The Impact of Question Type on Student Behavior in Using Response Cards: The Role of Teacher Preference

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The Impact of Question Type on Student Behavior in Using Response Cards: The Role of Teacher Preference

by

Elizabeth Cassell

A thesis submitted in partial fulfillment of the requirements for the degree of Master of Arts in Applied Behavior Analysis Department of Child and Family Studies College of Behavioral and Community Sciences University of South Florida

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Keywords: response cards, student response systems, class-wide intervention, classroom management

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Abstract

This study examined the relative impact of two different question types (multiple choice and short answer) on individual student behavior when using response cards and the potential role of teacher preference as it pertained to question type. Using an alternating treatments design across participants, the study focused on identifying the type of question that was more effective in reducing disruptive behavior and increasing academic engagement and correct response when using response cards and investigated whether implementation of teacher preferred question type enhanced student behavioral outcomes. The results indicated that response cards effectively decreased disruptive behavior and increased academic engagement and correct responses in all four participating students. However, changes in the students’ behavior and performance did not differ between question types. The results also indicated that implementation of the teacher preferred question type further decreased disruptive behavior across students.

*Keywords:* response cards, student response systems, class-wide intervention, classroom management
Chapter 1:

Introduction

A variety of difficulties are present in a teacher’s classroom each day in school. One obstacle that many teachers encounter is ensuring that students stay on task during class instructional periods. Students are prone to engage in disruptive behavior that can be potentially detrimental to their own learning and that of their peers when they are not actively engaged during teacher lessons. Students engaging in disruptive behavior can lead to distraction for the entire class, and ultimately not only affect student learning but also teacher instructional time (Bru, 2009). According to a national survey, 77% of teachers stated that their class would run more efficiently if they could spend less time addressing students’ disruptive behavior (Public Agenda, 2004). It is critical for students to remain academically engaged during teacher instruction to increase understanding and academic performance, and decrease time spent engaging in other competing disruptive behavior. Teacher responsibility for student performance is a significant amount of teacher evaluation (Harris, Ingle, & Rutledge, 2014). Research has shown that instructional supports that incorporate higher levels of active student responding increase learning in the classroom, and are correlated with higher levels of on-task behavior (Fischer, &Berliner, 1985; Miller, Hall, & Heward, 1995).

Classroom management techniques are highly effective strategies in stimulating a positive environment in the classroom (Newcomer, 2009; Noel, 2008; Randolph, 2007). A complete classroom management strategy entails effective behavioral, environmental, and instructional techniques (Newcomer, 2009). If a teacher is able to increase an opportunity for
students to respond using effective classroom management techniques, they are also increasing the opportunity for the students to engage with class instruction. Therefore, in order to increase students’ engagement during class instruction, effective strategies that increase student responses should be implemented. Increasing the opportunity for students to respond during instruction can also serve as a replacement behavior for problem behaviors that students engage in during class (Singer, Crosland, & Fogel, in review).

The research has demonstrated active student responding effectively increases engagement in the instructional activities by providing students more opportunities to respond to questions (Newcomer, 2009). Educational interventions with active student responding can be described as an instructional antecedent that is followed by an observable response (Heward, 1994). The literature on active response strategies reveals that teaching techniques incorporating active student responding at high levels increase learning (Pratton & Hales, 1986; Randolph, 2007). These types of teaching strategies also allow teachers to obtain direct feedback, and are related to higher levels of on-task behavior (Miller, Hall, & Heward, 1995; Randolph, 2007). Increases in responding, participation, and academic performance have been observed in the literature when students are obligated to engage in the lesson (Christle & Schuster, 2003; Kellum, Carr, & Dozier, 2001; Narayan, Heward, Gardner, Courson, & Omness, 1990). A variety of strategies, such as choral responding (Heward, 1994), direct instruction (Skinner, Pappas, & Davis, 2005), number heads together (Hunter & Haydon, 2013), guided notes (Larwin, Dawson, Erickson, & Larwin, 2012; Sweenery et al., 1999), response cards (Cavanaugh, Heward, & Donelson, 1996; Wood, Mabry, Kretlow, Lo, & Galloway, 2009), and peer tutoring (Arreaga-Mayer, 1998; Snowman & Biehler, 2003) have been found to be successful in increasing student responding. These strategies present more opportunities for
students to actively respond during teacher instruction, and therefore, decrease disruption and improve student behavior in the classroom (Blackwell & McLaughlin, 2005).

The literature has demonstrated the efficacy of increasing active student responding through implementing response cards during teacher instruction. Response cards are laminated flash cards or white boards that students utilize to answer questions from the teacher and then present them simultaneously to the teacher during instruction (Duchaine, Green, & Jolivette, 2010; Gardner et al., 1994). Response cards allow the whole class to answer teacher questions, as well as offer insight into the number of students who comprehend the information presented during class (Marmolejo et al., 2004). Response cards have been empirically assessed as an active teaching approach in a variety of academic areas, school settings, and participants (Randolph, 2007).

The preprinted response cards have been utilized in preschools to improve students’ engagement in coloring and the calendar activities (Godfrey, Grisham-Brown, Schuster, & Hemmeter, 2013; Inwood, 1995), in elementary school classrooms to improve student behavior during science (Gardner et al., 1994), math (Armendariz & Umbriet, 1999), vocabulary (Munro & Stephenson, 2009), and social studies (Narayan et al., 1990), and in college psychology and research methods classes targeting test scores and participation (Marmolejo, Wilder, & Bradley, 2004; Shabani & Carr, 2004). Other applications of response cards include increasing student response accuracy during instruction with students ages 7-10 with varying disabilities in special education classrooms (Skibo, Mims, & Spooner, 2011) and decreasing off-task behavior in a general kindergarten classroom (Wood, Mabry, Kretlow, Lo, & Galloway, 2009).

For example, in a study that evaluated the outcome of utilizing response cards in a fourth-grade classroom during social studies, Narayan et al. (1990) compared hand raising to response
cards using an ABAB design with six students. Results revealed that the response cards condition had higher rates of participation among the participating students compared to the hand raising condition because students were allowed more opportunities to respond. Accuracy of student responses did remain the same throughout conditions, but students achieved higher quiz scores in the response card condition.

Gardner et al. (1994) addressed limitations from the Narayan et al.’s study by increasing the delay between teaching and quizzing students to evaluate whether the increase in academic achievement would maintain. An ABAB design was utilized, and five teacher-nominated students represented academic participation and performance for the entire class. The results revealed that levels of responding during the response card condition were much higher than those of the hand raising condition. Additionally, an increase in delayed test scores was observed during the response condition. A limitation to the two above studies was the unnatural implementation of the intervention by the authors of the study as opposed to the teachers in the classroom.

To address the above limitation Maheady et al. (2002) examined the impact of response cards on student outcomes in a sixth-grade class by supporting the teacher to implement all of the procedures. An alternating treatments design was utilized to examine the effects of each teaching method on teacher questioning and student responding, while also observing academic achievement through quiz scores and a pre-post test. Results indicated that lectures using response cards generated increased quiz scores and the benefits were also apparent by a 20% to 78% increase in pre-post test scores.

Munro and Stephenson (2009) found the teacher in their study delivered feedback more often in the response card conditions, as opposed to hand raising conditions in a fifth grade
classroom during a vocabulary lesson. An increase in test scores was observed for all five students during the response card conditions, and this increase was replicated for most students when response cards were reintroduced to the class. Limitations to this study included a lack of data on the type of feedback that was provided by the teacher, and the accuracy of student responses during the intervention condition. The outcomes of using response cards were also evaluated in a fourth-grade math classroom (Christle & Schuster, 2003), in which five students with low rates of on-task behaviors and a range of academic performance skills were chosen to represent the class for data collection. Utilizing an ABA design, the study demonstrated increases in academic achievements, on-task behavior, and active participation during the response card condition.

Limited research has evaluated response cards as an effective intervention for reducing disruptive behavior in the classroom. Armendariz and Umbreit (1999) demonstrated response cards effectively decreased disruption for all students during lessons in a third-grade classroom. Lambert et al. (2006) found response cards resulted in a reduction in individual targeted students’ disruptive behavior and an increase in responding in two fourth-grade math classrooms. An interview conducted with the teachers and students revealed that the teachers believed that the procedures in the response card condition were easy to administer, and that they observed the beneficial effects on students’ academic performance and disruptive behavior. Students also indicated that they enjoyed utilizing the response cards during instruction and perceived the cards to be helpful in learning better.

Recent research and practice concerning the reduction of problem behavior and improvement of academic engagement in the classroom have focused on the use of student preference (Dunlap & Kern, 1993; Foster-Johnson, Ferro, & Dunlap, 1994). The literature
suggests that the use of preferred activities improves student behavior because they may result in access to immediate reinforcement (Kern & State, 2008). Although choice making motivates students to improve their behavior, it has been suggested that choice making may simply allow students to have access to preferred activities (Morgan, 2006). Killu, Clare, & Im (1999) found that preference improved task engagement, rather than choice-making. Similarly, Vaughn and Horner (1997) found that students engaged in less problem behavior when they had access to preferred tasks regardless of whether they had given the opportunity make choices on tasks.

Studies on student preferences for classroom or instructional activities have reported that incorporating student preference into academic activities can increase the probability that students will engage in the assigned task (Skinner, Wallace, & Nedderiep, 2015). Research has revealed that students are more likely to prefer academic tasks that are easier and require less time to finish (Cook, Guzaukas, Pressley, & Kerr, 1993; Horner, & Day; 1991, Kern, Childs, Dunlap, Clarke, & Faulk, 1994). Because students have access to desired activities that are more reinforcing when preferred activities are available, it is likely that they will become more academically engaged (Morgan, 2006).

Another area that may enhance interventions outcomes is accessing the type of question that is most preferred by teacher and students when using response cards. It is important to ensure the involvement of main stakeholders in the process of design and implementation of interventions to increase contextual fit, social validity, and external validity of the interventions (Carr et al., 2002). Research has indicated that response cards are an acceptable intervention to use in the classroom by teachers, but none has evaluated the most preferred question type when using response cards (Lambert et al. 2006). Choosing to implement a certain type of question in the classroom with response cards may be a more effective measure of preference from the
teacher. The implementation of the teacher preferred question type with teacher should be evaluated through research because the literature has shown that the acceptability of an intervention does not necessarily correlate with high implementation fidelity of that intervention (Filcheck, McNeil, Greco, & Bernard, 2004; Reitman et al. 2004).

Questioning during teacher instruction is critical in developing study thinking skills (Savage, 1998). Kucuktepe (2010) conducted a study with 156 elementary school teachers across 20 schools to classify teacher questions and evaluate if the questions that they asked were developing thinking skills of their students. The results of this study revealed that teachers mostly asked questions with one answer to their students, which can be detrimental because it does not promote critical thinking skills. The study recommended incorporating questions with multiple answer possibilities, such as short answer and multiple choice, so the students cannot simply memorize the correct answer, and will have to use their critical thinking skills.

Therefore, it would be valuable to assess what type of questions students and teachers prefer when using response cards to make it more likely that they will engage in instructional activities in the classroom. Research is needed to determine whether academic engagement will increase and disruptive behavior will decrease if students are asked questions that require less response effort to answer, such as multiple-choice questions and if the most preferred question type by students or teachers is provided when using response cards (Lambert et al., 2006).

The purpose of this study was to examine the type of questions that was more effective when using response cards in an elementary school classroom as measured by student disruptive behavior, academic engagement, and correct responses. This study also evaluated the role of teacher preference as it pertained to question type when using response cards, and evaluated
social validity from teacher and student perspectives. This study addressed the following research questions:

1. To what extent will response cards impact disruptive behavior, academic engagement, and correct responses of students with behavior concerns?

2. Which type of question (multiple choice and short answer) used with response cards will result in the more favorable behavioral outcomes?

3. To what extent will the teacher preferred question type enhance student outcomes?
Chapter 2:

Method

Setting

This study was conducted at a magnet elementary school (Kindergarten-5th Grade) in an urban city. A magnet school is a public school that provides specialized instruction and programs that are not available at other schools to attract a variety of students throughout a school district. The school population consisted of 352 children. The elementary school was considered a Title I, where 70% of the students received free or reduced price lunch. As of 2014, the school demographics were as follows: 0.3% Asian; 53.7% African American; 23.3% Hispanic; 7.4% Multiracial; and 15.1% Caucasian. This school had been implementing School Wide Positive Behavioral Interventions and Supports (SWPBIS) for 4 years. During the most recent year (2014-2015), the school’s Benchmark of Quality (BoQ; Childs, Kincaid, & George, 2010) score was 86%, which is indicative of a high fidelity of implementation of SWPBIS.

The study was conducted in two general education classrooms at the school. The first classroom was a 4th grade classroom. The target academic time period selected by the classroom teacher was shared reading. During the shared reading time the class would be reading and discussing a text from a reading textbook. The students were typically broken up into small groups of two or three students. Throughout the reading activity the teacher would instruct the groups to read 1-2 pages and then have them discuss the text in their groups and ask the whole
class questions. Students would then raise their hands to answer the questions, and the teacher would call on them to answer individually. The classroom teacher (Teacher 1) utilized a clip level system for managing classroom problem behaviors. All students started the beginning of the day in the middle of the chart and could move up or down based on engaging in appropriate or inappropriate behavior. When students engaged in disruptive behavior the teacher reprimanded the students individually and redirected them to the desired behavior. This academic activity lasted between 25-45 minutes each day.

The second classroom was a 5th grade classroom. The target academic time period selected by the classroom teacher (Teacher 2) was whole group reading instruction. During whole group reading instruction the teacher would sit or stand at the front of the classroom and deliver the reading lesson (e.g., text structure, text coding) to the whole group of students. During this reading activity, the students sit in their desks individually that were normally positioned in a semi-circle facing the front of the classroom. The teacher would deliver the instruction and ask questions throughout the lesson. The students would raise their hands, and the teacher would call on them individually to answer questions. Teacher 2 utilized a marble system to manage classroom behaviors. Students would earn a marble that would be placed in the jar if all of the students in the class engaged in appropriate behavior (i.e., all students were working on an assignment, all students were quiet, all students immediately followed directions). When disruptive behavior occurred the teacher often reprimanded the students individually and redirected them to the desired behavior. This activity lasted between 15-40 minutes each day.

Participants

The participants in this study included four students and two teachers in two general education classrooms of the school. Classroom teachers who were interested in using response
cards during their regular lessons to support students that engaged in disruptive behavior and improve overall classroom environment for all students were invited to participate in the study. Teachers were notified through a flyer placed in their mailbox that briefly described the study and invited those interested to contact the principal investigator (PI) via email or in person. Selection criteria for teacher participants included the following: (a) consent to participate and (b) nominated students for consideration who were receiving typical class-wide supports but were not adequately progressing. Exclusion criteria for teacher participants included teachers teaching self-contained exceptional student education (ESE) classrooms and teachers who were using an active learning strategy similar to response cards in their classrooms. The two teachers selected for the study were the only teachers that contacted the PI to be in the study and included a female, 4th grade teacher (Teacher 1) and a female, 5th grade teacher (Teacher 2). Teacher 1 was an African American female with 18 years of teaching experience. She had been teaching at the study setting for three years and had a Masters’ degree in educational leadership. Teacher 2 was a Caucasian female with two years teaching experience and with a Master’s degree in holistic education. It was her first year teaching at the elementary school.

The teachers each nominated two students from their classrooms who they thought would benefit from the response card intervention. Selection criteria for student participants included the following: (a) enrolled in grades K-5; (b) not been identified as eligible for a special education disability; (c) disruptive for at least 20% of instructional period; and (d) not adequately progressing while receiving typical class-wide supports. Exclusion criteria for student participants included those students who had been diagnosed with a disability. All students in both the 4th and 5th grade classrooms participated in the study and received the response card
intervention; however, data were only collected on the two students nominated by the teachers in each classroom.

Jackson and Brandon were nominated by Teacher 1, and both students were in the 4th grade. Jackson was a nine year old, African American male student with the Developmental Reading Assessment (DRA; Beaver, 2001) score of 38 at the beginning of the year, and 40 at the time of the study, indicating the Grade 4 reading level. The DRA is a criterion-referenced test with a ceiling score of 50 for 4th grade. Jackson had one office discipline referral (ODR) for disruptive behavior on the bus and one ODR for disruptive classroom behavior at the time of the study. Brandon was a nine year old, African American male student with a DRA score of 28 at the beginning of the year and 40 at the time of the study. Brandon had two ODRs for disruptive behavior on the bus and none in the classroom. The disruptive behavior for Jackson and Brandon included talking to peers when the teacher was talking, calling out, getting out of seat, and gesturing or making faces at peers.

Kiera and Zoey were nominated by Teacher 2, and both students were in the 5th grade. Kiera was a 10 year old, African American female student with a DRA score of 50 in the middle of the year, indicating the 5th grade level. The DRA ceiling for 5th grade students is a score of 60. Kiera had 14 ODRs for disruptive behavior on the bus and no ODRs for classroom disruptive behavior. Zoey was a 11 year old, African American female student with a DRA score of 50 in the middle of the year. Zoey had no ODRs. The disruptive behavior for Kiera and Zoey included talking to peers, dancing, calling out, out of seat, looking through teacher cabinets, and gesturing or making faces at peers.

Once students were deemed eligible, the PI met with each teacher to explain the study and attain written parental and teacher consent and student assent. These students were sent
home with informed consent forms to be completed and returned by their parents prior to data collection. Teachers were interviewed to identify the students’ disruptive behavior, problematic instructional time periods, and difficulty with engagement. The principal investigator observed the students during their targeted instructional times to document the levels of disruptive behavior prior to enrolling the participants into the study and to ensure that they engaged in disruptive behavior at least 20% of the target instructional time. A 15-sec momentary time sampling procedure was used to record disruptive behavior of the two students in each classroom. The observations indicated that the participants engaged in disruptive behavior between 42%-80% during instruction prior to study enrollment.

**Materials**

All of the necessary study materials for the intervention were provided to the teachers and students. Materials included response cards (dry-erase white boards 8½”x11”) and dry-erase markers with felt erasers on the cap of the marker. The teacher or a student helper distributed the materials at the beginning of the target academic time, collected them at the end of the time period. The materials were stored in the PI’s office at the elementary school when not in use. The PI took the materials to each classroom and gave them to the teacher before the targeted routine. The materials were given to the teachers when the students were not present (i.e., in the morning before the students arrived, while the students were at specials) to avoid the students predicting the days that the response cards were to be used. At the completion of the study the materials were donated to the classrooms.

**Measures and Data Collection**

The dependent variables in this study included academic engagement, disruptive behavior, and correct responses. In addition, treatment fidelity was measured to assess correct
implementation of the response cards procedures by teachers, and social validity was evaluated to determine the acceptability of the intervention by teachers and participating students.

Observers (PI and three research assistants) collected direct observational data in the classroom during the targeted instructional times. Research assistants were trained individually on collecting direct observational data on targeted student behavior using YouTube videos of students with disruptive behavior similar to behavior that they would observe in the classroom. A behavior skills training, a procedure including instruction, modeling, rehearsal, and feedback utilized to teach skills, was used to train the assistants to collect accurate and reliable data (Miltenberger, 2004). To begin data collection for the study, the research assistants were required to score above 90% accuracy on interobserver agreement during training. Classroom observations were conducted 2 to 5 times per week during the targeted instructional period. Data were collected with paper and pencil and the use of an electronic timer to indicate different time intervals for interval recording. The electronic timer also included an audio cue to signal the next interval. Observational periods in the both classrooms lasted from 15-45 min depending on the material that was being covered in the classroom each day.

**Academic engagement and disruption.** Data on individual student engagement during targeted academic activities were collected by recording the number of times that each student participated and responded to question-and-answer activities. The percentage of academic engagement for each student was calculated by dividing the number of questions answered using hand-raising or response cards by the number of opportunities to answer throughout the instructional time. The teacher and PI determined the number of questions to be asked during the targeted routines. In Classroom 1, Teacher 1 decided to ask between 5 and 8 questions during each shared reading routine. The teacher wanted to select a range of number of questions to ask
because she would often ask additional questions based on the students responses to determine if they comprehended the material. In Classroom 2, Teacher 2 decided to ask six questions during each whole-group reading instruction routine. During the hand raising (control) condition, both teachers verbally posed questions (multiple choice and short answer) to the students throughout the targeted activity, and students were given the opportunity to respond individually by raising their hands and verbally answering the teacher posed questions. Observers scanned the room and recorded which of the two target students in each classroom raised their hands and verbally answered the questions. During the response cards condition, both teachers posed questions to the class, and all students were given the opportunity to answer concurrently using the response cards.

Student disruptive behavior was defined as talking to peers (e.g., whispering, engaging in off-topic conversations) when teacher was talking or giving instructions, calling out (e.g., calling the teacher’s name, yelling out answers to questions), getting out of seat, or any other behavior requiring teacher redirection (e.g., dancing, gesturing to other students) during the instructional time. The disruptive behavior was measured using a 15-sec partial interval recording procedure. The definitions were developed by the each teacher and confirmed by PI during initial direct observations.

Correct responses. Data were also collected on correct responses during the control and response card conditions. During the control condition, correct responses were recorded if the student provided the correct answer by raising a hand and being called on by the teacher to answer the question. If the student raised their hand, was called on by the teacher, and answered incorrectly, the response was counted as incorrect. If the student raised their hand to answer the question, but was not called on by the teacher to answer the question, it was scored as neither
correct nor incorrect but as no opportunity. However, if a student raised their hand, but was not called on by the teacher to answer the question the student was scored as being academically engaged. During the response cards conditions, a correct response was recorded if the student wrote a response and raised the response card when the teacher gave the cue and provided the correct answer. The observers were seated in positions around the room that allowed them to view the students’ answers so they could be scored as correct or incorrect. The percentage of correct responses was calculated based on dividing the number of correct responses by the number of questions given during the instructional period.

Implementation fidelity. Implementation fidelity was recorded during 45% of sessions. To assess implementation fidelity, a checklist was designed that included the steps that should have been implemented each time a question was asked to the class by the teacher (e.g., teacher had questions and response cards ready; teacher presented the question to the class; teacher presented cue for students to raise their hands or hold up cards to answer the question; teacher called on students who raised their hands, teacher provided feedback to responses). A column next to the steps provided a yes, no, or n/a format. Observers would record fidelity by marking “Y” if the step was implemented correctly, “N” if the step was not implemented or was implemented incorrectly, and “n/a” if the step was not relevant. The implementation fidelity score was calculated by dividing the number of yes responses by the total number of yes plus no responses to demonstrate an overall fidelity of implementation (see the checklist in Appendix C and Appendix D).

Implementation fidelity in the first phase (RC) of intervention was 94% (range: 69%-100%) for Teacher 1. Due to low implementation fidelity from Session 7, specifically pertaining to the number of questions asked, a self-monitoring checklist was given to the teacher in the
form of tally sheet to keep track of the number of questions asked. Following the self-monitoring checklist the PI offered to assist with writing questions for Teacher 1 to decrease the response effort involved in using the response cards. Implementation fidelity for Teacher 2 was 99% (range: 88%-100%) during this phase. During the second phase of intervention (Teacher Preferred RC), implementation fidelity for both teachers was observed to be 100% across all sessions that implementation fidelity was assessed (three sessions for Teacher 1 and four sessions for Teacher 2)

**Social validity.** At the end of the intervention, teachers and targeted students were asked to complete a social validity survey to access the acceptability and satisfaction of the response card intervention. Social validity with teachers was assessed using an adapted questionnaire used by Lambert et al. (2006) that includes three open-ended questions (e.g., What was the best part of implementing response cards in your classroom?, What was the most challenging part of implementing response cards in the classroom?) and seven 5-point Likert type scale questions (e.g., Were response cards easy to implement in your classroom; Will you use response during other instructional routines). In addition to these questions additional questions were asked to determine why the teacher preferred a specific type of question. The student social validity questionnaire also included four open-ended questions and four Likert type scale questions and was developed using age appropriate language, using the same format as that of the teacher (see the questionnaires in Appendix A and Appendix B). Teacher surveys were distributed to both teachers with an envelope so they could be completed and returned to the PI at a time that was convenient for the teachers. Targeted students were removed from the classroom and given the survey in a room away from the rest of the class. The PI instructed the students that they would be left in the room for ten minutes to complete the survey and then put the questionnaire in an
envelope to ensure their privacy. The survey was first reviewed with the students to ensure they could read and understand all questions, and then students were allowed to ask any questions they had about the survey before the PI left the room. Following completion of the survey the students were given a piece of candy for completing the survey.

**Inter-observer Agreement (IOA)**

Inter-observer agreement on the dependent variables was assessed over 33% of sessions during the study, across all phases, participants, and direct observation measures. A second observer collected data on student academic engagement, disruptive behavior, and correct responses simultaneously, but independently from another observer. IOA for disruptive behavior was calculated by dividing the number of intervals with agreement by the total number of intervals, and multiplying by 100. IOA for academic engagement was calculated by dividing the smaller number of responses by the larger number of responses and multiplying by 100 for each session. IOA for correct responses was calculated by dividing the smaller number of correct response by the larger number of correct response and multiplying by 100 for each session.

The mean IOA for disruptive behavior was 94% (range: 85%-99%), the mean IOA for academic engagement was 100%, and the mean IOA for correct responses was 100%. The mean IOA was 92% (range: 85%-97%) for disruptive behavior, 100% for academic engagement, and 99% (range: 98%-100) for correct responses in the control condition, 96% (range: 92%-99%) for disruptive behavior, 100% for academic engagement, 100% for correct responses in the RC condition, and 96% (range: 96%-97%) for disruptive behavior, 100% for academic engagement and 100% for correct responses in the teacher preferred RC condition across participants.
Experimental Design and Procedures

An alternating treatments design was employed in phase 1 of the study. A control condition and response card conditions with two different types of questions were delivered to the students and rapidly alternated each day, counterbalancing the order of conditions to minimize the order or sequence effects, and data were continuously collected for each target student. The teachers were notified prior to the instruction which condition would be implemented that day. Prior to the start of the study, the purpose of the study and a brief description of response cards were discussed with the teacher. The investigator and teacher determined together a target instructional period, defined disruptive behavior and academic engagement for each student, and determined academic content to be used with the response cards during the instructional activity.

Experimental conditions. The experimental conditions in the first phase included: (a) hand-raising (Control); (b) response cards with multiple-choice questions (RC-M); and (c) response cards with short-answer questions (RC-S). In the second phase, teacher preferred question type (RC-P) was implemented.

Hand raising (Control). In this condition, the teachers implemented classroom instruction as usual. Response cards and materials were not implemented during this condition. The investigator and teacher determined together the number of questions to ask prior to data collection that was held constant across all conditions to control for extraneous variables. Questions were generated according to the teachers’ selected textbooks and adherence to state guidelines for specific grade level proficiency requirements. Teacher 1 chose to ask between 5-8 questions and Teacher 2 chose to ask 6 questions during their target routine. During the instructional period in this condition both teachers randomly selected either multiple choice or
short answer questions and verbally asked them to the class throughout the instructional activities. Following the teacher posed question the teachers allowed the students the opportunity to verbally respond to questions through hand raising. Each teacher waited approximately 10-15 seconds before calling upon individual students to answer the questions. The teacher provided praise for each correct response (e.g., “Good job”, “That’s correct”, “Great answer”) and corrective feedback (e.g., “Good try but the correct answer is...”) or chose another student to answer for incorrect responses. These types of feedback statements were similar to those given in the response card conditions.

**Response cards (RC).** Questions for both RC-M and RC-S conditions with response cards were generated from the same textbooks as used in the control condition. Both teachers posed questions that were stated verbally to the class and were repeated upon student request. Teacher-student interactions during the response card conditions were similar to the control condition, except they were given the opportunity to respond by writing their responses on the whiteboard and showing it to the teacher at the same time. Teacher 1 gave students approximately 1 to 2 minutes to answer questions, while Teacher 2 gave students approximately 30 seconds to 1 minute to answer questions. The amount of feedback provided to students remained similar to the control condition. In order to record data on correct responses the observers were seated in an area of the room where the answers could be viewed for the target students.

**RC-M.** During this condition teachers posed a question to the class and gave the students three answer choices. The teachers verbally read the questions and answer choices aloud and instructed the students to write the corresponding answer choice (e.g., letter A, B, or C) on their response cards.
During this condition the teacher posed a question to the class, and instructed the students to write their answer on their board without giving them any answer choices. Answers during this condition included a few words or a short phrase (e.g., he went to New York City, descriptive text-structure).

After the teacher posed the question and had given students time to answer, they quickly scanned the students’ answers on the cards, and then provided feedback to the classes responses collectively. If less than 50% of the students responded correctly to a questions, the teachers reviewed the question and correct answer with the students (e.g., “It seems that this is a difficult question let’s review it to make sure everyone knows the right answer.”). If the majority of the students in the class had the correct answer, the teachers moved onto the next question.

Prior to implementing this condition, the teachers received a brief preference assessment. In this assessment the PI asked the teachers which type of question they preferred (multiple choice or short answer). Teacher 1 indicated that she preferred multiple choice questions with response cards and Teacher 2 indicated that she preferred short answer questions with response cards. After the teachers had indicated their preferred question type, only the teacher preferred question type was implemented with response cards. The results were analyzed to examine if the preferred question type further improved student outcomes.

During the training the teachers also received behavior skills training, first using instruction, then modeling
and role plays with feedback provided by the PI on how to implement response cards with the different question types in their classrooms. Teachers received a brief handout that they used when introducing response cards to the class.

Implementation. During implementation, the investigator briefly met with each teacher at the end of each week to review the conditions to be implemented each day for the following week. The PI also checked in with each teacher before the target routine to ensure they were aware of the condition to run that day. Teacher 1 utilized a self-monitoring checklist to keep track of the number of questions that she asked during each session. Teacher 1 had difficulty consistently asking 5-8 questions each session, which was the number that she had identified before the study began. Therefore, the investigator assisted with writing the questions and gave them to the teacher a day before the session. Teacher 2 created the questions independently to ask to her classroom; she did not need assistance and was able to consistently ask six questions for the majority of sessions.

Teachers were given feedback as needed during the weekly meetings that lasted approximately 15-20 minutes to discuss implementation errors and address any questions or concerns that they had about procedures. During the meetings, the investigator offered support and additional recommendations for effectively using the cards (i.e., decreasing time allowed for students to answer questions, decreasing negative feedback for incorrect questions, ensuring that the cue to hold up cards is given every session when using response cards). Prior to starting the response card sessions in the classroom the investigator and teacher discussed behavioral expectations for response card use by the students. The teachers were given examples of behavior expectations that could be reviewed with the students (i.e., only draw on the board when answering a question, hold boards up when hear the cue “cards up”), and then created their
own based on their priorities. Both teachers then reviewed these expectations with the students prior to using the response cards, and reminded students of them randomly throughout the study.

**Follow-up.** Weekly follow-up probes were conducted two weeks after phase 2 ended and continued for a period of one week to examine if the teachers continued to implement the response card intervention, and observe whether the student behavior levels reached during implementation had maintained
Chapter 3:

Results

Disruptive Behavior and Academic Engagement

Figure 1 depicts data on disruptive behavior from the four targeted students in both classrooms for the targeted instructional routines. Across all four students the data clearly indicate a decrease in disruptive behavior with the implementation of the response cards. When response cards were implemented in the classroom a clear effect was demonstrated with decreased disruptive behavior from the control condition across participants. Jackson’s disruptive behavior decreased from an average of 49% of intervals (range: 32%-58%) in the control condition to 10% of intervals (range: 0%-23%) in the RC-M condition and 9% of intervals (range: 0%-17%) in the RC-S condition. For Brandon, disruptive behavior decreased from an average of 51% of intervals (range: 47%-58%) in the control condition to 9% of intervals (range: 1%-15%) in the RC-M condition and 7% of intervals (range: 1%-13%) in the RC-S condition. Kiera’s disruptive behavior decreased from an average of 64% of intervals (range: 58%-71%) in the control condition to 10% of intervals (range: 3%-24%) in the RC-M condition and 10% of intervals (range: 5%-18%) in the RC-S condition. Zoey’s disruptive behavior decreased from an average of 57% of intervals (range: 40%-64%) in the control condition to 8% of intervals (range= 1%-11%) in the RC-M condition and 7% of intervals (range: 0%-14%) in the RC-S condition.

Across students, data showed relatively low variability in response card conditions. However, for all students, there did not seem to be a clear pattern of differentiation in their
disruptive behavior between the two types of questions that were asked with response cards. For all four students, the percentage of intervals with disruptive behavior varied by no more than 2% of intervals between the two question types.

Figure 2 also depicts data on academic engagement. Across all four students the data clearly indicate an increase in academic engagement with the implementation of the response cards intervention. When response cards were implemented in the classroom an increase in academic engagement compared to the control condition was demonstrated. For Jackson, academic engagement increased from an average of 21% of opportunities (range: 17%-25%) in the control condition to 96% of opportunities (range: 67%-100%) in the RC-M condition and 100% of opportunities in the RC-S condition. For Brandon, academic engagement increased from an average of 32% of opportunities (range: 17%-50%) in the control condition to 99% of opportunities (range: 86%-100%) in the RC-M condition and 93% of opportunities (range: 67%-100%) in the RC-S condition. Kiera’s academic engagement increased from an average of 20% of opportunities (range: 0%-33%) in the control condition to 100% of opportunities in the RC-M condition and 100% of opportunities in the RC-S condition. Zoey’s academic engagement increased from an average of 9% of opportunities (range: 0%-33%) in the control condition to 100% of opportunities in the RC-M condition and 75% of opportunities (range: 29%-100%) in the RC-S condition.

Across students, data on academic engagement showed relatively low variability in response card conditions except for Zoey. Additionally, there was no clear pattern of differentiation in their academic engagement between the two question types for Nicolas, Brandon, and Kiera; their academic engagement did not vary between the two question types by
more than 7%. However, for Zoey, an additional 25% increase in academic engagement was observed in the response cards condition where multiple-choice questions were utilized.

**Correct Responses**

Figure 3 depicts data on correct responses by the four targeted students in both classrooms. During the two response card conditions Jackson, Kiera, and Zoey responded with higher accuracy to the questions than in the control condition. Brandon responded with high accuracy across both response card conditions and the control condition. No clear pattern of differentiation was observed in the percentages of accurate responses between short answer and multiple choice question conditions for Jackson, Brandon, and Kiera. However, for Zoey, a 17% increase in the percentage of accurate responses was observed in the multiple choice condition.

**Impact of Teacher Preferred Response Card Implementation**

Figure 1 and Figure 2 also depict data collected during the teacher preferred RC condition. The data indicate that implementation of the teacher preferred RC condition further decreased disruptive behavior across students with little variability. Although changes in the behavior were relatively small, all four students demonstrated lower levels of disruptive behavior during the teacher preferred RC condition than in the RC phase during which teachers did not have choices of implementing preferred RC. Disruptive behavior for Jackson decreased from an average of 11% of intervals in phase 1 RC conditions to an average of 8% of intervals in phase 2, teacher preferred RC condition, for Brandon from an average of 9% to an average of 7%, and for Kiera from an average of 12% to an average of 6%. Zoey remained at an average of 7% across both phases.

However, data on academic engagement indicate that the teacher preferred RC had little or no impact on the rates of academic engagement in the second phase. Jackson’s academic
engagement increased from an average of 97% of opportunities in phase 1 RC conditions to an average of 100% of opportunities in phase 2, teacher preferred RC condition. Brandon’s academic engagement remained consistent at 97% of opportunities across both phases. Kiera remained consistent at 100% of opportunities across both phases, and Zoey’s academic engagement decreased from 87% of opportunities to 80% of opportunities.

**Follow-Up**

Follow-up data collected two weeks after phase 2 of the study had ended indicated that for all four students both disruptive behavior and academic engagement were maintained at the levels observed in the intervention phase. Correct responding was also maintained at the same levels as observed during intervention. During follow-up, both classroom teachers continued utilizing their preferred question type with response cards without the investigator’s consultation support.

**Social Validity**

*Teachers.* Table 1 and Table 2 provide data on social validity assessed with the teachers and students. Results from both teachers indicate that Teacher 1 strongly agreed and Teacher 2 agreed that they enjoyed using response cards as an instructional intervention. Both teachers agreed that response cards were easy to use in their classrooms, effective in decreasing student disruptive behavior, effective in increasing student academic engagement, and effective in increasing student correct responses. Teacher 1 agreed and Teacher 2 strongly agreed that she would continue to use response cards during the targeted routine. Teacher 2 agreed and Teacher 1 was neutral to using response cards in other instructional routines. Both teachers indicated that the best part of using this intervention was the increase in student academic engagement, and that the most challenging part was problem behaviors related to the response cards (i.e., students
requesting to switch markers, students drawing pictures on boards instead of answering questions). Teacher 1 also indicated that she preferred multiple choice questions because she felt it better prepared the students for testing. Teacher 2 indicated that she preferred short answer questions because she felt the students had to engage in the lesson more to answer them correctly. Overall, the average rating across items was 4 (range 3-5) on a scale of 1-5 for both teachers.

**Students.** Results from the social validity questionnaire from the targeted students revealed that all four students strongly agreed that they enjoyed using response cards more than raising hands and that it was easier to answer questions using response cards. Brandon was neutral and Jackson, Kiera, and Zoey agreed that they would like to use response cards in other lessons. Brandon and Kiera indicated that they would give their experience with response cards a grade of A (I loved using response cards), and Jackson and Zoey indicated that they would give their experience with response cards a B (I liked using response cards). All students indicated that their favorite type of question to use with response cards was multiple choice questions because the questions were easier. All students also mentioned that the best part of using response cards was getting to write on the white boards, and that they did not like not being able to draw pictures on the cards while using them in class. The average rating was 4.3 (range: 4-5) on a scale of 1-5 for all students.
Figure 1. Percentage of intervals observed with disruptive behavior across conditions and participants.
Figure 2. Percentage of observed academic engagement across conditions and participants.
Figure 3. Percentage of correct responses displayed by students during the hand raising (control), response cards with multiple choice, and response cards with short answer question conditions.
Table 1.

Teacher Social Validity Teacher Social Validity Questionnaire Results:

<table>
<thead>
<tr>
<th>Item</th>
<th>Teacher 1</th>
<th>Teacher 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. I enjoyed using the response cards intervention as an instructional support.</td>
<td>5</td>
<td>4</td>
</tr>
<tr>
<td>2. The intervention used in this study was easy to use in my classroom.</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>3. I will continue to use this intervention during the target routine.</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>4. I will use this intervention during other instructional routines.</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>5. The response cards were effective in decreasing student disruptive behavior.</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>6. The response cards were effective in increasing student academic engagement.</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>7. The response cards were effective in increasing student correct responses.</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td><strong>Mean</strong></td>
<td><strong>4</strong></td>
<td><strong>4</strong></td>
</tr>
</tbody>
</table>

Table 2.

Student Social Validity Questionnaire Results:

<table>
<thead>
<tr>
<th>Item</th>
<th>Jackson</th>
<th>Brandon</th>
<th>Kiera</th>
<th>Zoey</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. I liked using response cards more than raising hands.</td>
<td>5</td>
<td>4</td>
<td>5</td>
<td>4</td>
</tr>
<tr>
<td>2. It was easier to answer questions using response cards.</td>
<td>5</td>
<td>4</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>3. I want to use response cards in other lessons.</td>
<td>4</td>
<td>5</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td><strong>Mean</strong></td>
<td><strong>4.7</strong></td>
<td><strong>4.7</strong></td>
<td><strong>4.3</strong></td>
<td><strong>4.3</strong></td>
</tr>
<tr>
<td>4. What grade would you give you experience with response cards.</td>
<td>A</td>
<td>A</td>
<td>A</td>
<td>A</td>
</tr>
<tr>
<td>5. What was your favorite type of question to use with response cards?</td>
<td>MC</td>
<td>MC</td>
<td>MC</td>
<td>MC</td>
</tr>
</tbody>
</table>
Chapter 4:

Discussion

This study aimed to determine the extent to which response cards would impact disruptive behavior, academic engagement and correct responses of students with behavior concerns, which type of question (multiple choice, short answer) used with response cards resulted in more favorable behavioral outcomes, and the extent to which the teacher’s preferred question type would enhance student outcomes.

The results of this study showed that response cards effectively decreased the level of disruptive behavior across all target students in both classrooms from the hand raising condition. Response cards also effectively increased academic engagement and accurate responses across all students in both classrooms. The data reveal that overall, there seemed to be no clear difference in the levels of disruptive behavior, academic engagement, and accurate responses overall across students for different types of questions used with response cards. Simply, the addition of the response cards intervention to the classroom, regardless of what type of questions were utilized was enough to produce changes in student disruptive behavior. However, academic engagement and accurate response data for Zoey did reveal slight differences between multiple choice and short answer question types. Zoey seemed to be more academically engaged and answer a higher percentage of questions accurately when multiple choice questions were utilized with response cards. Results from this study may suggest that students with a low level of academic engagement can reach higher levels if choices are provided for answers when questions are asked during teacher instruction (Skinner, Pappas, & Davis, 2005). The data from
Zoey may reveal that providing students choices when asking questions could result in higher levels of academic engagement and accurate response during instructional routines, but more research is needed to further evaluate these results.

The results from this study may reveal that the teachers’ preferred question type further decreased disruptive behavior, but had relatively little impact on academic engagement. Two students’ academic engagement did not further increase during the teacher preferred question type phase, and one student’s (Zoey’s) academic engagement somewhat decreased during this phase. However, this decrease in her academic engagement from phase 1 to phase 2 might be explained by the change in question type. During phase 1, the RC-S and RC-M conditions were alternated, and higher levels of academic engagement were observed for Zoey during the RC-M condition; however, in phase 2 only the RC-S condition was conducted due to being the preferred question type indicated by Teacher 2. Measures on implementation fidelity revealed that both Teacher 1 and Teacher 2 scored 100% implementation fidelity during the teacher preferred RC phase. These results indicated that the use of teacher-preferred instructional strategies may have potential to enhance the student outcomes (Ennis, Blair, & George, 2016). Ennis et al. demonstrated that implementation of group contingency interventions preferred by teachers further decreased class-wide disruptive behavior and increased academic engagement compared to other group contingency interventions. Although the preferred question type may have resulted in only slight increases in student academic engagement behavior, both teachers tended to implement their preferred question type with response cards with higher implementation fidelity. Higher levels of implementation fidelity for both teachers in the current study could be associated with increased teacher by-in when they were allowed to implement RC
with only their preferred question type. However, because only two teachers were included in this study more research is needed to verify these results.

Evaluating teacher preference as it pertains to response cards also reveals additional insight when designing instructional interventions for teachers to use in the classroom. Each teacher involved in this study preferred a different type of question. Teacher 1 preferred to use multiple choice questions because she felt they better prepared her students for reading assessments, and teacher 2 preferred short answer questions because she felt the students had to attend more to her instruction to be able to answer the questions. The reasons for preferring different types of questions lead to the importance of asking for teacher input when designing interventions and incorporating teacher preference to ensure that instructional supports are assisting teachers in meeting their individualized goals for students in their classrooms. This study was the first study to evaluate teacher preference as it pertains to response cards.

The current study confirms previous findings on response cards showing that they are effective to decrease disruptive behavior (Armendariz & Umbreit, 199; Lambert et al., 2006), increase student academic engagement and accurate responses in the classroom (Christle & Schuster, 2003; Lambert et al., 2006). Specifically, this study extends the literature on response cards by being the first study to evaluate the effects of asking different types of questions when using response cards. Results from this study reveal that question type may not play a significant role in the effectiveness of response cards as an instructional intervention; simply, the addition of response cards to the instructional routine may be enough to improve student behavior regardless of the type of questions that are used. However, slight increase in the academic engagement and accurate response of Zoey with multiple choice questions is an interesting finding and one that may be further evaluated with additional research.
This study is also one of the few studies to implement response cards in a reading routine in the classroom. Teacher 1 and Teacher 2 both chose to implement response cards during the reading time in their classrooms. As shown by Singer, Crosland, and Fogel (2013) data from this study demonstrated that response cards were an effective intervention when implemented during reading, resulting in favorable student outcomes. This study was the first study to evaluate response cards during a small group activity in the classroom. Results show that response cards can lead to improved student behavior and academic performance while working in small groups together as opposed to solely independent work or large group activities.

In this study, multiple opportunities for feedback were provided to the teachers. As mentioned earlier the PI met with the participating teachers multiple times throughout the study to answer questions and provide additional coaching. These additional coaching and feedback meetings could account for the low levels of disruptive behavior of the targeted students and high levels of implementation fidelity that were observed with both teachers.

**Limitations and Future Directions**

There are a couple of limitations to be considered when interpreting the study results. One limitation is the inconsistency in number of questions asked for Teacher 1. Even with additional supports of a self-monitoring checklist and assistance writing the questions, Teacher 1 elected to ask between 5 and 8 questions each session. The inconsistency in asking questions in a range instead of sticking to a certain number could be a variable that would impact the data. However, considering the stability in data across sessions, despite change in number of questions asked across sessions, this variable did not seem to have had a significant impact on the results of the study. Future studies should aim to control this variable by yoking the number of questions asked each session to a certain number as was done with Teacher 2.
Another limitation to this study is the variation in amount of time that both teachers tended to give students to write their answers on the response cards. Teacher 1 gave students 2 minutes to answer the questions, while Teacher 2 gave students 30 seconds to 1 minute to answer questions. Sometimes, it seemed that when Teacher 1 gave students a longer amount of time to write their responses the students who had finished writing would start to engage in disruptive behavior such as talking to peers and calling out. However, when Teacher 2 gave students a shorter amount of time to answer questions some students would not be done writing their answers and would call out due to frustration. Future research should attempt to develop a systematic way for teachers to ensure that they give students the same amount of time to answer each question. Additionally, it would interesting to evaluate different lengths of time to determine the optimal amount of time that students should be given to answer questions while decreasing disruptive behavior and increasing academic engagement.

The third limitation to this study is the small number of data points that were collected in the alternating treatments phase. Due to time constraints and some of the student participants being absent from school when sessions were conducted some conditions in the first phase only had four data points. Future studies should aim to collect more data points if treatments are to be alternated to further analyze behavioral outcomes of different question types.

The fourth limitation to this research is that it examined disruptive behavior, academic engagement, and accurate response during one instructional academic time period. It would be interesting if additional data could be collected simultaneously during a non-target instructional time period to see if teachers could implement the RC intervention independently without consultation support, and if implementation of the intervention by teachers would result in improved student behavior and academic performance during the non-target instructional time
period. Conducting generalization probes across other non-target routines would also be helpful to examine the generalization effects of the RC intervention.

The fifth limitation to this study is the small amount of follow-up data that were collected. Due to time constraints additional follow-up data could not be collected to evaluate if the teachers continued using the intervention during the targeted routine without consultation support. For this reason it is difficult to evaluate if utilizing response cards in the classroom could maintain long term behavior outcomes over times.

Additional limitations to this study include the number of students targeted for intervention. Future research should attempt to include a larger number of students for data collection to further evaluate the effects of different types of questions on individual students. Another area that could be evaluated in future research includes recruiting students who scored both high and low on instructional assessments. This study included students who were performing at their grade levels. Including students who score both above and below grade level on curriculum assessments would allow researchers to evaluate if certain question types are more effective for students who are on or below their grade level academically.

Although low levels of disruptive behavior were observed with targeted students at the end of this study, to further decrease disruptive behavior and maintain them over time, additional supports may be needed. Response cards are a tier 1 classroom intervention that has been demonstrated to be a highly effective strategy for increasing academic engagement (Newcomer, 2009; Heward et al., 1994). However, to keep levels of disruptive behavior low for students that engage in high frequencies or high intensity disruptive behavior a tier 2 intervention in additional to response cards may be necessary.
Future research in this area should attempt to replicate this study to further evaluate the effects of different question types on individual students. Additional research could also incorporate additional question types with response cards such as fill in the blank and true or false questions to see if impacts on behavioral outcomes are observed. Furthermore, it may be interesting to evaluate the impact of additional class-wide behavior management strategies with response cards. For example, in this study outside of praise for using response cards correctly little praise was given to students for engaging in other appropriate behaviors. Future research could evaluate if response cards produce more positive behavioral outcomes if used with other behavioral strategies such as pivot praise and planned ignoring of low intensity disruptive behaviors.

**Conclusion**

Despite its limitations this study provides important information regarding the types of questions to be used with response cards. This study also offers a contribution to the literature on response cards by evaluating the role of teacher preference as it pertains to question types. This study offers empirical support for the efficacy of different questions types on student behavior outcomes when used with response cards in an elementary school classroom.
References


Appendices
Appendix A: Student Social Validity Questionnaire

1. I liked using response cards more than raising hands.

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strongly disagree</td>
<td>Disagree</td>
<td>Neutral</td>
<td>Agree</td>
<td>Strongly Agree</td>
<td></td>
</tr>
</tbody>
</table>

2. It was easier to answer questions using response cards.

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strongly disagree</td>
<td>Disagree</td>
<td>Neutral</td>
<td>Agree</td>
<td>Strongly Agree</td>
<td></td>
</tr>
</tbody>
</table>

3. I want to use response cards in other lessons.

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<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strongly disagree</td>
<td>Disagree</td>
<td>Neutral</td>
<td>Agree</td>
<td>Strongly Agree</td>
<td></td>
</tr>
</tbody>
</table>

4. What grade would you give your experience with response cards?

<table>
<thead>
<tr>
<th></th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>I loved using response cards</td>
<td>I liked using response cards</td>
<td>I didn’t care about using response cards</td>
<td>I did not like using response cards</td>
<td>I hate using response cards</td>
<td></td>
</tr>
</tbody>
</table>

5. What was your favorite type of question to use with response cards?
6. Why was that your favorite question type?
7. What did you like best about using the cards?
8. What did you not like about using the cards?
Appendix B: Teacher Social Validity Questionnaire

1. The intervention used in this study was easy to use in my classroom.

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strongly disagree</td>
<td>Disagree</td>
<td>Neutral</td>
<td>Agree</td>
<td>Strongly Agree</td>
<td></td>
</tr>
</tbody>
</table>

2. I will continue to use this intervention during the target routine.

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strongly disagree</td>
<td>Disagree</td>
<td>Neutral</td>
<td>Agree</td>
<td>Strongly Agree</td>
<td></td>
</tr>
</tbody>
</table>

3. I will use this intervention in during other instructional routines.

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strongly disagree</td>
<td>Disagree</td>
<td>Neutral</td>
<td>Agree</td>
<td>Strongly Agree</td>
<td></td>
</tr>
</tbody>
</table>

4. The response cards were effective in decreasing student disruptive behavior.

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strongly disagree</td>
<td>Disagree</td>
<td>Neutral</td>
<td>Agree</td>
<td>Strongly Agree</td>
<td></td>
</tr>
</tbody>
</table>

5. The response cards were effective in increasing student academic engagement.

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strongly disagree</td>
<td>Disagree</td>
<td>Neutral</td>
<td>Agree</td>
<td>Strongly Agree</td>
<td></td>
</tr>
</tbody>
</table>

6. The response cards were effective in increasing student correct responses.

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
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<td>Disagree</td>
<td>Neutral</td>
<td>Agree</td>
<td>Strongly Agree</td>
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</table>

7. What was the best part of implementing response cards in your classroom?
8. What was the most challenging past of implementing response cards in the classroom?
9. What type of question did you most prefer to use with response cards?
## Appendix C: Teacher Implementation Fidelity-Control

Classroom: _____________  Date: _____________  
Start Time: _____________  End Time: _____________  
Observer: _____________  Number of Student: ____

For each step indicate Y (yes) if the step was completed, N (no) if the step was not complete, or N/A (not applicable).

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<td>Teacher allowed students time to answer</td>
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<td>Teacher calls on a student who raised their hand</td>
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**Implementation Scores**  
(Total Y’s/Total Y’s + N’s in Column)

**Total Implementation/Fidelity Score**  
(Total Y’s/Total Y’s + N’s across 2 domains)

### Note
- For each step indicate Y (yes) if the step was completed, N (no) if the step was not complete, or N/A (not applicable).
### Appendix D: Teacher Implementation Fidelity-Response Cards

Classroom: ___________  
Date: ____________  
Start Time: ___________  
End Time: ___________  
Observer: ___________  
Number of Student: __

For each step indicate Y (yes) if the step was completed, N (no) if the step was not complete, or N/A (not applicable).

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Appendix E: Script

Control:

“Today during our ____ lesson I will ask questions through the lesson, and if you all will be expected to raise your hands and wait to answer the question if I call on you.”

Response Cards Multiple Choice:

“Today during our ____ lesson I will ask questions through the lesson, after I ask each question you all will be expected to write the answer on your white boards and show them to me all together at the same time. Today I am going to be asking multiple choice questions, so after I state the question I will give you all three answer choices to choose from. You will choose the choice that you think is the correct answer, write it on your board, and show it to me when I say “cards up”.

Response Cards Short Answer:

“Today during our ____ lesson I will ask questions through the lesson, after I ask each question you all will be expected to write the answer on your white boards and show them to me all together at the same time. Today I am going to be asking short answer questions, so after I state the question you will write the answer you think is correct on the board, and show it to me when I say “cards up”.

Teacher reads question (wait 10 seconds)

Teacher choose student to answer if in control condition, or say “cards up” if in response card condition.

Teacher “Great job answering everyone”

Give praise “Everyone did a great job answering the question correctly”

Review question “It seems that this question was difficult for everyone so we are going to review the question and the answer one more time. I know you will all answer it correctly next time.”
# Appendix F: Data Collection Sheet

Date: ___________________________    Condition: ___________________________

Observer: ___________________________    Classroom: ___________________________

Teacher: ___________________________

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Appendix G: Teacher Preference Assessment

Teacher:_________________________ Date:_________________________

Question Type Preference Assessment

Mark an X next to the type of question you prefer to use when using response cards in the classroom?

___ Multiple choice questions

___ Short answer questions
Appendix H: USF IRB Approval

9/16/2015

Elizabeth Cassell
ABA-Applied Behavior Analysis
13301 Bruce B. Downs Blvd MHC2113A
Tampa FL  33612

RE:  Expedited Approval for Initial Review
IRB#:  Pro00023520
Title: The Impact of Question Type on Student Behavior in Using Response Cards: The Role of Teacher Preference

Study Approval Period: 9/16/2015 to 9/16/2016

Dear Ms. Cassell:

On 9/16/2015, the Institutional Review Board (IRB) reviewed and APPROVED the above application and all documents contained within, including those outlined below.

Approved Item(s):
Protocol Document(s):
Protocol_Response_Cards_V1.docx

Consent/Assent Document(s)*:
SB Adult Minimal Risk (1).docx.pdf
SB Parental Permission V1.docx.pdf

Consent/Assent Script(s):
Student Assent V1.docx

*Please use only the official IRB stamped informed consent/assent document(s) found under the "Attachments" tab. Please note, these consent/assent document(s) are only valid during the approval period indicated at the top of the form(s).

It was the determination of the IRB that your study qualified for expedited review which includes activities that (1) present no more than minimal risk to human subjects, and (2) involve only procedures listed in one or more of the categories outlined below. The IRB may review
research through the expedited review procedure authorized by 45CFR46.110 and 21 CFR 56.110. The research proposed in this study is categorized under the following expedited review category:

(7) Research on individual or group characteristics or behavior (including, but not limited to, research on perception, cognition, motivation, identity, language, communication, cultural beliefs or practices, and social behavior) or research employing survey, interview, oral history, focus group, program evaluation, human factors evaluation, or quality assurance methodologies.

This research involving children was approved under the minimal risk category 45 CFR 46.404: Research not involving greater than minimal risk.

As the principal investigator of this study, it is your responsibility to conduct this study in accordance with IRB policies and procedures and as approved by the IRB. Any changes to the approved research must be submitted to the IRB for review and approval via an amendment. Additionally, all unanticipated problems must be reported to the USF IRB within five (5) calendar days.

We appreciate your dedication to the ethical conduct of human subject research at the University of South Florida and your continued commitment to human research protections. If you have any questions regarding this matter, please call 813-974-5638.

Sincerely,

John Schinka, Ph.D., Chairperson
USF Institutional Review Board