

**THE EFFECTS OF THE RADICAL RACEWAY ON HOMEWORK COMPLETION AND  
ACCURACY IN A HIGH SCHOOL SOCIAL STUDIES CLASS**

By

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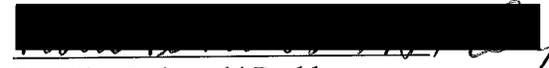
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**CERTIFICATION OF PROJECT WORK**

We, the undersigned, certify that this project entitled, *The Effects of the Radical Raceway on Homework Completion and Accuracy in a High School Social Studies Class*, by *Derek Houser*, Candidate for the Degree of Master of Science in Education, Department of Curriculum & Instruction, is acceptable in form and content and demonstrates a satisfactory knowledge of the field covered by this project.

  
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## Abstract

Homework is an educational strategy used to improve student understanding of content taught in class. It provides a means for students to further their knowledge through additional, independent practice. Many studies have shown that completing homework correctly has a positive effect on student learning. The problem is that large numbers of students in many classes are not doing their homework and many of those who do complete it incorrectly. The present study showed how the Radical Raceway a intervention package containing group contingencies, small competing teams, public posting, and mystery motivators, was used to improve the homework completion and accuracy rates for a 9th grade Global Studies classroom. The Radical Raceway produced immediate and sustained positive results that improved students' social studies homework grades by two to three letter grades. Intervention effects were replicated across subsequent experimental phases and the teachers and pupils rated intervention goals, procedures, and outcomes quite favorably. Implications for future research and practice are discussed.

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## **The Effects of the Radical Raceway on Homework Completion and Accuracy in a High School Social Studies Class**

Teachers face many challenges when creating instructional programs that allow all of their students to succeed. One question many teachers must address is, “What role does homework completion and accuracy play in student achievement?” Is homework important, why, and how does a classroom teacher maximize its effectiveness? These types of questions are faced almost daily by educators. Most teachers and educational experts agree that homework completion and accuracy does have a positive overall impact on academic achievement (Cooper, Robinson, & Patall, 2006; Little, Akin-Little, & Newman-Fig, 2010; Madaus, Kehle, Madaus, & Bray, 2003; Olympia, Sheridan, Jenson, & Andrews, 1994; Paschal, Weinstein, Walberg, 1984; Trautwein, 2007). Among the purported benefits of homework is that it can have an immediate influence on students’ retention and understanding of new academic material (Cooper 1989). Additionally, homework can improve concept formation, enhance study and critical thinking skills and perhaps most importantly demonstrate to students that learning can take place anywhere, not just in a classroom (Sullivan & Sequiera, 1996). However, completing homework assignments has become a very tedious and uninteresting task for many students, particularly for those with academic difficulties (Olympia et al., 1994). This often results in low performing students doing less work, getting lower grades, and then doing less work and so on. Their motivation to learn continues to decrease with each subsequent low grade. Even failing to complete homework become negatively reinforcing because it allow pupils to avoid or escape from aversive tasks such as homework. Each time they avoid these unpleasant tasks, the less likely they are to engage in such tasks in the future (e.g., Alberto & Troutman , 2009; Heward,

2009). This long-term avoidance leads to lower student achievement levels, increased drop outs, and placements in special and remedial education programs (Bembenutty, 2010; Olympia et al., 1994).

Teachers continue to find ways, however, to make homework more useful and appealing to students. Completing homework requires students to practice self-regulatory behaviors such as planning, reducing distractions, persisting at difficult tasks, organizing environments, overcoming unwanted emotions, and reflecting on what was learned. As a result, students improve their academic performance and learn to self-regulate their own behavior (Boekaerts & Corno, 2005). To maximize their potential students must be actively engaged in their own learning and monitoring their homework progress is one way to do so (Xu, 2011). If students do not keep track of assignment completion, then they may have misconceptions about their understanding and progress. When this happens homework becomes less meaningful and its overall effectiveness is compromised (Cooper et al., 2006).

Over the years, researchers have developed a variety of interventions to improve homework completion and accuracy. These interventions have included: (a) school- (e.g. after-school programs, during school programs, parent-teacher communications, cooperative homework teams, and parent volunteers) and (b) home-based programs (e.g. parental involvement, parent training, and family-school improvement projects), as well as group contingency interventions. While other school- and home-based programs have distinct disadvantages such as high costs, increased teacher time, and some implementation challenges (Hill & Tyson, 2009; Trautwein & Lüdtke, 2006), group contingencies provide a more cost effective instructional alternative. In addition, teachers and students reportedly like using group

contingency interventions in the classroom (Skinner, Cashwell, & Dunn, 1996). One particularly interesting group contingency intervention is called the Radical Raceway (Knorr, 2010). The Radical Raceway is actually an intervention package that consists of at least four primary components: (a) small, heterogeneous learning groups, (b) interdependent group contingencies, (c) public posting and progress monitoring, and (d) mystery motivators. These components were assembled into a game format and used to motivate students to complete homework assignments more consistently and accurately. While the four primary components of the Radical Raceway were well-researched in psychology and education, no formal investigations were conducted to date on the efficacy of Radical Raceway. The purpose of this study, therefore, was to examine the effects of RR on a 9<sup>th</sup> grade social studies class' homework completion and accuracy rates. Before proceeding to the methodology, an illustrative review was conducted of two relevant literatures: (a) homework completion and accuracy, (b) group contingencies, and (b) mystery motivators.

## **Homework**

Homework has been used across almost all grade levels from elementary school through college as a way to supplement pupil learning and to give them opportunities to practice their competence independently (Olympia et. al, 1994). Extensive research indicates that homework has a positive effect on learning, particularly at the middle and high school levels (Hattie, 2009; Xu, 2011). Keith (1986) concluded that regardless of students' prior ability, the amount of time spent on homework will increase achievement. Hattie (2009) described findings from two previous meta-analyses (Cooper et al., 2006; Paschal et al., 1984) that examined the effects of homework on pupil achievement. The samples included 161 separate studies and more than

100,000 students. The average of all effect sizes was .29 which suggested a modest effect on achievement. Hattie concluded that the overall effects of homework were positive, but that there were some important moderators. First, the positive effects of homework were most noticeable at the high school level, followed in strength by their effects at the middle and elementary school levels. Second, effect sizes were largest for science and social studies and smallest for mathematics. Third, homework had the most positive effects when assignments were: (a) purposeful, (b) designed to facilitate completion, (c) involved parents in meaningful ways, and (d) provided systematic feedback (Marzano & Pickering, 2007; Miller & Kelly, 1991).

Homework was also identified as one of the most important factors for establishing *productive academic environments* (Cooper, 1989; Cooper, 2001; Epstein, 1983; Trautwein, 2007).

Additional suggestions included: (a) assign *purposeful* homework, (b) design assignments to maximize the likelihood that they are completed, (c) involve parents in meaningful ways, and (d) provide systematic feedback to improve future performance (Marzano & Pickering, 2007; Miller & Kelly, 1991).

Recently, however, homework has come under increased scrutiny. For example, some have challenged its importance in learning. Too often it seems that teachers and students are simply going through the motions; teachers give assignments because they are supposed to and many students simply insert answers just to say that it is completed. As such, there is a growing need for teachers to find assignments that are worthwhile and interesting to students, as well as ways to get them to try out their work assignments. Wilson and Rhodes (2010) concluded that students who understand that assignments are meaningful not just busy-work, have higher rates of completion than peers who do not see similar value in the work. Bembenutty (2011) argued

that many students do not value work completion because their home environment did not cultivate these interests; often allowing children to engage in more preferred activities (e.g., video games, excessive television watching, etc) instead of completing homework.

### **Group Contingencies**

Another intervention that was quite effective in improving pupils' homework completion and accuracy was group contingencies (e.g., Lynch, Theodore, Bray, & Kehle, 2009; Popkin & Skinner, 2003; Reinhardt, Theodore, Bray, & Kehle, 2009; Theodore, DioGuardi, Hughes, Aloiso, Carlo, & Eccles, 2009). What makes group contingencies effective is that consequences are based on the group's collective performance; either the whole group wins or loses together (Heering & Wilder, 2006). Therefore, there is less likelihood that the actions of one single student will cost the entire class. The teacher can use interdependent group contingency to create more productive and supportive learning environments (Skinner et al., 1996).

Little and colleagues (2010) found that using a reinforcement schedule to reward group completion rates increased the class' homework completion and accuracy scores. They found that, on average, group contingencies raised homework completion by about 20%. In addition, there were high levels of student satisfaction (i.e., 93% in one class and 87% in the other wanted to continue using the intervention beyond the study). Lynch et al (2009) found similar results in their investigation. Using an alternating treatments design, the researchers found that all three types of group contingencies (i.e., independent, dependent, and interdependent) improved students' homework completion and accuracy more than teacher-led instruction. All three group contingencies approaches were about equally effective. The researchers also noted that the teacher was particularly satisfied with the intervention and noticed a dramatic increase student

enthusiasm for doing homework. Reinhardt et al (2009) also randomized group contingencies components in order to improve pupils' homework completion and accuracy. Using a multiple baseline design, Reinhardt et al used interdependent group contingencies with randomized components to improve the homework performance of six, low performing 4<sup>th</sup> grade students. They found that the interdependent contingencies were effective in improving all six students' accuracy on daily homework assignments.

Finally, group contingencies have also been used effectively at the secondary level. Williamson, Campbell-Whatley, and Lo (2009), for example, conducted a group contingency study to improve the on-task behavior of students with disabilities. By providing students with rewards based on improvements in their on-task time, the teacher increased her overall instructional time. Homework completion is a desired behavior that teachers can focus their group contingencies on. Once more, secondary students indicated a preference for group contingencies over more traditional teaching practices.

### **Mystery Motivators**

A third interesting intervention that was used to improve pupil academic and behavioral performance was mystery motivators (Rhode, Jenson, & Reavis, 1993). Mystery motivators are unknown rewards that pupils can earn for meeting some pre-established criteria. Typically, there are two parts to the mystery motivator. The first is a series of highly decorated envelopes that are displayed prominently in class and that contain paper slips with the names of high preference rewards written on them. Students usually provide a variety of ideas for possible mystery motivators, but the teacher has the ultimate responsibility for determining which rewards will be placed in the mystery motivator envelopes. The second component is a procedure

for determining if a mystery motivator is earned. Typically, a series of invisible letters (M) or shapes (\*) are made on a class calendar with an invisible marking pens. When the group meets pre-established criteria, they are allowed to use a magic decoding pen or infra-red lights to see if there is a hidden letter or symbol. On those days when the objects appear, pupils are allowed to select one of the mystery motivator envelopes and share the reward. If no letter or shape appears, then students are encouraged to try harder the next day.

To date, mystery motivators were used in at least 11 published research studies. These studies found that the intervention: (a) improves students' homework completion and accuracy rates (Moore, Waguespack, Wickstrom, Witt, & Gaydos, 1994; Madaus et al., 2003), (b) decreases a wide range of disruptive pupil behaviors (e.g., obscene language, non-compliance, verbal threats, and calling out in class) (DeMartini-Scully, Bray, & Kehle, 2000; Kelshaw-Levering, Sterling-Turner, Henry, & Skinner, 2000; Mottram, Bray, Kehle, Broudy, & Jenson, 2002; Murphy, Theodore, Aloiso, Alric-Edwards, & Hughes, 2007; Theodore et al., 2004; Theodore, Bray, Kehle, & Jenson, 2001), and (c) enhances interpersonal interactions among students at both the primary and secondary levels (Kehle, Bray, Theodore, Jenson, & Clark, 2000; Musser, Bray, Kehle, & Jenson, 2001). The investigator was drawn to mystery motivators because they did not require excessive time or resources and they seemed like things that would capture secondary students' interest and attention (Moore et al., 1994). Schanding and Sterling-Turner (2010) actually conducted one of the first and only mystery motivator studies at the secondary level. They found that they could reduce disruptive classroom behavior by 40% simply by rewarding the entire class with mystery rewards when they reduced their inappropriate behavior.

Collectively, this illustrative review suggests that homework completion and accuracy are critical for academic success. Unfortunately, the literature also suggests that many students fail to complete homework consistently or accurately and as a result, they fall further and further behind their normally achieving peers. Researchers have developed an array of intervention approaches, some school- and other home-based, that have been used effectively to improve pupil performance in both domains. Here, group contingencies, with and without randomized components, as well as mystery motivators were used as cost-effective and socially acceptable ways to improve students' homework performance. The purpose of the present study, therefore, was to examine the effects of an intervention package that included: (a) independent and interdependent group contingencies, (b) small heterogeneous learning groups, and (c) mystery motivators on a group of 9<sup>th</sup> graders' social studies homework completion and accuracy. This study also examined the social acceptability of the new intervention package, Radical Raceway, for students and teachers. More specifically, students and teachers were asked to rate the intervention in terms of: (a) the importance of the intervention *goals*, (b) the acceptability of intervention *procedures*, and (c) their satisfaction with intervention and study *outcomes*.

## **Method**

### ***Participants and Setting***

The present study was conducted in a small (485 students), suburban high school in Western New York. Twenty-four students (13F, 11M) were enrolled in a 9th grade consultant Global I social studies class. Students ranged in age from 14 to 16 and 10 class members had Individual Education Plans (IEPs) for various learning disabilities, as well as attention-focusing and auditory processing difficulties. Two additional students had 504 plans, one for difficulty

with written responses and one for attention and organizational problems. This particular class was selected for intervention because they did not regularly complete homework assignments and many students who did complete the work did so below grade expectations. Informal data collected prior to investigation showed that only about half of the class turned in homework on time and the class average was at or below 65%.

The 9th grade class was taught by the classroom teacher, a Caucasian male with five years of teaching experience, and a special education consultant teacher, a female with 20 years of teaching experience. The general education teacher also served as the primary investigator in the study. He was responsible for daily social studies instruction and also developed all study-related materials, trained students to use response cards, and collected and analyzed data. The consultant teacher was assigned full-time to this class to support students with special needs. In addition, she assisted in study implementation by collecting inter-rater reliability and fidelity data.

The study was conducted during regularly scheduled, 80-minute instructional blocks that met on alternating days (e.g., Monday-Wednesday-Friday or Tuesday-Thursday). The class was arranged physically into a series of five rows of pupil desks that were facing the front of the classroom. Students did, however, move their desks into small clusters when the intervention was in effect. The social studies teacher was primarily responsible for lesson development and implementation, while the consultant teacher generally provided individual assistance to students with special needs. Homework was generally assigned at the end of each class period. Assignments included defining important vocabulary terms, answering text-related comprehension questions, responding to analytical questions, and writing short and long essays.

A typical homework assignment would take students between 20-30 minutes to complete.

Primary topics covered during the study were: (a) the Middle Ages, (b) Africa and the Americas before European exploration, and (c) The Renaissance/Reformation. At the beginning of each class, the classroom teacher would walk around the room and collect student homework.

Assignments were then graded after class and student work was checked for completion and accuracy before being returned during the next class period.

### ***Dependent Variables***

There were four dependent variables in the present study: (a) percentage of homework assignments completed, (b) percent correct on homework assignments, and (c) pupil and teacher satisfaction ratings. Homework completion was defined as the successful completion, attempt and submission of all parts of an assignment when the students arrived to class. For an item to be considered “completed”, students had to make a clear, cogent written response to each item. The investigator then calculated the written responses for each pupil. The completion percentage for each assignment was compiled by dividing the number of completed assignments by the number completed and not completed times 100%. For example, if 20 of 24 pupils completed and turned in homework assignment, then percentage completed was 83%.

Percentage correct was calculated using teacher-made rubrics for each assignment. Rubrics were generally based on five components: (a) effort, (b) comprehensiveness of response, (c) level of analysis, (d) organization, and (e) content accuracy. Pupils written responses were scored on a scale from 1-5, 1 (no effort), 2 (minimal effort), 3 (basic completion) 4 (above average effort) and 5 (considerable effort) basis across each of the five dimensions. Individual dimension ratings were then summed and divided by the highest possible score and multiplied by

100% to yield an individual accuracy score. Homework completion and accuracy percentages were aggregated at the classroom- and team-levels and displayed on simple line graphs across experimental conditions. In addition, individual data charts were created for each student to track progress both before and during the intervention.

The third and fourth dependent measures were pupil and teacher social validity assessments. Using a 5-point, Lickert-type scale, pupils rated independently and anonymously 19-items in terms of the: (a) importance of intervention goals (e.g., how important is it to do well in social studies class and to complete homework), (b) acceptability of intervention procedures (e.g., how much did you like creating and posting individual and team data, working together in groups, and earning mystery rewards), and (c) satisfaction with intervention outcomes (e.g., how much did radical raceway improve your social studies grades, help you to learn content better, and help you complete more work). Survey items were scored on a 5-point scale where 1 = not important at all, not acceptable at all, and not satisfied at all and 5 = very important goal, liked it a lot, and very satisfied (see Appendix A). Higher mean ratings (approaching 5.0) reflected more positive perceptions of intervention goals, procedures, and outcomes. In addition, students were asked to indicate the extent to which the intervention (a) was fair; (b) should be done in other classes; and (c) could be harmful to other students.

A teacher satisfaction survey was also constructed using acceptability items from previous research with group contingencies and rewards (e.g., Chafouleas, Briesch, Riley-Tillman, & McCoach, 2009). This particular scale included 28 items clustered around three headings: (a) Acceptability, (b) Understanding, and (c) Feasibility. The classroom and consulting teachers were asked to rate the extent to which they agreed or disagreed with each item using a

5-point, Likert-type scale (i.e., 1 = strongly disagree and 5 = strongly agree). In this instance, higher scores (approaching 5.0) were indicative of higher levels of teacher agreement. The first section included 14 questions that addressed the following issues: (a) fairness, (b) effectiveness, (c) ease to implementation, and (d) probability the teacher would use this intervention again. The second section included seven questions regarding teacher understanding of the intervention's: (a) procedures, (b) theoretical framework, and (c) directions. The third section included seven questions that addressed intervention feasibility including assessments of record keeping and time requirements, as well as the level of intrusiveness for students. Teachers completed surveys independently and anonymously and their responses were described qualitatively.

### ***Independent Variable***

The Radical Raceway is an intervention package consisting of four primary components: (a) small, heterogeneous learning groups, (b) interdependent group contingencies, (c) public posting and progress monitoring, and (d) mystery motivators. The intervention allows students the opportunity to earn rewards for their own and others' work in and out of class. The first component, small heterogeneous learning groups, was established by assigning students randomly to five teams each containing five students. Students were rank ordered privately on the basis of baseline performance and assigned to teams comprised of comparable numbers of high, average, and low performing students. Teams were also balanced in terms of gender. Once teams were formed, interdependent group contingencies were established by having teams compete daily for the highest homework completion and accuracy rates. Since rewards were

earned based on the collective performance of each team, the contingencies were deemed interdependent.

The third intervention component was public posting of individual and team scores and ongoing progress monitoring. Homework was graded daily for completion and accuracy and individual scores were entered onto Team Data Collection Sheets (see Appendix B). Daily team averages for completion and accuracy were calculated and posted and teams were ranked from highest to lowest in both categories. Team(s) with the highest daily completion or accuracy averages moved two spaces on the publicly posted Radical Raceway game board. Second place teams moved one space. (If there was a tie for first or second place, then both teams were allowed to move their race cars the allotted number of spaces). The first team (car) to cross the finish line wins the “grand prize”. Team scores and the race track were displayed prominently and updated daily. Since team and individual progress was updated daily through movement toward the goal, the raceway itself served as a progress monitoring measure for individual teams and students.

The final intervention component was mystery motivators. Mystery motivators are unknown rewards that are used to improve pupils’ academic, behavioral, or interpersonal performance (Rhode et al., 1993). In this study, mystery motivators (MM) were used in two different ways. First, students competed for an opportunity to draw from a mystery box of prizes. These prizes were awarded to the winning teams who crossed the finish line first. Prizes were selected from a mystery reward box that included: (a) free homework passes, (b) fruit and healthy drink and snack coupons, (c) student-picked class day activities, and (d) bonus points on upcoming quizzes and tests. Mystery motivators were also used through independent group

contingencies. Each day students who met minimal homework criteria (i.e., 100% completion, 85% accuracy) were allowed to color in a space on their *Individual Reward Sheets* (see Appendix C). Individual reward sheets contained randomly assigned mystery motivator indicators (M) that were made with invisible marking pens one week prior to the study. If individuals meet minimal completion and accuracy criteria, then they used a decoding pen to determine if there was an invisible (M) written on that particular day. Teams were also given other opportunities to earn rewards. For example, first place teams could selected and/or retain prizes after each round. Second place teams were also allowed to draw prizes (but only one time) from the mystery prize box.

To ensure that the Radical Raceway (RR) was implemented accurately, a 10-item, fidelity checklist was developed (see Appendix D). The protocol listed the 10 primary steps required to use RR as intended and spaces to note the presence or absence of each procedural step. Fidelity assessments were conducted during 25% of intervention sessions by having the consultant teacher record the presence or absence of each procedural component. Fidelity was calculated by dividing the number of items present by the total number of items (both present and absent) and multiplying by 100%. Mean fidelity rating of .93 was found with a range of .90 to 1.00. This suggests that the intervention was implemented with sufficient integrity.

### ***Experimental Design and Procedures***

An A-B-A-B withdrawal of treatment design was used to assess the effectiveness of the Radical Raceway intervention on students' homework completion percentages and accuracy rates. This particular design establishes a functional relationship by showing that pupil

performance changes, when and only when, the intervention is presented and/or withdrawn (Kennedy, 2005).

The study began with an initial baseline phase in which students' homework performance was examined under typical teaching conditions. Homework was assigned and assessed by the teacher in the same manner used throughout the school year. Students turned in assignments at the beginning of class the teacher recorded percent completed and correct and returned work the next class period. During baseline, students did not work for any kind of rewards or motivators. The only feedback they received were the grades on assignments and comments from the teacher. Students were also expected to monitor their own homework completion and accuracy rates.

After data were collected for two weeks, the teacher conducted a brief (30-minute) training session on how to play the Radical Raceway Game. Game purposes included improving every one's homework completion and accuracy rates in social studies, helping one another to do their best, and having fun in social studies class. Student input was solicited on what types of mystery motivators might be earned, how the intervention was implemented, and how to make it the most fun. Homework criteria and expectations (e.g., 100% completion & 85% accuracy) were posted clearly and reviewed regularly. Students were allowed to arrange their chairs into team clusters and discuss homework assignments. After homework was graded, the teacher announced how each team had fared and how many spaces particularly winning teams were allowed to move their cars. At the end of class students viewed their individual scores and if criteria were met, they were allowed to color in their individual reward sheets. This intervention lasted for about one month. After having about 10 data points on the student performance with

the intervention the Radical Raceway was removed for five days. The class returned to the conditions under the first baseline procedure and there were no opportunities for rewards or group contingencies during this time. Following the second baseline period, RR was re-introduced (Intervention II). Immediately after the final intervention session, pupils completed the social validity surveys independently and anonymously. The teacher also completed the acceptability and feasibility assessments at this time.

### **Results**

The effects of Radical Raceway on 9<sup>th</sup> grade students' social studies homework completion and accuracy rates can be seen in Figure 1. As depicted, the class performance in both areas was quite low during initial baseline assessments. On average, about 57% of the class completed and turned in homework assignments initially; with the exception of the first day when only 36% of the class completed social studies homework, completion rates were quite stable around 60% of the class. Similarly poor performance was noted in the accuracy of student homework. During initial baseline, the class' homework average was 51% (F) with a range of 31% to 60%. Once again, all data points except day one were quite stable and reflected consistent failing grades. When the Radical Raceway Game was introduced, the class' homework completion and accuracy rates increased immediately and noticeably. Homework completion increased, example, to a mean of 86% of the class turning in completed assignments; this represented a 50% increase in completion rates. On two intervention days, all students turned in completed social studies assignments and only once did less than 80% of the class turn-in work. There were also no overlapping data points between initial baseline and intervention completion data. Similar effects were noted on the class' homework accuracy rates. When RR was

introduced, the class average increased immediately and noticeably to a mean of 78% with a range of 59% to 89%. This represented a 38% improvement in homework grades or the equivalent of three letter grades (i.e., F to C+). There was also only one overlapping data point across initial baseline and intervention phases. When RR was removed, the class' homework completion and accuracy rates dropped immediately and substantially. Completion rates fell to a mean of 41% (range = 35% to 48%) while accuracy was reduced to an average of 38% with a range from 33% to 44%. This provided a second replication of intervention effects and there were no overlapping data points across adjacent phases. Finally, when RR was put back into effect the class' completion and accuracy rates actually doubled over the adjacent baseline phase and there were no overlapping data points across adjacent phases.

To examine more closely Radical Raceway effects on separate heterogeneous learning teams a tabular display was created (see Table 1). As shown, all five teams had fairly low completion rates. The Blue Team had the fewest students completing homework (i.e., two out of five students) were turning in social studies homework on a typical day. The Red Team, in contrast, had the highest mean completion rate at 72%. In terms of accuracy, all teams with the exception of the Red Team had failing homework averages ranging from 38% (Blue Team) to 56% (Green Team) correct. When RR was put into effect, however, all five teams' completion and accuracy rates improved noticeably. Homework completion rates increased by an average of 31% across the five teams with a range of improvements from +8% (Red Team) to +52% (Pink Team). The Pink Team, in fact, had 100% completion across all intervention sessions. Social studies accuracy scores also improved by an average of 28% (i.e., baseline M = 50% versus Intervention M = 78%) across all five teams (range = +7% (Red Team) to +44% (Pink Team)).

When RR was removed all five teams' completion and accuracy rates fell immediately and substantially. On average about half as many students (42%) were completing social studies homework during second baseline and all five teams' accuracy levels fell by an average of 40% (from C+ to F) with a range of 16% (Green Team) to 58% (Orange Team). When RR was put back into effect, all five teams' homework completion and accuracy doubled on average (baseline II completion  $M = .42$  versus intervention II  $M = .84$ ) (baseline II accuracy  $M = .38$  versus intervention II  $M = .76$ ).

Consumer satisfaction survey results for the Radical Raceway can be seen in Table 2. The closer that students' mean ratings were to 5.0 the more favorably they viewed RR. Pupils rated all goals quite highly indicating that they thought that it was important for them and their peers to complete homework and get good grades in global studies. Similarly, they rated most, if not all, RR components quite favorably. They rated "getting rewarded for individual effort", "picking mystery motivator envelopes" and "using markers to color sheets" the highest (i.e., 4.5 and 4.2 respectively), followed by "playing RR", "being on teams" and "completing benchmark assignments". Finally, students appeared to be quite satisfied with most outcomes associated with the use of RR. They felt, for example, that RR was fair and should be used in other classes (i.e., 4.3 & 4.1) respectively. They also reported that it helped them to complete social studies assignments better and improved their overall performance in the course. They provided slightly lower ratings for RR impact on their interpersonal relationships, but indicated that Radical Raceway would not be harmful to other students.

## Discussion

The present results indicate that Radical Raceway produced immediate and noticeable improvements in the social studies homework completion and accuracy rates for a 9<sup>th</sup> grade inclusive class in a rural high school in Western New York. During initial baseline, only a little over half of the class completed social studies homework and the class average was only 51%. Only nine of 24 students (38%) had passing homework averages in social studies. Radical Raceway produced immediate and substantial increases in the class' completion and accuracy rates. When RR was introduced 86% of students completed homework and their overall average was 78%; twenty-seven percent higher than baseline levels (i.e., F to C+). These outcomes were replicated across subsequent experimental phases indicating a *functional* relationship between the use of RR and improvement in pupils' homework performance (Kennedy, 2005). That is, RR and not some extraneous variables were responsible for these changes in pupils' homework performance. With the exception of one data point, the class *always* did better when Radical Raceway was being used. The educational importance of these findings cannot be underestimated. All 24 students, including 12 with IEPs and 504 plans, did better in social studies class when they were using RR! When told that they could earn rewards contingent on individual and team performance, students responded positively by completing more work at higher accuracy levels. These data provide initial evidence that Radical Raceway is an effective intervention for improving pupils' homework completion and accuracy rates (Knorr, 2010).

The present findings while unique for RR are highly consistent with previous research documenting the effectiveness of various intervention components. For example, *interdependent group contingencies* were used to: (a) improve academic performance (Lynch, et al., 2009;

Reinhart et al., 2009; Sharp & Skinner, 2004; Theodore et al., 2009), (b) reduce disruptive behavior (Christ, & Christ, 2006; Kelshaw-Levering et al., 2000; McKissick, Hawkins, Lentz, Hailly, & McGuire, 2010; Theodore et al., 2004; Theodore, Bray, Kehle, & Jenson, 2001), and (c) facilitate room-to-room transitions (Campbell & Skinner, 2004). The use of *heterogeneous learning teams* has also been an integral part of other empirically-supported practices such as Class Wide Peer Tutoring [CWPT] (Delquadri, Greenwood, Stretton, & Hall, 1983; Delquadri, Greenwood, Whorton, Carta, & Hall, 1986; Greenwood, Delquadri, & Carta, 1997), Peer-Assisted Learning Systems [PALS] (Fuchs, Fuchs, Mathes, & Simmons, 1997), and major cooperative learning programs (e.g., Johnson & Johnson, 1999; Kagan & Kagan, 2009; Slavin, 1980 ). Finally, *mystery motivators* have been used in a number of studies to improve pupils' homework completion and accuracy (Madaus et al., 2003), reduce disruptive behavior (Mottram, et al., 2002; Murphy et al., 2007; Robinson & Sheridan, 2000) and improve in class work habits (Moore et al., 1994). The present findings add to the emerging data base on group contingency based intervention packages that can improve pupils' academic performance in inclusive educational settings.

Present findings also extend the literature on the use of group contingencies and homework completion and accuracy to a new student population, geographic location, and another subject matter (i.e., social studies). The fact that the study was conducted by the classroom teacher and all 24 pupils, including 12 with IEPs and 504 plans, improved their performance so much is a very encouraging outcome. There have not been too many empirical studies in secondary inclusive classrooms of this nature and perhaps this will stimulate additional research. The magnitude of improvements that most teams and individual students made when

RR were in effect were quite unexpected. When teams can almost double their daily completion and accuracy rates immediately and so consistently, it suggests that their initial difficulties were more motivational than skill-based (Heward, 2009). That is, when pupils were provided with incentives and a game format for completing their work they do so without additional instruction. They already had the knowledge and skills to accurately complete the work, but they simply did not do so under the teacher's existing instructional conditions. The data indicated that the quality of student work increased dramatically. Since the students were given a target goal of 85% accuracy on assignments the amount of effort that the class put into the assignments was greater than it was before the intervention. The teacher noted that there was almost instantaneous improvements in the effort that students were putting into assignments. This suggested further that students were receiving the knowledge and skills to practice that they needed to be successful, but that the RR gave them the motivation to put those skills into practice. Additional data analyses should examine in more detail those students who had performance as opposed to skill deficits.

Student reactions during class time were generally very positive towards the intervention. The class frequently asked when they would be able to check individual results to see how they had performed on homework assignments. The class started to show their enthusiasm about the third day of the intervention and there was a clear difference in their attitudes towards homework. Students who were afraid that they wouldn't get work done on time asked to stay after school for help; they said specifically that they wanted to color in their individual reward sheets. The teacher noted that classroom participation seemed to increase as well once more students were doing their homework. Students who normally were not active in class discussions

began asking and answering more content-related questions. Classroom discussions became longer and more in depth with student inquiries often driving the discussion.

The Radical Raceway also appeared to be feasible and socially acceptable to both teachers and pupils. This finding is also consistent with previous research that shows positive consumer satisfaction evaluations for group contingency based interventions (Skinner, Skinner, & Burton, 2009; Skinner, Williams, & Neddenriep, 2004). The classroom and consultant teachers felt that the intervention was fair, took little time and effort to implement and evaluate, and produced important improvements in pupils' social studies performance. There was also a generally improved social atmosphere within the class during the intervention. Teammates often worked collaboratively on homework assignments helping one another to complete work and get better grades. The investigator felt that the more positive social interactions and increased student responsibility as very important outcomes. Since new Annual Professional Performance Reviews (APPR) teacher evaluations have become more "student-centered" such outcomes may provide teachers with an evidence based practice to maximize pupil growth. The investigator also noted that Radical Raceway did not take much time to implement once the intervention was in place. The investigator noted as well that the intervention was successful because homework completion levels continued to improve each week by at least four or five students. At least 10 pupils saw dramatic increases in their social studies average (i.e., 8 points or more) during implementation. There were a couple of students, however, who did complain about being on teams with students who normally did not complete assignments. Although they were bothered initially, these concerns faded as more and more teammates completed assignments and

earned higher grades. In addition, all students liked the idea of getting individual rewards for their own performance.

Although current findings are promising, there are a number of important study limitations that may reduce their utility to some extent. First, the study was conducted with only one group of students (N =24), in one geographical location, and in one narrow facet of the academic curriculum (i.e., social studies homework completion and accuracy). Generalizations to other grade levels, geographic settings, and subject areas are not warranted at this time. Second, the study was conducted for a relatively short duration (8-10 weeks) and no generalization and maintenance data were collected. It is not appropriate to conclude, therefore, that the same effects would be obtained over a longer time period and/or that benefits would generalize to other areas of social studies performance (e.g., in class work completion, quiz performance, and active participation in class) and/or be sustained in the absence of the intervention. As such, future research should include longer intervention durations and explicit generalization measures for examining potential “spillover effects”.

Current findings are limited because the investigator also served as primary data collector and evaluator. Although procedures were used to monitor fidelity of implementation (i.e., fidelity assessments), one cannot rule out potential experimenter bias effects at this time. Future research should utilize independently-trained data collectors to the maximum extent possible. Finally, present findings are limited by the absence of direct observations of pupils’ academic and interpersonal behavior during baseline and intervention phases. It is quite likely that one can learn much more about the effects of interventions by observing students’ faces and hearing their voices when intervention procedures are implemented and/or taken away. Were they excited,

dismayed, or some other affect? Who did the talking among the different heterogeneous team members and what did they say to one another? How might Radical Raceway or some facsimile work in other secondary classrooms and would classroom teachers be willing to give it a try?

In summary, the present study examined the effects of a “new” group contingency based intervention package called Radical Raceway on a 9<sup>th</sup> grade social studies class’ homework completion and accuracy rates. The study involved breaking the class into small heterogeneous learning teams that then competed against one another in order to advance their group race car a few spaces ahead each day by having the highest daily completion and/or accuracy rates. The team whose race car crossed the finish line first won the race and earned a larger reward based on initial student input. In addition, individual team members had an opportunity to earn smaller prizes by meeting daily homework requirements of turning in a completed assignment and getting at least 85% correct on the paper. These pupils colored in their individual progress charts and if a mystery symbol appeared then they could choose a smaller unknown reward. Results showed that RR produced immediate and substantial improvements in the entire class and individual team’s completion and accuracy rates. Moreover, students and teachers rated the intervention quite favorably. While initial material development and progress monitoring did require additional teacher time and effort early on, the system was relatively easy to maintain once it was in place. Obviously, there is a need for additional research on the Radical Raceway. Will other teachers get similar results with RR, can it be used to improve other pupil outcomes (e.g., in class productivity, active student participation in class, better report card grades and/or scores on high stakes tests), and how long can it be used effectively in the classroom? These questions among others should be addressed by future practitioners and researchers. In an era of

evidence-based practice, classroom teachers must use interventions that are powerful enough to improve all of their pupils' performance and yet be fairly easy to implement and socially acceptable to pupils and teachers alike.

## References

- Alberto, P. A., & Troutman, A. C. (2009). *Applied behavior analysis for teachers (8<sup>th</sup> Ed.)*. Upper Saddle River, NJ: Pearson/Merrill/Prentice Hall.
- Bembenutty, H. (2010). Homework completion: The role of self-efficacy, delay of gratification, and self-regulatory processes. *International Journal of Educational & Psychological Assessment, 6(1)*, 1-20.
- Boekarts, M. & Corno, L. (2005). Self-regulation in the classroom: A perspective on assessment and intervention. *Applied Psychology: An International Review, 54(2)*, 199-231.
- Campbell, S., & Skinner, C. H. (2004). Combining explicit timing with an interdependent group contingency program to decrease transition times: An investigation of the timely transitions game. *Journal of Applied School Psychology, 20*, 11-27.
- Chafouleas, S. M., Briesch, A. M., Riley-Tillman, T. C., & McCoach, D. B. (2009). Moving beyond assessment of treatment acceptability: An examination of the factor structure of the Usage Rating Profile---Intervention (URI-I). *School Psychology Quarterly, 24*, 36-47.
- Christ, T. E. & Christ, J. A. (2006). Application of an interdependent group contingency mediated by an automated feedback device: An intervention across three, high school classrooms. *School Psychology Review, 35*, 78-90.
- Cooper, H. (1989). *Homework*. White Plains, NY: Longman.
- Cooper, H. (2001). Homework for all—in moderation! *Educational Leadership, 58*, 34 – 38.
- Cooper, H., Robinson, J. C., & Patall, E. A. (2006). Does homework improve academic achievement? A synthesis of research, 1987-2003! *Review of Educational Research, 76*, 1-62.

- Delquadri, J., Greenwood, C. R., Stretton, K., & Hall, R.V. (1983). The peer tutoring game: A classroom procedure for increasing opportunity to respond and spelling performance. *Education and Treatment of Children, 6*, 225-239.
- Delquadri, J. C., Greenwood, C. R., Whorton, D., Carta, J. J., & Hall, R. V. (1986). Class-wide peer tutoring. *Exceptional Children, 52*, 535-542.
- DeMartini-Scully, D., Bray, M. A., & Kehle, T. J. (2000). A packaged intervention to reduce disruptive behaviors in general education students! *Psychology in the Schools, 37*, 149-156.
- Epstein, J. L. (1983). *Homework practices, achievements, and behaviors of elementary school children*. Baltimore, MD: Johns Hopkins University, Center for Social Organization of Schools.(ERIC Document Reproduction Service No. 250 351).
- Fuchs, D., Fuchs, L. S., Mathes, P. G., & Simmons, D. C. (1997). Peer-assisted learning strategies: Making classrooms more responsive to diversity. *American Educational Research Journal, 34*, 174-206.
- Greenwood, C. R., Delquadri, J. C., & Carta, J. J. (1997). *Together we can: Classwide peer tutoring to improve basic academic skills*. Longmont, CO: Sopris West Publishers. ([www.sopriswest.com](http://www.sopriswest.com))
- Hattie, J. (2009). *Visible learning*. New York: Routledge.
- Heering, P. W., & Wilder, D. A. (2006). The use of dependent group contingencies to increase on-task behavior in two general education classrooms. *Education and Treatment of Children, 29*, 459-467.

- Heward, W. L. (2009). *Exceptional children: An introduction to special education*. Boston: Allyn & Bacon/Pearson.
- Hill, N. E., & Tyson, D. F. (2009). Parental involvement in middle school: A meta-analysis assessment of the strategies that promote achievement. *Developmental Psychology, 45*, 740-763.
- Johnson, D. W., & Johnson, R. (1999). *Learning together and alone: Cooperative, competitive, and individualistic learning (5th Ed.)*. Boston: Allyn & Bacon.
- Kagan, S., & Kagan, M. (2009). *Kagan cooperative learning*. San Clemente, CA: Kagan Publishing.
- Kehle, T. J., Bray, M. A., Theodore, L. A., Jenson, W. R., & Clark, E. (2000). A multi-component intervention designed to reduce disruptive behavior. *Psychology in the Schools, 37*, 475-481.
- Kehle, T. J., Maduas, M. M., Baratta, V. S., & Bray, M. A. (1998). Augmented self-modeling as a treatment for a child with selective mutism! *Journal of School Psychology, 36*, 377-399.
- Keith, T. Z. (1986). *Homework*. West Lafayette, IN: Kappa Delta Phi.
- Kelshaw-Levering, K., Sterling-Turner, H. E., Henry, J. R., & Skinner, C. H. (2000). Randomized interdependent group contingencies: Group reinforcement with a twist! *Psychology in the Schools, 37*, 523-533.
- Kennedy, C. R. (2005). *Single-case designs for educational research*. Boston: Allyn & Bacon/Pearson.
- Knorr, J. (2010, March). *Radical raceway!* A power point presentation for school psychologists who work with students with severe emotional disturbance. Salt Lake City, UT:

University of Utah.

- Little, S. G., Akin-Little, A., & Newman-Eig, L. M. (2010). Effects on homework completion and accuracy of varied and constant reinforcement within an interdependent group contingency system! *Journal of Applied School Psychology, 26*(2), 115-131.
- Lynch, A., Theodore, L. A., Bray, M. A., & Kehle, T. J. (2009). A comparison of group-oriented contingencies and randomized reinforcers to improve homework completion and accuracy for students with disabilities. *School Psychology Review, 38*(3), 307-324.
- Madaus, M. M. R., Kehle, T. J., Madaus, J., & Bray, M. A. (2003). Mystery motivator as an intervention to promote homework completion and accuracy! *School Psychology International, 24*, 369-377.
- Marzano, R. J., & Pickering, D. J. (2007). The case for and against homework! *Educational Leadership, 64*, 74-79.
- McKissick, C., Hawkins, R. O., Lentz, F. E., Hailly, J., & McGuire, S. (2010). Randomizing multiple contingency components to decrease disruptive behaviors and increase student engagement in an urban, second grade classroom. *Psychology in Schools, 47*, 944-959.
- Miller, D. L., & Kelly, M. L. (1991). Interventions for improving homework performance: A critical review! *School Psychology Quarterly, 6*, 174-185.
- Moore, L. A., Waguespack, A. M., Wickstrom, K. F., Witt, J. C., & Gaydos, G. R. (1994). Mystery motivator: An effective and time efficient intervention. *School Psychology Review, 23*, 106-118.
- Mottram, L. M., Bray, M. A., Kehle, T. J., Broudy, M., & Jenson, W. R. (2002). A classroom-based intervention to reduce disruptive behaviors. *Journal of Applied School*

*Psychology, 19, 65-74.*

Murphy, K. A., Theodore, L. A., Aloiso, D., & Alric-Edwards, J. M. (2007). Interdependent group contingency and mystery motivators to reduce preschool disruptive behavior.

*Psychology in the Schools, 44, 53-63.*

Musser, E. H., Bray, M. A., Kehle, T., & Jenson, W. R. (2001). Reducing disruptive behaviors in students with serious emotional disturbance. *School Psychology Review, 30, 294-304.*

Olympia, D. E., Sheridan, S. M., Jenson, W. R., & Andrews, D. (1994). Using student-managed interventions to increase homework completion and accuracy. *Journal of Applied Behavior Analysis, 27(1), 85-99.*

Paschal, R.A., Weinstein T., & Walberg, H. J. (1984). The effects of homework on learning: A quantitative synthesis. *Journal of Educational Research, 78(2), 97-104.* <http://www.jstor.org/stable/27540101>

Popkin, J., & Skinner, C. H. (2003). Enhancing academic performance in a classroom serving students with serious emotional disturbance: Interdependent group contingencies with randomly selected components. *School Psychology Review, 32, 282-295.*

Reinhardt, D., Theodore, L. A., Bray, M. A., & Kehle, T. J. (2009). Improving homework accuracy: Interdependent group contingencies and randomized components. *Psychology in the Schools, 46(5), 471-488.*

Rhode, G., Jenson, W. R., & Reavis, H. K. (1993). *The tough kid book: Practical classroom management strategies.* Longmont, CO: Sopris West Publishers.

Robinson, K., & Sheridan, S. M. (2000). Using the mystery motivator to improve child bedtime

- compliance. *Child and Family Behavior Therapy*, 22, 29-49.
- Schanding, G. T., & Sterling-Turner, H. E. (2010). Use of mystery motivators for a high school class! *Journal of Applied School Psychology*, 26, 38-53.
- Sharp, S., & Skinner, C. H. (2004). Using interdependent group contingencies with randomly selected criteria and paired reading to enhance class-wide reading performance. *Journal of Applied School Psychology*, 20(2), 29-46.
- Skinner, C. H., Cashwell, C. S., & Dunn, M. (1996). Independent and interdependent group contingencies: Smoothing the rough waters. *Special Services in the Schools*, 12(1-2), 61-78.
- Skinner, C. H., Skinner, C. H., & Burton, B. (2009). Applying group contingencies in classrooms. In K. A. Akin-Little, S. G. Little, M. Bray, & T. Kehle (Eds.), *Behavioral interventions in schools: Evidence-based positive strategies* (pp. 157-170). Washington, DC: APA Press.
- Skinner, C. H., Williams, R. L., & Neddenriep, C. E. (2004). Using interdependent group-oriented reinforcement to enhance academic performance in general education classrooms. *School Psychology Review*, 33, 384-397.
- Slavin, R. E. (1980). Cooperative learning!. *Review of Educational Research*, 50(2), 315-342.
- Stage, S. A., & Quiroz, D. R. (1997). A meta-analysis of interventions to decrease disruptive classroom behavior in public education settings. *School Psychology Review*, 26, 339-368.
- Sullivan, M. H., & Sequeira, P. V. (1996). The impact of purposeful homework on learning. *Clearing House*, 69(6), p. 346.

- Theodore, L. A., Bray, M. A., & Kehle, T. J. (2004). A comparative study of group contingencies and randomized reinforcers to reduce disruptive classroom behavior. *School Psychology Quarterly, 19*, 253-271.
- Theodore, L. A., Bray, M. A., Kehle, T. J., & Jenson, W. R. (2001). The use of group dependent and randomization procedures to reduce disruptive classroom behavior. *Journal of School Psychology, 39*, 267-277.
- Theodore, L. A., DioGuardi, R. J., Hughes, T. L., Aloiso, D., Carlo, M., & Eccles, D. (2009). A class-wide intervention for improving homework performance. *Journal of Educational & Psychological Consultation, 19*(4), 275-299.
- Trautwein, U. (2007). The homework-achievement relation reconsidered: Differentiating homework time, homework frequency, and homework effort. *Learning and Instruction, 17*(3), 372-388.
- Trautwein, U., & Ludtke, O., (2006). Predicting homework effect: Support for a domain-specific, multilevel homework model. *Journal of Educational Psychology, 98* (2), 438-456.
- Williamson, B. D., Campbell-Whatley, G. D., & Lo, Y. (2009). Using a random dependent group contingency to increase on-task behaviors of high school students with high incidence disabilities. *Psychology in the Schools, 46*(10), 1074-1083.
- Xu, J. (2011). Homework completion at the secondary school level: A multilevel analysis. *Journal of Educational Research, 104*(3), 171-182.

Figure 1 shows the entire social studies class' homework completion and accuracy rates across experimental conditions.

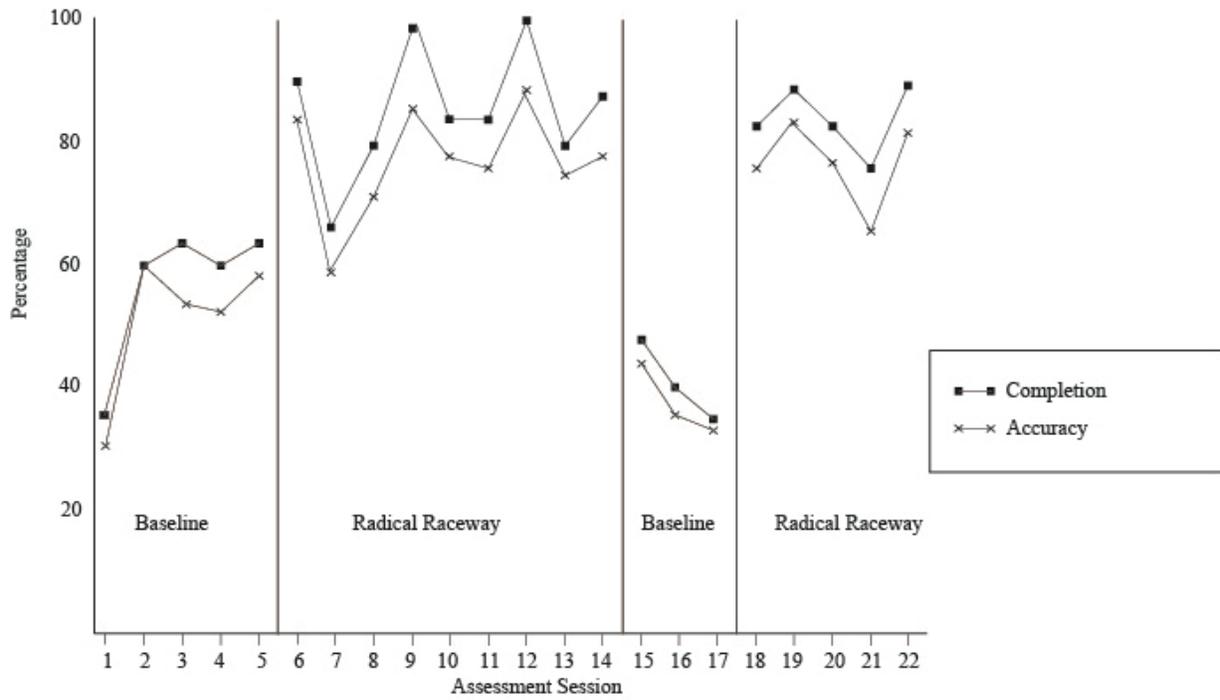


Table 1. shows individual team completion and accuracy rates by experimental conditions.

| <b>Conditions</b> | <b>Baseline</b> |                | <b>Intervention</b> |                | <b>Baseline</b> |                | <b>Intervention</b> |                |
|-------------------|-----------------|----------------|---------------------|----------------|-----------------|----------------|---------------------|----------------|
|                   | <b>Complete</b> | <b>Correct</b> | <b>Complete</b>     | <b>Correct</b> | <b>Complete</b> | <b>Correct</b> | <b>Complete</b>     | <b>Correct</b> |
| <b>Blue</b>       | .4              | .38            | .73                 | .68            | .33             | .30            | .84                 | .75            |
| <b>Red</b>        | .72             | .67            | .8                  | .74            | .4              | .39            | .95                 | .87            |
| <b>Green</b>      | .6              | .56            | .84                 | .78            | .67             | .62            | .76                 | .69            |
| <b>Pink</b>       | .48             | .43            | 1.0                 | .87            | .42             | .39            | .88                 | .81            |
| <b>Orange</b>     | .56             | .53            | .93                 | .81            | .27             | .22            | .76                 | .68            |
| <b>Totals</b>     | <b>.55</b>      | <b>.51</b>     | <b>.86</b>          | <b>.78</b>     | <b>.42</b>      | <b>.38</b>     | <b>.84</b>          | <b>.76</b>     |

Table 2. Mean consumer satisfaction ratings by 9<sup>th</sup> grade Global Studies students

| Items                                                                                                              | Mean |
|--------------------------------------------------------------------------------------------------------------------|------|
| 1. How important is it for you to do well in Global Studies class?                                                 | 4.1  |
| 1. How important is it for other students in your class to do well in Global Studies?                              | 3.6  |
| 1. How important is it for students to complete homework assignments?                                              | 4.2  |
| 1. How important is it for students to score well on homework assignments for global studies?                      | 4.2  |
| 1. How much did you like completing benchmark assignments each day?                                                | 3.1  |
| 1. How much did you like using a marker to color your sheet to find out if you were eligible for a prize each day? | 4.2  |
| 1. How much did you like being on a team and competing each day?                                                   | 3.8  |
| 1. How much did you like having a chance to get rewarded for your individual effort?                               | 4.5  |
| 1. How much did you enjoy playing the Radical Raceway Game?                                                        | 4.0  |
| 1. How much did you like picking one of the mystery motivator envelopes?                                           | 4.2  |
| 1. How satisfied are you with your overall performance in Global Studies class?                                    | 3.6  |

|                                                                                        |     |  |
|----------------------------------------------------------------------------------------|-----|--|
| 1. How satisfied are you with your performance when using the Radical Raceway Game?    | 3.9 |  |
| 1. How much did the Radical Raceway help you learn Global Studies content better?      | 3.5 |  |
| 1. How much did Radical Raceway help you to complete class assignments?                | 3.9 |  |
| 1. How much did the Radical Raceway help you to get along better with others in class? | 3.0 |  |
| 1. Does Radical Raceway seem like something that should be done in school?             | 4.1 |  |
| 1. Could Radical Raceway be harmful to other students?                                 | 1.6 |  |
| 1. How fair was the Radical Raceway to everyone in class?                              | 4.3 |  |

## Appendix A

### The Radical Raceway

#### Consumer Satisfaction Survey

Directions:

Please read each item aloud to your students and ask them to circle the number that best represents their feelings about that particular item. Emphasize the importance of completing the rating individually and privately.

#### I. Importance of Instructional Goals

**How important is it for you to do well in Global Studies class?**

|            |   |                    |   |                |
|------------|---|--------------------|---|----------------|
| 1          | 2 | 3                  | 4 | 5              |
| Not at all |   | somewhat important |   | very important |

**How important is it for other students in your class to do well in Global Studies class?**

|            |   |                    |   |                |
|------------|---|--------------------|---|----------------|
| 1          | 2 | 3                  | 4 | 5              |
| Not at all |   | somewhat important |   | very important |

**How important is it for students to complete homework assignments?**

|            |   |                    |   |                |
|------------|---|--------------------|---|----------------|
| 1          | 2 | 3                  | 4 | 5              |
| Not at all |   | somewhat important |   | very important |

**How important is it for students to score well on homework assignments for Global class?**

|            |   |                    |   |                |
|------------|---|--------------------|---|----------------|
| 1          | 2 | 3                  | 4 | 5              |
| Not at all |   | somewhat important |   | very important |

#### II. Acceptability of Instructional Procedures

**How much did you like completing benchmark assignments each day?**

|            |   |    |   |                |
|------------|---|----|---|----------------|
| 1          | 2 | 3  | 4 | 5              |
| Not at all |   | OK |   | Liked it a lot |

**How much did you like using a Jar to determine which goal/behavior would be monitored each day?**

|            |   |    |   |                |
|------------|---|----|---|----------------|
| 1          | 2 | 3  | 4 | 5              |
| Not at all |   | OK |   | Liked it a lot |



Not at all

maybe

definitely should

**Could the Radical Raceway be harmful to other students?**

1

2

3

4

5

Not at all

maybe

definitely could

**How fair was the Radical Raceway to everyone in class?**

1

2

3

4

5

Not fair at all

somewhat fair

Very fair

Additional Comments/Suggestions: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

## Appendix B

### Sample Team Scoring Sheets

| Blue Team | Day 1 | Day 2 | Day 3 | Day 4 | Day 5 |
|-----------|-------|-------|-------|-------|-------|
| Student 1 |       |       |       |       |       |
| Student 2 |       |       |       |       |       |
| Student 3 |       |       |       |       |       |
| Student 4 |       |       |       |       |       |
| Average   |       |       |       |       |       |

| Red Team  | Day 1 | Day 2 | Day 3 | Day 4 | Day 5 |
|-----------|-------|-------|-------|-------|-------|
| Student 5 |       |       |       |       |       |
| Student 6 |       |       |       |       |       |
| Student 7 |       |       |       |       |       |
| Student 8 |       |       |       |       |       |
| Average   |       |       |       |       |       |

| Green Team | Day 1 | Day 2 | Day 3 | Day 4 | Day 5 |
|------------|-------|-------|-------|-------|-------|
| Student 9  |       |       |       |       |       |
| Student 10 |       |       |       |       |       |
| Student 11 |       |       |       |       |       |
| Student 12 |       |       |       |       |       |
| Average    |       |       |       |       |       |

| <b>Pink Team</b>  | <b>Day 1</b> | <b>Day 2</b> | <b>Day 3</b> | <b>Day 4</b> | <b>Day 5</b> |
|-------------------|--------------|--------------|--------------|--------------|--------------|
| <b>Student 13</b> |              |              |              |              |              |
| <b>Student 14</b> |              |              |              |              |              |
| <b>Student 15</b> |              |              |              |              |              |
| <b>Average</b>    |              |              |              |              |              |

| <b>Orange Team</b> | <b>Day 1</b> | <b>Day 2</b> | <b>Day 3</b> | <b>Day 4</b> | <b>Day 5</b> |
|--------------------|--------------|--------------|--------------|--------------|--------------|
| <b>Student 16</b>  |              |              |              |              |              |
| <b>Student 16</b>  |              |              |              |              |              |
| <b>Student 18</b>  |              |              |              |              |              |
| <b>Student 19</b>  |              |              |              |              |              |
| <b>Average</b>     |              |              |              |              |              |

## Appendix C

### Team Data Collection Sheet

#### Team Race Car Reward Sheet

Car/Team Name:

| Category           | Day 1 | Day 2 | Day 3 | Day 4 | Day 5 |
|--------------------|-------|-------|-------|-------|-------|
| Completion<br>100% |       | M     | M     |       |       |
| Accuracy<br>85%    | M     |       |       | M     |       |
| Comments           |       |       |       |       |       |

## Appendix D

### Radical Raceway Intervention

#### Fidelity of Treatment Record

Investigator:   Derek Houser   Date: \_\_\_\_\_

Time session began: \_\_\_\_\_ Time session ended: \_\_\_\_\_

Directions: Observe the investigator as s/he implements the intervention and use the scoring code below to note the presence and/or absence of each tutoring component.

**Scoring Code:**

|    |                           |
|----|---------------------------|
| +  | Behavior demonstrated     |
| -  | Behavior not demonstrated |
| NA | Not applicable            |

#### General Implementation

- \_\_\_\_\_ 1. Students are assigned to small, heterogeneous teams.
- \_\_\_\_\_ 2. Teacher announces criteria for students to earn prizes (100% completion & 85% accuracy).
- \_\_\_\_\_ 3. Radical raceway rules and expectations are reviewed  
\_\_\_\_\_ teams with highest completion and accuracy averages any team that gets a mystery motivator on team score sheets moves one space ahead  
\_\_\_\_\_ first team to cross finish line is winner
- \_\_\_\_\_ 4. Race-track and group progress sheets are posted prominently in class; mystery motivator envelopes are clearly visible.
- \_\_\_\_\_ 5. Students place homework in folder before bell rings.
- \_\_\_\_\_ 6. Teacher reviews homework folder and enters data on progress monitoring sheets.
- \_\_\_\_\_ 7. Teacher *averages* completion and accuracy scores for each team.  
\_\_\_\_\_ team (s) with highest averages for completion and accuracy, move car(s) ahead one space.
- \_\_\_\_\_ 8. Team progress sheets are colored in; if “M” appears, team(s) move

cars one space.

\_\_\_\_\_ 9. Winning team gets to choose mystery motivator envelopes.

\_\_\_\_\_ 10. Class makes smooth transition to next activity.

Total \_\_\_\_\_/10 (Please record the number of behaviors observed plus the number of NA)

\_\_\_\_\_ % Procedural fidelity

Anecdotal

Comments: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_