p>Readings #2: Due Monday, 9/9/2013, before class</p> <ul style="list-style-type: none"> • Miller Lesson 2 Definitions of Everyday Behaviors • Skinner (1938) - pp. 23-25 – available on Bb Learn <p>Homework Assignment #2: Due Monday, 9/9/2013, before class</p>
<p>Unit 2: Basic Concepts Monday September 9, 2013</p> <p>Wednesday September 11, 2013</p> <p>Friday September 13, 2013</p>	<p>In-Class Lecture #2: Basic Concepts</p> <p>In-Class Discussion #2: Basic Concepts</p> <p>BCP: Select a target behavior, start writing behavioral definition</p> <p>Quiz #2: Basic Concepts</p> <p>Reading #3: Due Monday, 9/16/2013, before class</p> <ul style="list-style-type: none"> • Miller Lesson 6 Visual Analysis of Behavioral Exp. <p>Homework Assignment #3: Due Monday, 9/16/2013, before class</p>

<p>Unit 3: Measurement & Visual Analysis Monday September 16, 2013</p> <p>Wednesday September 18, 2013</p> <p>Friday September 20, 2013</p>	<p>In-Class Lecture #3: Measurement & Visual Analysis</p> <p><i>BCP: Progress Check 1: Individual component due at the beginning of class on Wednesday, September 18, 2013. You may complete this using the Rubric as your template. It must be typed.</i></p> <p>In-Class Discussion #3: Measurement & Visual Analysis</p> <p><i>BCP: Progress Check 1: Group component due at the beginning of class on Friday, September 20, 2013. This must be in paragraph form NOT using the Rubric as a template. Must be typed.</i></p> <p>Quiz #3: Measurement & Visual Analysis</p> <p>Reading #4: Due Monday, 9/23/2013, before class</p> <ul style="list-style-type: none"> • Miller Lesson 8 Reinforcement of Everyday Behaviors <p>Homework Assignment #4: Due Monday, 9/23/2013, before class</p>
<p>Unit 4: Positive Reinforcement Monday September 23, 2013</p> <p>Wednesday September 25, 2013</p> <p>Friday September 27, 2013</p>	<p>In-Class Lecture #4: Positive Reinforcement</p> <p><i>BCP: Progress Check 2: Individual component due at the beginning of class on Wednesday, September 25, 2013. You may complete this using the Rubric as your template. It must be typed.</i></p> <p>In-Class Discussion #4: Positive Reinforcement</p> <p><i>BCP: Progress Check 2: Group component at the beginning of class on Friday, September 27, 2013. This must be in paragraph form NOT using the Rubric as a template. Must be typed.</i></p> <p>Quiz #4: Positive Reinforcement</p> <p>LAST DAY FOR QUIZ 2 ATTEMPTS FOR UNITS 1-3 BY THE END OF OFFICE HOURS</p> <p>Reading #5: Due Monday, 9/30/2013, before class.</p> <ul style="list-style-type: none"> • Miller Lesson 12 Reinforcer Effectiveness <p>Homework Assignment #5: Due Monday, 9/30/2013, before class.</p>

Unit 5: Reinforcer Effectiveness
Monday September 30, 2013

In-Class Lecture #5: Reinforcer Effectiveness

Extra credit opportunities now available

*BCP: Progress Check 3a: Individual component due at **the beginning of class on Wednesday, October 2, 2013**. You may complete this using the Rubric as your template. It must be typed.*

Wednesday October 2, 2013

In-Class Discussion #5: Reinforcer Effectiveness

*BCP: Progress Check 3a: Group component due at **the beginning of class on Friday, October 4, 2013**. This must be in paragraph form **NOT** using the Rubric as a template. Must be typed.*

Friday October 4, 2013

Quiz #5: Reinforcer Effectiveness

Reading #6: Due Monday, 10/7/2013, before class

- Miller Lesson 24 Escape and Avoidance

Homework Assignment #6: Due Monday, 10/7/2013, before class

Unit 6: Negative Reinforcement
Monday October 7, 2012

In-Class Lecture #6: Negative Reinforcement

BCP Tutorials

Wednesday October 9, 2013

In-Class Discussion #6: Negative Reinforcement

Friday October 11, 2013

Quiz #6: Negative Reinforcement

Monday October 14, 2013

BCP: Tutorials

BCP: If you haven't already, start baseline data collection!

Wednesday October 16, 2013

Midterm Review – Units 1 - 6

Friday October 18, 2013

Midterm Exam – Units 1 – 6

Reading #7: Due Monday, 10/21/2013, before class

- Miller Lesson 9 Extinction of Everyday Behaviors

Homework Assignment #7: Due Monday, 10/21/2013, before class

Unit 7 - Extinction
Monday October 21, 2013

In-Class Lecture #7: Extinction

***BCP:** If you haven't already, start collecting 2 weeks of intervention data*

***BCP:** Progress Check 3b: Individual component due at **the beginning of class on Wednesday, October 23, 2013**. You may complete this using the Rubric as your template. It must be typed.*

Wednesday October 23, 2013

In-Class Discussion #7: Extinction

***BCP:** Progress Check 3b: Group component due at **the beginning of class on Friday, October 25, 2013**. This must be in paragraph form **NOT** using the Rubric as a template. Must be typed.*

Friday October 25, 2013

Quiz #7: Extinction

LAST DAY FOR QUIZ 2 ATTEMPTS FOR UNITS 4-6 BY THE END OF OFFICE HOURS

Reading #8: Due Monday, 10/28/2013, before class

- Miller Lesson 10 Differential Reinforcement of Everyday Behavior

Homework Assignment #8: Due Monday, 10/28/2013, before class.

Unit 8: Differential Reinforcement
Monday October 28, 2013

In-Class Lecture #8: Differential Reinforcement

***BCP: Week 2 of Intervention Data Collection**
Nov 8th BCP 4*

Wednesday October 30, 2013

In-Class Discussion #8: Differential Reinforcement

Friday November 1, 2013

Quiz #8: Differential Reinforcement

Reading #9: Due Monday, 4/1/2013, before class

- Miller Lesson 11 Shaping Everyday Behaviors

Homework Assignment #9: Due Sunday, 3/31/2013, by 11:59 pm

<p>Unit 9: Shaping Monday November 4, 2013</p> <p>Wednesday November 6, 2013</p> <p>Friday November 8, 2013</p>	<p>In-Class Lecture #9: Shaping <i>BCP: Progress Check 4: Individual component due at the beginning of class on Wednesday, November 6, 2013. You may complete this using the Rubric as your template. It must be typed.</i></p> <p>In-Class Discussion #9: Shaping <i>BCP Progress Check 4: Group component due at the beginning of class on Friday, November 8, 2013. This must be in paragraph form NOT using the Rubric as a template. Must be typed.</i></p> <p>Quiz #9: Shaping</p> <p>Reading #10: Due Monday, 11/11/2013, before class</p> <ul style="list-style-type: none"> • Miller Lesson 13 Ratio Schedules <p>Homework Assignment #10: Due Monday, 11/11/2013, before class.</p>
<p>Unit 10: Ratio Schedules Monday November 11, 2013</p> <p>Wednesday November 13, 2013</p> <p>Friday November 15, 2013</p>	<p>In-Class Lecture #10: Ratio schedules BCP Tutorials– November 27 Final Paper due</p> <p>In-Class Practice #10: Ratio Schedules</p> <p>Quiz #10: Ratio Schedules</p> <p><i>LAST DAY FOR QUIZ 2 ATTEMPTS FOR UNITS 7-9 BY THE END OF OFFICE HOURS</i></p> <p>Reading #11: Due Monday, 11/18/2013, before class</p> <ul style="list-style-type: none"> • Miller Lesson 14 Interval Schedules of Reinforcement <p>Homework Assignment #11: Due Monday, 11/18/2013, before class</p>
<p>Unit 11: Interval Schedules Monday November 18, 2013</p> <p>Wednesday November 20, 2013</p> <p>Friday November 22, 2013</p>	<p>In-Class Lecture #11: Interval Schedules BCP Tutorials</p> <p>In-Class Discussion #11: Interval Schedules</p> <p>Quiz #11: Interval Schedules</p> <p>Readings #12: Due Monday, 11/25/2013, before class</p> <ul style="list-style-type: none"> • Miller Lesson 22 Punishment by Contingent Stimulus • Miller Lesson 23 Punishment by Contingent Withdrawal <p>Homework Assignment #12: Due Monday, 11/25/2013, before class</p>

<p>Unit 12: Punishment Monday November 25, 2013</p> <p>Wednesday November 27, 2013</p> <p>Friday November 29, 2013</p>	<p>In-Class Lecture #12: Punishment</p> <p>In-Class Discussion #12: Punishment <i>BCP Final Paper Due at the beginning of class Wednesday November 27, 2013. This must be typed and in paragraph form. You must NOT use the Rubric as a template.</i></p> <p>NO SCHOOL – Thanksgiving</p>
<p>Unit 12: Punishment Monday December 2, 2013</p> <p>Unit 13 &14: Culture Wednesday December 4, 2013</p> <p>Friday December 6, 2013</p>	<p>Quiz #12: Punishment</p> <p><i>Last day for Extra Credit</i></p> <p>Reading #13: Due on Wednesday, 12/4/2013, before class. Skinner (1938) - pp. 412-425 Glenn (1997) – pp. 1-14</p> <p>In-Class Lecture #14: Culture In-Class Discussion #14: Completed in class</p> <p><i>Last Day for Make-Ups</i> LAST DAY FOR QUIZ 2 ATTEMPTS FOR UNITS 10-12 BY THE END OF OFFICE HOURS BCP: Graded paper returned</p> <p>Reading day – no class</p>
<p>Wednesday December 11, 2013</p>	<p>FINAL: 10:30-12:30</p>

Appendix D
Survey Monkey E-mail

Q1 Edit Question ▼ Move Copy Delete

*** 1. Name (First and Last):**

+ Add Question ▼ Split Page Here

Q2 Edit Question ▼ Add Question Logic Move Copy Delete

2. Your clicking or marking the consent bubble below indicates that you have read or have had read to you all of the above and that you confirm all of the following:

Your Instructor has explained the study to you and answered all of your questions. You have been told the possible benefits and the potential risks and/or discomforts of the study.

You understand that you do not have to take part in this study, and your refusal to participate or your decision to withdraw will involve no penalty or loss of rights or benefits. The study personnel may choose to stop your participation at any time.

You understand why the study is being conducted and how it will be performed.

You understand your rights as a research participant and you voluntarily consent to participate in this study.

You may receive an email or copy of this form upon request to your instructor.

I consent

I DO NOT consent

Appendix E

E-mail to Students Who Did Not Complete Survey Monkey

Please read the research consent form, click on the link provided for the survey monkey, and complete the survey. Thank you!

You are being asked to participate in a research study that will use course assignment scores and the results of the end of semester questionnaire you completed for research and publication purposes. While the course assignments are required for course credit, it is the student's choice to voluntarily submit their work to be use in this study. Before agreeing to participate in this research study, it is important that you read and understand the following explanation of the purpose, benefits and risks of the study, and how it will be conducted.

Title of Study: Contingency analysis of behaviorally based teaching strategies on undergraduate student learning and behavior

Principal Investigator: Dr. Traci Cihon, Department of Behavior Analysis, University of North Texas (UNT).

Co-Investigators: Karl Zimmerman, Darren Bandy, Darren Bandy, Donna Ludlum, Lucero Neri, Audrey Shivers, Erica Foss, Rachel Horsch, Danton Shoemaker, Brittney Degner, Christine Delapp, Emily Rulla

Purpose of the Study: This study will look at current educational techniques targeted at improving student learning outcomes. Understanding which instructional design techniques are the most effective is essential to improving not only our classroom instruction and helping other instructors to choose the best strategies for their courses and students.

Study Procedures: By consenting to and participating in this study you are giving your permission for your performance on various aspects of the BEHV 2300 course to be included in professional papers or publications. Your identifying information will be removed from all data displays prior to presentation or publication. No one will be able to identify your data. Your course grade will not be affected by your decision to participate in this research.

Foreseeable Risks: The risks associated with participation in the proposed study are minimal. Risks might include increased stress about course grades, discomfort with using technology to access course information and content, and anxiety about course assignment and assessment requirements. These risks are not outside of what is typically experienced by undergraduate students in most courses. However, in order to help minimize these risks students will receive demonstrations on how to access and use the on-line course materials and a list of "helpful hints" that will be shown in class and will be available throughout the semester on the course website via Blackboard Learn. The "helpful hints" will include troubleshooting and support/help instructions/contacts for any technical issues and e-mail addresses for teaching fellows/assistants responsible for the course and research. Teaching fellows also conduct weekly office hours during which students can simply drop by or make appointments to discuss any course related

needs. Your decision to consent or decline to consent will have no bearing on your reputation or standing in the course.

Benefits to the Subjects or Others: We anticipate that you will benefit from our ability to better understand various aspects of course design and delivery and assessment through continual improvements to course delivery informed by the data we are collecting and analyzing. Moreover, we hope to share these findings with other instructors in order to help them to adopt the best teaching strategies in their classrooms. You will not receive any course credit or extra credit for choosing to participate in the research.

Procedures for Maintaining Confidentiality of Research Records: Your personally identifying information will never be used for research purposes. In addition, all of your personal identification (including your EUID) will be deleted at the end of the semester and your EUID will be replaced with a random and unique identification code. This identification code will allow researchers to identify a set of responses as belonging to one person without allowing them to know who that person is. Your course instructor will not have access to your data until this 'de-identification' has taken place. Completed questionnaires will be stored in a locked filing cabinet in the primary investigator's on-campus office for three years at which point all records will be destroyed. The primary investigator, who is not an instructor in the course, will conduct a de-identification process.

Questions about the Study: If you have any questions about the study, you may contact Dr. Traci Cihon at traci.cihon@unt.edu or 940-565-3318.

Review for the Protection of Participants: This research study has been reviewed and approved by the UNT Institutional Review Board (IRB). The UNT IRB can be contacted at (940) 565-3940 with any questions regarding the rights of research subjects.

Research Participants' Rights: Your clicking or marking the consent bubble below indicates that you have read or have had read to you all of the above and that you confirm all of the following:

Your Instructor has explained the study to you and answered all of your questions. You have been told the possible benefits and the potential risks and/or discomforts of the study.

You understand that you do not have to take part in this study, and your refusal to participate or your decision to withdraw will involve no penalty or loss of rights or benefits. The study personnel may choose to stop your participation at any time. You understand why the study is being conducted and how it will be performed. You understand your rights as a research participant and you voluntarily consent to participate in this study. You may receive an email or copy of this form upon request to your instructor.

<http://www.surveymonkey.com/s/ZCXQW97>

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