CONDITIONAL PROBABILITIES AND CONTINGENCY SPACE ANALYSIS: A STATISTICAL OVERVIEW OF THE RELATIONSHIP BETWEEN STUDENT BEHAVIOR AND TEACHER CONSEQUENCE

by

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Abstract

The research on classroom management systems has provided a comprehensive evidence base for effective classroom management strategies for teachers to adopt in their classrooms. The most common strategies found in the literature are rules, reprimands, and praise. Reprimands and praise are used by the teacher as part of the reinforcement schedule to implement classroom rules (Acker & O'Leary, 1987; Sherman & Cormier, 1974). The purpose of the current study was to analyze the conditional probabilities of teachers' use of reprimands and praise following student disruption and on-task behavior from baseline to an intervention known as the Class-Wide Function-related Intervention Teams (CW-FIT; Wills et al., 2010). The conditional probabilities of teacher reprimands and praise given student disruptive and on-task behavior were also examined through a contingency space analysis (CSA; Martens, DiGennaro, Reed, Szczech, & Rosenthal, 2008). The participants included 50 teachers and 100 students. Results showed that reprimands followed disruptive behavior less frequently during CW-FIT. Results also showed that praise followed on-task behavior more frequently during CW-FIT. In other words, teachers were more likely to use praise following on-task behavior from baseline phase to CW-FIT phase than they were to use reprimands following disruptive behavior. As a means of evaluating the CW-FIT intervention program, CSA depicts that the intervention resulted in the anticipated changes in the behavior of both the teachers and the students, as teacher attention was more likely dependent or contingent on on-task behavior than it was on student disruption, and to a slightly higher extent than during baseline. When CW-FIT was implemented, the conditional probabilities that teacher praise was used given on-task behavior increased for a majority of students. Results imply that CW-FIT improves the teacher-student interaction for students at-risk for behavioral disorders when used as a classroom management system.

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Chapter I

Introduction

One of the most important responsibilities that a teacher has is managing classroom behavior effectively (Wang, Haertel, & Walberg, 1993). Effective classroom behavior management has a significant positive effect on student achievement (Barbetta, Norona, & Bicard, 2005; Wang, et al., 1993). Some common classroom behavioral management strategies that teachers use are rules, reprimands, and praise (Gable, Hester, Rock, & Hughes, 2009).

The Use of Rules in the Classroom

Teachers use rules to outline academic and behavioral expectations, and to establish the routines used during classroom activities (Martins, 2004; Sherman & Cormier, 1974; Wills et al., 2010). Classroom rules provide the structure teachers use to maintain on task behavior and to regulate disruptive behavior (Kamps et al., 2011; Madsen, Becker, & Thomas, 1968; Reinke, Lewis-Palmer, & Merrell, 2008). Although teachers establish rules, sometimes students follow these rules, and other times they do not. Teachers in turn respond to student behaviors with consequences. These responses may have a dramatic impact on how students behave in their classroom (Kazdin & Klock, 1973; Martens, Hiralall, & Bradley, 1997; Reinke et al., 2008; Sherman & Cormier, 1974). Without consistent consequences for disruptive and on-task behavior, for example, students can resort to their own devices (e.g., creating their own flexible rules), which often create an unruly classroom atmosphere with increased disruptions (Gunter et al., 1994; Kamps et al., 2011).

The Use of Reprimands in the Classroom

For most classroom management systems, disruptive behavior tends to result in attention from the teacher via reprimands to get the student back on task (Gable et al., 2009; Haynes,

Emmons, & Ben-Avie, 1997; Kounin, 1970; Reinke et al., 2008). For example, the teacher may scold (e.g., "Keep your hands to yourself!"), provide negative statements (e.g., "Stop talking!"), or act (e.g., finger held to lips to indicate quiet is needed) in response to disruptive behavior. Reprimands are often used as a consequence to student disruptive behavior in an attempt to reduce future occurrences of such behavior. There is much disagreement among researchers, however, about the effectiveness and utility of reprimands. Some researchers support the use of reprimands in the classroom because reprimands serve as a channel for critical dialogue between the teacher and students (e.g., Larrivee, 2002; O'Leary, Kaufman, Kass, & Drabman, 1970) and some studies support the use of reprimands in the context of sufficient praise (i.e., praise-to-reprimand ratio of 3:1 or 4:1; Kalis, Vannest, & Parker, 2007; Piazza et al., 1999; Shores, Gunter, & Jack, 1993). Other researchers, however, advocate against the use of reprimands, claiming that the reprimands end up maintaining the disruptive behavior they were meant to avert (Kodak, Northup, & Kelley, 2007; Mancuso & Eimer, 1982; Webster-Stratton & Hammond, 1998).

The Use of Praise in the Classroom

Although reprimands address disruptive behavior, praise is a classroom management strategy used as a form of positive reinforcement (Wills et al., 2010). There is an abundance of literature on the academic and behavioral benefits of praise when it is used as a classroom behavioral management strategy (e.g., Ferguson & Houghton, 1992; Franzen & Kamps, 2008; Sutherland, Wehby, & Copeland, 2000). Praise can be defined as a verbal statement or physical gesture of intended reinforcement (e.g., hugs, pats) or tangibles (e.g., tokens, points) that indicate approval of behavior over and above an evaluation of adequacy or acknowledgement of a correct response to a question (Wills et al., 2010). The research on teacher praise has shown that

teachers' use of contingent praise effectively reinforced, or increased, a variety of appropriate student behaviors and academic skills, including following directions, staying on task (Ferguson & Houghton, 1992; Sutherland et al., 2000), providing appropriate academic responses (Sutherland & Wehby, 2001), working accurately and completing work, and increasing positive teacher-student relationships (Alber, Heward, & Hippler, 1999; Craft, Alber, & Heward, 1998; Kamps et al., 2011; Partin, Robertson, Maggin, Oliver, & Wehby, 2010; Thorne & Kamps, 2008; Wills et al., 2010).

Effective Classroom Management

In light of the existing research, an effective classroom management system should at the very least include rules and consequences (e.g., praise) as the primary strategies. Consequently, the use of classroom rules and positive teacher attention in the form of praise are combined as classroom management strategies under what is known as Class-Wide Function-related Intervention Teams (CW-FIT), and provide the teacher with a comprehensive toolkit for behavior management (Wills et al., 2010). As a part of the CW-FIT intervention, teachers are taught how to catch students behaving appropriately rather than focusing on the disruptive behavior, and thus to use more praise than reprimands as a consequence. Although studies of CW-FIT have provided empirical support for the reduction of student disruptive behavior and increase of the use of teacher praise through its comprehensive classroom management system (Conklin, 2010; Wills et al., 2010), what is unknown is the contingent relationship between the schedule for teacher praise and reprimands and student disruptive and on-task behavior.

Theory of Change

CW-FIT is a comprehensive classroom management system that serves to reduce disruptive behavior and teacher reprimand use, while at the same time teaching students

appropriate behavior and reinforcing the use of these behaviors through teacher praise. If CW-FIT is implemented in a research study, the differences observed from baseline to CW-FIT can be evaluated under the Theory of Change (ToC; Weiss, 1997). Theory of Change is a type of theory-based evaluation which identifies the beliefs and assumptions behind a project in order to find how and why the project has worked or failed (Weiss, 1997). In the case of this study, the beliefs and assumptions behind CW-FIT are that teacher reprimands and student disruptive behavior will decrease, while teacher praise and student on-task behavior will increase because CW-FIT will help teachers focus more on students' on-task behavior and using praise as a consequence, rather than noticing disruptive behavior and using reprimands as a consequence.

Purpose of Current Study

The purpose of the present study is to analyze teachers' use of reprimands and praise following student disruption and on-task behavior. The data for the study were collected during baseline and intervention phases of an implementation of the CW-FIT classroom management program so the findings will inform the change in the teachers' behaviors due to the intervention. CW-FIT was designed to teach students appropriate or on-task behavior, and to train teachers to reinforce on-task behaviors through praise. The logic and procedures of a Contingency Space Analysis (CSA; Martens et al., 2008) will be adopted to conduct the analyses. Results will contribute to the literature on classroom management strategies, provide a pilot for the use of CSA on a large data sample and its potential use as a fidelity check, and also expound on previous research concerning the relationship between teacher (i.e., reprimands, praise) and student behavior (i.e., disruption, on-task behavior).

Research Questions

1. What are the conditional probabilities of (a) teacher reprimands given student disruption, (b) teacher reprimands given on-task behavior, (c) teacher praise given student disruption, and (d) teacher praise given on-task behavior during the baseline phase?
    a. What are the conditional probabilities of teacher reprimands given student disruption during baseline?
    b. What are the conditional probabilities of teacher reprimands given on-task behavior during baseline?
    c. What are the conditional probabilities of teacher praise given student disruption during baseline?
    d. What are the conditional probabilities of teacher praise given on-task behavior during baseline?
2. What are the conditional probabilities of (a) teacher reprimands given student disruption, (b) teacher reprimands given on-task behavior, (c) teacher praise given student disruption, and (d) teacher praise given on-task behavior during the CW-FIT phase?
    a. What are the conditional probabilities of teacher reprimands given student disruption during the CW-FIT phase?
    b. What are the conditional probabilities of teacher reprimands given on-task behavior during the CW-FIT phase?
    c. What are the conditional probabilities of teacher praise given student disruption during the CW-FIT phase?
    d. What are the conditional probabilities of teacher praise given on-task behavior during the CW-FIT phase?

Chapter II

Review of the Literature

The review of literature is presented in nine sections. The first section describes the importance of classroom management and the effects of good and poor classroom management on students' behavior and teacher responses to the behavior. The second section reviews the literature on strategies of classroom management, followed by the third section, which focuses on the literature relating classroom management to student disruptive behavior. The fourth section reviews the literature on teacher attention as a function of student behavior. The fifth section summarizes the Class-Wide Function-related Intervention Teams (CW-FIT) project, which is the study that serves as the backdrop to the present study. The sixth section reviews the theory of change and the seventh section summarizes literature relating to the analysis of the relationship between teacher use of reprimands and student disruptive behavior using Contingency Space Analysis (CSA). The eighth section describes treatment integrity and how CSA can work as a treatment integrity check during intervention implementation. The final section summarizes how the current study relates to the existing literature.

Importance of Classroom Management

Approximately 45 years ago, researchers began conducting studies on teacher classroom management and the strategies therein (e.g., Becker, Madsen, Arnold, & Thomas, 1967; Madsen et al., 1968; Zimmerman & Zimmerman, 1962). Classroom management broadly refers to the process through which a teacher outlines expected student behavior, creates and reinforces parameters to prevent student disruptive behavior, and implements appropriate consequences for compliance and noncompliance to classroom rules (Barbetta et al., 2005; Brouwers & Tomic, 2000). Classroom management is an important component in creating a safe learning

environment for teachers and students (Gregory & Ripski, 2008; Wubbels & Levy, 1991). Moreover, effective instructional strategies and functional classroom curriculum design are built on the foundation of effective classroom management (Brophy, 2006; Marzano, Marzano, & Pickering, 2003). Consequently, classroom management is tied directly to student classroom involvement and academic achievement (Kamps, et al., 2006; Shumate & Wills, 2010).

Effects of good classroom management. The use of effective classroom management strategies has a beneficial effect on students (Kounin, 1970). Effective classroom management creates a positive learning environment, which increases academic learning time and opportunities for academic and social success (Emmer & Stough, 2001; Nelson, Martella, & Marchand-Martella, 2002). The adoption of effective classroom management strategies has been associated with reductions in disruptive classroom behavior and increases in student engagement (Reinke et al., 2008; Wills et al., 2010). Good classroom management strategies (e.g., group reward programs) not only demonstrate positive behavioral results in students, but also prove to be time efficient and easy to implement for teachers (Kamps et al., 2011; Skinner, Cashwell, & Dunn, 1996; Tulley & Chiu, 1995).

Effects of good classroom management on instruction. Teachers implement classroom management with the goal of maintaining order in the classroom. Consequently, good classroom management skills help to facilitate the dissemination of instruction to the students (Reinke et al., 2008). Although good classroom management does not guarantee that teacher instruction will effectively elicit learning from students, it establishes the environmental context that promotes good instructional opportunities for teachers, increased learning opportunities for students, and helps enhance productive teacher-student relationships (Marzano et al., 2003). Incidents of student disruptive behavior are reduced when good classroom management is in place because as

instruction time increases, opportunities to respond also increase (Emmer & Stough, 2001; Partin et al., 2010). Classroom management and curriculum instruction are positively correlated in that if classroom management is deficient, curriculum instruction will also be deficient and vice versa (Baker, 2005). Teachers are required to provide differentiated curriculum instruction to meet every student at their points of academic need. Similarly, good classroom management requires that teachers be able to diversify their intervention skill set to fit the behavioral needs of all the different types of students in their class (Brophy & McCaslin, 1992).

***Good Behavior Game*.** A group of researchers have combined a number of effective, easy to implement teacher strategies to come up with comprehensive classroom management systems (e.g., Babyak, Luze, & Kamps, 2000; Barrish, Saunders, & Wolf, 1969; Harris & Sherman, 1973; Medland & Stachnik, 1972; Tankersley, 1995; Wills et al., 2010). The Good Behavior Game is an example of such a system, and one that has been shown to be effective (Barrish et al., 1969). The Good Behavior Game is an approach to classroom management that rewards children for displaying appropriate on-task behaviors during instructional times. The rules to be followed during the Game are either created by the teacher, or in collaboration with the teacher and the class. Procedurally, the class is divided into two teams and a point is given to a team for any inappropriate behavior displayed by one or more of its members. In other words, positive peer-pressure prevents the group from earning points for inappropriate behavior by encouraging students to work together. This collaboration reduces the disruptive behaviors that interfere with learning and academic success. The team with the fewest number of points at the Game's conclusion each day wins a group reward. If both teams keep their points below a preset level, then both teams share in the reward. Research on the effects of the Good Behavior Game shows an increase in on-task behavior and student productivity (Barrish et al., 1969). As a result

of this systematic, proactive intervention for disruptive behavior, the Good Behavior Game has provided a framework for subsequent classroom management systems (Babyak et al., 2000; Wills et al., 2010).

Effects of poor classroom management. In the same way that good classroom management has positive effects on students, poor classroom management can have a negative effect on students. Ineffective classroom management refers to classroom management devoid of clear academic and behavioral expectations for students and poorly delivered consequences (e.g., repeating commands to students more than is required to elicit their compliance; Sentelle, 2003). The lack of academic and behavioral rules along with the ineffective delivery of consequences may result in short-term negative effects such as student displays of inappropriate classroom behavior (Colvin, 2010), reduced opportunities for students to respond to instruction (Partin et al., 2010), and lost instruction time for teachers (Grossman, 2004; Kamps et al., 2006; Sherman & Cormier, 1974). Teachers' inability to effectively manage classroom behavior often contributes to low achievement especially for those students at risk for disruptive behavior problems (Harrell et al., 2004; Kamps et al., 2006).

Long-term effects of poor classroom management. The negative effects of poor classroom management may not be transitory. Research has linked poor classroom management to a number of long-term negative effects in students (Baumeister, 1993; Gartell, 1987; Kellam, Ling, Merisca, Brown, & Ialongo, 1998; National Research Council, 2002; Reinke & Herman, 2002; Sentelle, 2003). Kellam et al. (1998) conducted a study on the effects of first grade teacher classroom management (i.e., teachers' ability to prevent or address disruptive behavior) on seventh grade student outcomes. The researchers' choice of classroom management system was the Good Behavior Game (Barrish et al., 1969). Intervention classes implemented the Good

Behavior Game while control classes were left to their own mode of classroom management. Results found that students, especially boys, had poor behavioral outcomes (e.g., aggressive behavior) in seventh grade if they were in a poorly managed class in first grade. The researchers defined well managed classrooms as those with the Good Behavior Game intervention, and poorly managed classrooms as those that were randomly assigned as control classrooms. The odds ratio of students' development of aggressive behavior in a poorly managed class was 58.7 compared with 2.7 for a well-managed class.

Poor classroom management may result in a lack of structure in the classroom, and a lack of structure in the classroom allows for recurring aggressive and pervasive or disruptive student behavior, such as teasing or vandalism of classroom material (Greenwald, 2002). Students who develop disruptive behaviors are more likely to suffer attrition from school and constantly move from one school to another because they are suspended or expelled for their disruptive behavior (Reinke & Herman, 2002). Students who are targeted or victimized through teasing can end up suffering psychological problems later on (Storr, Ialongo, Anthony, & Breslau, 2007).

Several long-term negative effects on the psychological well-being of students have been associated with poor classroom management. One of these long-term negative effects involves issues of self-esteem. Self-esteem refers to one's attitude toward oneself (Rosenberg, 1965). Poor classroom management has been tied to self-esteem issues in children later on (Edwards, 1994). Impaired self-esteem (i.e., too much or too little) predicts mental and physical health issues such as depression, anxiety, physiological ailments (Baumeister, 1993), engagement in antisocial behavior (Edwards, 1994), and even possible narcissism (Baumeister, 1993).

External locus of control for personal behavior (Findley & Cooper, 1983), and a lack of personal responsibility for one's actions (Stevenson, 1991) are other long-term effects associated

with poor classroom management. An *external locus of control* refers to the belief that all events in one's life are caused by uncontrollable factors such as the environment or other people (Grinnell, n.d.). Students' reliance on an external force to make behavioral decisions can result in involvement in questionable activities such as drug use, bullying, or delinquency (Greenwald, 2002). Good classroom management systems provide students with outlined behavioral expectations and an opportunity to practice these expectations in a safe, learning environment (Barbetta et al., 2005). Poor classroom management systems do not have clearly outlined behavioral expectations, which can result in student reliance on the presence of a figure of authority in order to display appropriate behavior (i.e., external locus; Greenwald, 2002), and it becomes more likely that the student will engage in disruptive behavior when he or she thinks no one is watching (Marzano et al., 2003). Finally, when students are unable to take responsibility for their own disruptive behavior, they are prone to delinquency and conduct problems later (Baumeister, 1993; Domitrovich & Greenberg, 2003). Poor classroom management does not provide consistent consequences that hold students accountable for their behavior (Reed & Kirkpatrick, 1998). As a result, students may get away with displays of disruptive behavior, and if they are not exposed to good classroom management at some point during their academic career, they may end up with significant behavioral problems later on in life (Kellam, et al., 1998).

The ripple effect of poor classroom management. The use of inconsistent classroom management for behavior can result in a reduced level of active participation from students in the classroom and in an increased level of disruptive behavior (Loeber & Farrington, 2000; Reed & Kirkpatrick, 1998). Consequently, a teacher's failure to follow through on his or her classroom behavioral rules when a student displays disruptive behavior in class can cause a behavioral

ripple effect (Kounin, 1970; Reed & Kirkpatrick, 1998). To explain the ripple effect, Kounin (1970) elaborated that if one student is able to display disruptive behavior without being told publicly to stop, this likely gives other students in the class license to engage in disruptive behavior without expecting any consequence. This ripple effect in turn reinforces the teacher's propensity to use more restrictive forms of classroom management, such as time-outs, reprimands, in-school suspensions, and out-of-school suspensions (Kounin, 1970; Reed & Kirkpatrick, 1998). The ripple effect can be prevented if the teacher maintains consistency in his or her implementation of classroom management strategies (Maag, 2004; Marzano et al., 2003).

Strategies for Classroom Management

Positive and negative effects of classroom management are determined by what classroom management strategies a teacher chooses to use within the classroom. Effective classroom management enables teachers to address the academic and behavioral needs of their students. Classroom management strategies provide the framework around which classroom behavioral and academic expectations are built (Marzano et al., 2003). The goal of using any prescribed classroom management strategy is to help teachers to establish a positive classroom climate conducive to student learning (Kerr & Nelson, 2006). It is therefore important that the strategies being used in classroom management are evidence-based best practices (Cartledge & Loe, 2001; Gable, Hendrickson, Tonelson, & Van Acker, 2002). A comparison of various classroom management strategies used by teachers is important for the identification of effective strategies (Lewis, 1999; Roache & Lewis, 2011). In the section that follows, various types of classroom management strategies are presented, including use of classroom rules, relationship building, coercive discipline, and use of reprimands and praise.

Classroom rules. Classroom rules have long been seen as the mortar that sets the bricks of a productive, safe and orderly classroom. Rules can influence the environment within which teacher-student relationships are built, as well as regulate the parameters for discipline - positively and negatively - depending on their implementation. Gable et al. (2009) define classroom rules as "explicit statements that define behavior expectations and help establish a predictable teaching and learning environment" (p. 196). Rules encourage students to accept responsibility for their behavior; they should be simple, reasonable, enforceable, and concise for students to remember what is expected of them in the classroom (Burden, 2006; Grossman, 2004; Kerr & Nelson, 2006; Maag, 2004). Sometimes students are not aware of the rules that teachers have for them. Therefore, it is important for teachers to take three to five minutes out of class time to explicitly teach the classroom rules to the students (Paine, Radicci, Rosellini, Deutchman, & Darch, 1983), addressing both examples and non-examples of acceptable behavior as it relates to the rules, and positive and negative consequences for rule-following and rule-breaking behavior (Kerr & Nelson, 2006). Rule enforcement and checks for understanding from the students of what the classroom behavioral expectations are should occur frequently throughout the school year, tapering the rule teaching component towards the end of the year. Use of more detailed review sessions should also happen when necessary, for example, when a new student joins the class. Practice of the expected behavior is beneficial especially because repetition enhances and reinforces learning of any behavioral concepts (Gable et al., 2009).

An example of a past practice with rules that has probably lost its effectiveness today is the *fair-pair rule* (White & Haring, 1980). In this practice, the teacher introduced one strategy to reduce disruptive behavior and another strategy to teach a replacement behavior. This fair-pair rule however assumes that having a replacement behavior for every disruptive behavior is a

broadly accepted rule and can be used as a one-size-fits-all for the reduction of disruptive behavior, yet this pairing is not necessarily the case for all situations (Johnston, 2006). Johnson (2006) posited that the above assumption can create oversimplifications and misunderstandings regarding the intricacies of behavior intervention. These oversimplifications and misunderstandings can lead to limited intervention effectiveness and bias in the decisions made about available therapeutic options.

Nonetheless, rules and expectations are a fundamental part of classroom management. Gable and his colleagues (2009) conducted a meta-analysis to review past-to-present literature about effective classroom management. In an effort to help educators comply with the legislative mandates to use empirically based strategies (e.g., Individuals with Disabilities Education Act Amendments, 1997; Individuals with Disabilities Education Improvement Act, 2004; No Child Left Behind, 2002), the researchers conducted the meta-analysis to determine whether basic behavioral strategies behind classroom management (e.g., the use of classroom rules) needed revision. Their findings suggest that rules are still sound classroom management strategies but with the following caveats to consider. First, teachers should be careful to limit the number of rules to those that can be enforced consistently. Next, the rules should focus on behavioral expectations. In other words, the focus should be on teaching appropriate behavior the teacher wants her students to display while they are in the classroom. Finally, classroom rules should be taught directly and systematically so that students are provided with considerable opportunity to practice the appropriate behavior and receive positive teacher feedback (e.g., praise) on their performance.

Relationship building. Building relationships with students is a classroom management strategy that has a positive effect on both academic and nonacademic student behavior. When

teachers build relationships with students, they maintain an appropriate system of consequences for disruptive behavior, and work to increase students' level of cooperation within the class (Gregory & Ripski, 2008; Maag, 2001). As a result, academic engagement is increased and disruptive behaviors are decreased (Gable et al., 2009; Gregory & Ripski, 2008; Pianta & Stuhlman, 2004; Sabol & Pianta, 2012).

Pianta and Stuhlman (2004) studied the correlation between teacher-student relationships and student success in the first years of school. Assessments of teacher-child relationships were obtained in preschool, kindergarten, and first grade. In first grade, student academic performance was rated by teachers using a mock report card containing items on children's academic performance, work habits, and social and emotional development. In preschool and first grade, the students' vocabulary development was assessed using the Picture Vocabulary subtest of the Woodcock Johnson Psycho-Educational Battery-Revised Tests of Cognitive Ability and Tests of Achievement (WJ-R; Woodcock & Johnson, 1990). Parents and teachers rated the students' social competence using the Social Skills Questionnaire (SSQ) from the Social Skills Rating Scale (SSRS; Gresham & Elliott, 1990). Student behavioral functioning was assessed using the Child Behavior Checklist (CBCL; Achenbach, 1991). Finally teacher-student relationships were assessed using the Student-Teacher Relationship Scale (STRS; Pianta, 2001). Hierarchical regression analyses showed that when students had a positive teacher-student relationship in preschool, there was a significant improvement in their social skills, as well as with their internalizing and externalizing behaviors in first grade. Additionally, teacher-student relationship quality was associated with positive changes in social and behavioral skill levels. Overall findings from the study generally affirmed that teacher-student relationships play a significant

role in a student's ability to acquire the skills necessary for academic and behavioral success in school.

Coercive discipline. Coercive discipline refers to the use of threat to gain compliance or to modify undesirable behavior and is often applied as a means to control students (Edwards, 1994). This technique relies on the use of punishment (e.g., in-school or out-of-school suspension) and aggression (e.g., use of sarcasm or yelling in anger) to gain student compliance (Roache & Lewis, 2011). When discipline is viewed as a way to control students and when it is applied aggressively, teachers do not learn effective ways to manage their classrooms (Watson, 1982); thus, coercive discipline can critically influence the level of classroom disruptive behavior and student class participation.

Teachers use coercive discipline to intimidate students into compliance. However, as students are intimidated by the teacher through aggression, students act out (Hyman & Snook, 2001) putting both teacher and student at risk for injury (Reid, Patterson, & Snyder, 2002). Similar to Patterson's (1976) coercive cycle, the teacher and student both escalate in their resolve to get their way. The escalating negative interaction between parent and child often results in negative reinforcement of whatever behavior stops the conflict (e.g., Dad's yelling is negatively reinforced when Tommy stops hitting his sister, and Tommy doesn't stop hitting his sister until Dad starts yelling). Similarly, with coercive discipline, the teacher's yelling is negatively reinforced when the student is sent out of the classroom in order to maintain the status quo; this in turn negatively reinforces the student's disruptive behavior. In contrast, however, unlike the coercive cycle, the repetitive negative exchange does not always occur between the teacher and the student. Students who are considered chronic offenders due to constant engagement in disruptive behavior are often resistant to punitive techniques to change their behavior

(Domitrovich & Greenberg, 2003). Therefore, although the ripple effect as outlined earlier is a reminder that it is important to attend to disruptive behavior when it occurs in the classroom, coercive discipline is not the most optimal approach.

Numerous studies have found that coercive discipline is ineffective and detrimental to student academic and behavioral progress (Gable et al., 2009; Haynes et al., 1997; Hyman & Snook, 2000; Reinke & Herman, 2002). A research example from Lewis (2001) analyzed the role of classroom discipline on student ownership of behavior. He compared nonaggressive (e.g., rewards and recognition, discussions, involvement, and non-directive hints) and aggressive discipline techniques (e.g., use of sarcasm towards students, yelling in anger, keeping classes in from recess, or use of derogatory language) in promoting student responsibility. Elementary and secondary students completed detailed questionnaires asking them to rate their teachers on the above discipline strategies when addressing student disruptive behavior. A factor analysis was used to determine which discipline strategies accounted for the most variance in student behavior. The six initial strategies were (a) hinting at disruptive behavior, (b) discussing impact of disruptive behavior on the class, (c) involving students in creating classroom rules, (d) recognition of appropriate and on-task behavior, (e) punishing disruptive behavior, and (f) aggressive discipline techniques. The solution provided two factors with eigenvalues greater than one. These two factors were labeled Relationship-based discipline (a, b, c, and d), and Coercive discipline (e and f) and they accounted for 70% of the variance. Correlation analysis was conducted to analyze the relationship between discipline techniques and student behavior, and work attitude which influenced on-task behavior. The highest positive correlation was found between coercive discipline and disruption of classroom activities ($r = 0.46$).

The coercive discipline approach, however, is one of many approaches that teachers may take in managing student disruptive behavior, especially when faced with persistent or pervasive student disruptive behavior (Lewis, 2001; Shores et al., 1993; Van Acker, 2007). Coercive discipline is often applied because the immediate reduction of disruptive behavior as a result of using more punitive consequences can be reinforcing for the teacher when they provide some reprieve from the student disruptive behavior during instruction time, albeit temporarily (Reed & Kirkpatrick, 1998; Sabol & Pianta, 2012). Coercive discipline, however, is more likely to increase the level of disruptive behavior in the classroom (Lewis, 2001).

Teacher praise. Teacher praise is one of the fundamental elements of creating a safe and orderly class (Alber et al., 1999; Alber & Heward, 2000; Owen, Slep, & Heyman, 2012). Praise consists of verbal or written statements or actions that acknowledge a desired student behavior and provide positive reinforcement to encourage the student to repeat the desired behavior (Gable et al., 2009). The research on teacher praise has shown that teachers' use of contingent praise effectively reinforced, or increased, a variety of appropriate student behaviors and academic skills, including following directions, staying on-task (Ferguson & Houghton, 1992; Sutherland et al., 2000), providing appropriate academic responses (Sutherland & Wehby, 2001), working accurately, completing work, and increasing positive teacher-student relationships (Alber et al., 1999; Craft et al., 1998; Kamps et al., 2011; Partin et al., 2010; Thorne & Kamps, 2008; Wills et al, 2010). Nevertheless, praise should not be implemented as a stand-alone strategy because when disruptive behavior is not pointed out to the students, they are unaware of what behavior they should change, and they falsely believe that they always follow behavioral rules (Baumeister, 1993; Larrivee, 2002). Gable and his colleagues (2009) therefore suggest that

teachers should pair praise with physical proximity and increased opportunities for students to respond correctly.

Studies have found that teacher use of praise—in lieu of punishment techniques—can help to increase student on-task behavior (DeLeon, Neidert, Anders, & Rodriguez-Catter, 2001; Franzen & Kamps, 2008; Kamps et al., 2011; Lalli et al., 1999; Sutherland et al., 2000; Thorne & Kamps, 2008; Walker & Buckley, 1968; Wills et al., 2010) as long as it is linked to the desired behavior it is supposed to reinforce (Partin et al., 2010). Sutherland et al., (2000) conducted a study in a class for children with significantly disruptive behaviors. During the study, the researchers collected observational data on the teacher's use of behavior-specific praise and non-behavior-specific praise, and on student on-task behavior. Results revealed an increase in on-task behavior with an average of 48.7% at baseline to 85.6% during the intervention when the teacher used praise statements with the students. There was no statistically significant difference between behavior-specific and non-behavior-specific praise.

Finally, Partin and his colleagues (2010) provide some research-based guidelines from their extensive review of the literature on the effective use of praise. First, teachers should check the contingency of the praise statement to the desired behavior to make sure the student links the praise with the appropriate behavior. Second, the kind of informative feedback the student receives in the praise statement should provide explicit information about how their behavior is appropriate. Third, praise statements should provide students with opportunities for positive and meaningful interaction with their teacher. Finally, when providing praise teachers should avoid general statements (e.g., "Awesome!") and instead provide individualized behavior-specific praise (e.g., "Great job standing in line quietly, Brady!").

Teacher reprimands. Reprimands are a form of attention given to students when the teacher is trying to avert disruptive behavior (Abramowitz, O'Leary, & Futtersak, 1988; Van Houten, Nau, Mackenzie-Keating, Sameoto, & Colavecchia, 1982). Definitions of reprimands have varied over the years from one source of scholarly literature to another. For example, in a study conducted by Reinke et al. (2008), they defined reprimands as verbal comments or gestures made by the teacher indicating disapproval of student behavior, in spite of tone variation. Some examples included telling a student to stop talking or banging on a desk to get the student's attention while at the same time indicating disapproval for the student's behavior. Disruptive behavior was defined as any statements or actions given by an individual student or group of students that disrupted or interfered with ongoing classroom activities for the teacher (e.g., talk outs during instruction), any behavior that was reprimanded by the teacher, or actions that resulted in disruption of the lesson (e.g., tapping a pencil on the desk). These descriptions are relatively similar to those that have been considered for this paper when referring to reprimands and student disruptive behavior.

Mancuso and Eimer (1982) offered a different definition of reprimands from a constructivist approach. Their definition of reprimands refers to, "the behaviors that are directed toward a target person in order to forestall rule-breaking behavior while promoting rule-following behavior" (p. 40). They argued that the validity of behavior modification depends on the context within which the behavior is modified and the information processing systems of the people participating in the event. Any input presented within a given context will be processed through an individual's system. There exists a presupposition that the rules for the context in question are usually predetermined and discussed between the two parties involved. In this case it would be teacher and students. To explain the constructivist approach further, teachers use

reprimands based on (a) the classroom rules, (b) the history of use of reprimands within the context of student disruptive behavior, and (c) the reinforcement the teacher gets as a result of using reprimands. Understanding some of the reasons for teachers' use of reprimands can provide that conceptualization for researchers because it is how well reprimands are implemented, rather than how often they are used, that can make a difference in addressing disruptive behavior.

Reprimands have long been considered a form of punishment as their primary use is to reduce rates of disruptive behavior (Johnston, 1972). They are used more often than time-outs or overcorrection when addressing student disruptive behavior (Heller & White, 1975; Thomas, Presland, Grant, & Glynn, 1978; White, 1975). There has been some concern about the potential reinforcing effect that reprimands have on disruptive behavior (Kodak et al., 2007; Larrivee, 2002) and thus, there are doubts about their effective use in the classroom (Johnston, 1972).

Effective and ineffective use of reprimands in the classroom. Reprimand efficacy influences the use of reprimands within the classroom (Kazdin & Klock, 1973). Reprimand efficacy refers to how effectively reprimands are used to address disruptive behavior (Van Houten et al., 1982). When a teacher fails to reprimand students for rule-breaking or noncompliance, it renders their classroom management system and rules ineffective (Madsen et al., 1968). Some researchers have determined that reprimands can increase the likelihood of student compliance (Kuczynski & Kochanska 1990; Kuczynski, Kochanska, Radke-Yarrow, & Girnius-Brown, 1987; Van Houten et al., 1982).

Alternatively, reprimands may also have some negative effects. Hyman and Snook (2000), for example, emphasize that teachers' disciplinary measures can have a negative impact on student development of responsible behavior if used coercively (e.g., when techniques that

rely on fear and intimidation are used to get students to behave in a particular manner). Moreover, verbal reprimands may reinforce inappropriate behavior simply because individuals at risk for behavior disorders also need and crave teacher attention, but if they rarely get attention for appropriate behavior they will continue displaying disruptive behavior and accept reprimands as sufficient attention (Abramowitz, O'Leary, & Rosen, 1987; Shores et al., 1993; Webster-Stratton & Hammond, 1998).

The delivery of reprimands is also important. If a verbal reprimand is delivered, the teacher's accompanying nonverbal behavior should be consistent with disapproval (e.g., no smile and firm focus; Kazdin & Klock, 1973). The delivery of private, quiet reprimands are more effective than loud reprimands delivered in front of an entire class (O'Leary et al., 1970). Additionally, reprimands should be brief and not lengthy or drawn out (Abramowitz et al., 1988).

In addition to the delivery itself, the schedule of the delivery of reprimands is important for the reprimands to be effective. If reprimands are given with increased frequency, it can become a source of nagging. Nagging refers to persistent faultfinding by the teacher toward the student in an effort to reduce undesired, disruptive behavior (Merriam-Webster, 2013). Gable et al. (2009) found that negative teacher responses such as nagging students can undermine the integrity of the teacher-student relationship by reducing positive interactions. Therefore, teachers need to use reprimands sparingly, and alongside strategies like praise in order to maintain their effectiveness as a response to student disruptive behavior. Authorities on the use of reinforcing statements propose a praise to reprimand ratio of 3:1 or 4:1 (Kalis et al., 2007; Shores et al., 1993). There is limited current research where reprimands are some of the main variables of interest; additional research is necessary (Piazza et al., 1999).

Classroom Management and Student Disruptive Behavior

As earlier addressed, if appropriate and effective classroom management systems are implemented at the beginning of the school year they reduce the potential for pervasive student disruptive behavior (Emmer, Evertson, & Anderson, 1980). However, disruptive behavior is a reality in many classrooms today (Marzano et al., 2003), so there needs to be a stipulation in the classroom management system that includes consequences for both on-task and disruptive behavior.

Student disruptive behavior has been and is still a major concern in many classrooms today (Colvin, 2010; Hoff & DuPaul, 1998, Lewis, Powers, Kelk, & Newcomb, 2002; Swinson & Harrop, 2001). A body of research has provided some useful definitions for disruptive behavior in the classroom context. Charles (1998) described five broad types of problem behavior with class disruptions being one of the five. He defines class disruptions as acts such as talking loudly, walking around the room, and calling out. Kaplan, Gheen, and Midgley (2002) described disruptive behavior as talking out of turn, teasing, disrespecting others, and getting out of one's seat. In their definition, they also considered the less frequent, but violent acts (e.g., use of weaponry). One last definition was provided by Levin and Nolan (1996) who defined disruptive behavior as behavior that interferes with the act of teaching, interferes with other students' learning, is psychologically or physically unsafe, or destroys property. In general, however, classroom disruptive behaviors are described along a continuum ranging from minor disruptive behaviors, such as talking out of turn and getting up out of one’s seat without teacher approval, to major disruptive behaviors, such as hitting, throwing objects at others, and physical and verbal threats (Todras, 2008). Teachers are daily faced with the challenge of managing disruptive behaviors in the classroom (Reed & Kirkpatrick, 1998).

Research shows that teachers are more inclined to use aggressive classroom management approaches when working with students with disruptive behavior (Lewis, 2001; Roache & Lewis, 2011). However, the use of more aggressive strategies of classroom management (e.g., threats) creates a vicious cycle that produces little to no long-term result in decreasing the student disruptive behaviors, while increasing the teacher's reliance on coercive and restrictive approaches to manage or control their students' behavior (Lewis, 2001).

The use of aggressive classroom management techniques overshadows the development of learning and instructional opportunities for the students, resulting in decreased academic engagement and increased disruptive behavior (Reed & Kirkpatrick, 1998). If a student's academic engagement is low and rates of disruptive behavior are high, the amount of time spent teaching and learning is reduced as the teacher gets involved in correcting the student's disruptive behavior (Lewis et al., 2002; Wills et al., 2010). Teacher's classroom behavioral rules help with regulating student disruptive behavior by providing behavior parameters for the students. Consequently, students are usually more likely to engage in disruptive behavior if the teacher's behavioral rules of them are unclear (Grossman, 2004). When students lack direction about the rules regarding classroom behavior, they may generate their own rules about their conduct (Brouwers & Tomic, 2000) or behave in ways that produce the greatest reinforcement even if the behavior causes disruption to the classroom (Baloglu, 2009; Gable et al., 2009; Haynes et al., 1997; Little & Akin-Little, 2008; Reinke & Herman, 2002; Van Acker, 2007). When appropriate student behavior is not clearly spelled out in the classroom, students respond to the contingencies in place. Unlike appropriate behavior (e.g., on task behavior) that is only occasionally reinforced through attention (praise), disruptive behavior nearly always draws reinforcement in the form of attention (reprimands).

Madsen and his colleagues (1968) conducted a study to evaluate the importance of social reinforcers (e.g., smiles, praise, attention) in establishing and maintaining effective behaviors in children. They recruited two elementary school teachers and measured their use of rules, approval or praise of appropriate behavior, and ignoring of inappropriate behavior. They also measured the frequency of disruptive behavior of three students. The teachers were taught to make classroom rules explicit, ignore disruptive behaviors unless a student was getting hurt, and praise appropriate classroom behaviors. The results from this study indicated that (a) the use of rules on their own exerted little effect on student disruptive behavior, and (b) student disruptive behavior was rare when teachers ignored inappropriate behavior and showed approval for appropriate behavior (i.e., differential reinforcement was implemented).

Overall, the research on classroom management and student behavior continually shows that in order to successfully teach and learn in class, teachers and students need rules, behavioral expectations, and consequences for appropriate and disruptive behavior as part of the classroom management system.

Teacher Attention as a Function of Student Behavior

Student behavior serves a number of functions that involve both positive and negative reinforcement. Behavior maintained by negative reinforcement attempts to avoid or escape an unpleasant stimulus, such as a challenging task or situation (Kamps et al., 2006). Behavior maintained by positive reinforcement attempts to gain access to a desired stimulus, such preferred items, activities, or attention (Russell & Lin, 1977; Vollmer, Iwata, Zarcone, Smith, & Mazaleski, 1993). Teachers are more likely to give attention to disruptive behavior than on-task behavior because disruptive behavior interferes with and reduces instructional time (Kodak et al., 2007; Piazza et al., 1999). Teacher or peer attention is a common function of student disruptive

behavior (Kodak et al., 2007) even if this attention comes in the form of disapproval or reprimands (Russell & Lin, 1977).

Reprimands and praise as forms of teacher attention. The effects of teacher reprimands on student disruptive behavior, and praise on student on-task behavior are well established (Swinson & Harrop, 2001). By themselves, teacher reprimands and praise are mere verbalizations, but if they are repeatedly paired with naturally reinforcing or punishing consequences, reprimands and praise develop social meaning (Owen et al., 2012). Disapproval or approval of students' behavior are the most common social meanings of reprimands and praise (Swinson & Harrop, 2001). Incessant reprimands for student disruptive behavior can end up reinforcing the disruptive behavior that the teacher wants to extinguish (Madsen et al., 1968; Shores et al., 1993). Subsequently, too much non-behavior-specific praise for on-task behavior can reduce the effectiveness of praise in increasing desirable on-task behavior (Larrivee, 2002). The message the student learns from the kind of attention he or she consistently receives from the teacher - whether reprimands or praise - is that he or she is to display the behavior that gets him or her the most attention from the teacher (Swinson & Harrop, 2001).

Some studies have found a positive correlation between reprimands and disruptive behavior when reprimands are used as a form of social attention (Kodak et al., 2007). Kodak et al. (2007) conducted a single subject study to evaluate the types of attention that maintained disruptive behavior. The researchers conducted both functional analyses and an attention evaluation for both students, with the latter analysis being a major focus. The functional analysis provided the social context within which the attention variables were manipulated. The researchers evaluated the effects of teacher attention in the form of reprimands and praise as reinforcers by conducting a functional analysis and attention analysis with two students who

displayed disruptive behavior. The functional analysis included attention, demand, alone, and toy play conditions that were alternated in a multi-element design. In the attention condition, the students received attention from their teachers for on-task or disruptive behavior. In the demand condition, the students were given work of varying difficulty to do. In the alone condition, the students were left on their own, and in the toy play condition they were provided with toys to play with. Results demonstrated that demand increased student disruptive behavior. In the attention analysis, the researchers manipulated the frequency of praise, reprimands, physical attention, tickles, unrelated comments, and eye contact toward student disruptive and on-task behavior. The attention analysis revealed that disruptive behavior occurred at higher levels during instances when the students received teacher attention in the form of reprimands. These findings indicate that the students' disruptive behavior was maintained by reprimands when work demands were put on them.

In contrast to Kodak and her colleagues, when Acker and O'Leary (1987) examined the effects of a myriad of consequences on on-task behavior of a class of students with behavioral and academic difficulties, they found that praise alone decreased on-task behavior. Acker and O'Leary compared (a) the effects of reprimands alone, (b) the use of both reprimands and praise as consequences, and (c) the withdrawal of all consequences. The researchers assessed the reinforcement schedule during each condition to determine its effect on student on-task behavior and academic productivity. Results indicated that the use of reprimands alone was associated with high levels of on-task behaviors during the initial days of the class. The addition of praise brought about no change in the rate of on-task behavior rates or in the level of the students' academic performance. The withdrawal of both praise and reprimand resulted in significant decreases in student on-task behavior and academic productivity. Interestingly, when praise was

used alone it led to an initial increase followed by a dramatic decline in on-task performance, but the average rate of on-task behavior was no different than when all consequences were withdrawn. These results presented a double-edged sword; while they indicated the importance of reprimands for maintaining appropriate classroom behavior where reprimands have been presented as punitive in nature, they also cautioned against the use of praise alone to increase on-task behavior.

The effect of reprimands and praise on student behavior. The effects of reprimands and praise on student behavior in the classroom are usually evidenced by a decrease in disruptive behavior and reprimand use and an increase in on-task behavior and praise use (Kamps et al., 2011; Lane, Kalberg, Bruhn, Mahoney, & Driscoll, 2008; Sherman & Cormier, 1974; Wills et al., 2010). Some studies have examined the effects of concurrent reinforcement of disruptive behavior and on-task behavior using reprimands and praise. Sherman and Cormier (1974) conducted a study to evaluate the relationship between student behavior change and teacher reactions to the change in student behavior. They used a multiple baseline design to observe two students at various stages. They collected frequency data on teacher reprimands, praise, and neutral statements. They also collected data on student disruptive and on-task behavior. The researchers found that teacher reprimands decreased as student disruptive behavior decreased, and teacher praise increased as student on-task behavior increased. Study conclusions provided evidence that changes in the classroom behavior of the students had consistent effects on the teacher's behavior.

The effects of reprimands on student behavior. Teachers can inadvertently maintain student disruptive behavior when they use fewer praise statements and more reprimands with students identified as having disruptive behavior (McKercher & Thompson, 2004; Ndoro,

Hanley, Tiger, & Heal, 2006; Strain, Lambert, Kerr, Stagg, & Lenkner, 1983; Van Acker, Grant, & Henry, 1996; VanDerHeyden, Witt, & Gatti, 2001). Verbal reprimands can act as reinforcers for attention-seeking behavior if they follow disruptive behavior that is sensitive to adult attention. Piazza and her colleagues (1999) studied attention-maintained destructive behavior in students. The researchers compared the effects of attention in the form of praise and reprimands on both destructive (i.e., aggression and disruption) and appropriate behavior (i.e., communication) by manipulating the frequency of the reinforcement schedule used to deliver attention. The results indicated that the students' destructive behavior increased when the teacher provided attention for destruction.

Research has shown that the overuse of reprimands in the classroom produce negative outcomes for students (Franzen & Kamps, 2008; Larrivee, 2002; Kamps et al., 2011; Todd, Horner, & Sugai, 1999; Van Acker et al., 1996). Van Acker et al. (1996) conducted observations in 25 second grade through fifth grade classrooms and analyzed teachers' rates of verbal and nonverbal praise and reprimands directed toward students identified as being at low (N = 102) and high (N = 104) risk for aggression. The Child Behavior Checklist (CBCL; Achenbach, 1991) was used for the risk assessment. Students scoring in the 51-75th percentile were placed in the low to mid risk group, and student scoring in the 76th percentile and higher were placed in the high risk group. Results indicated that the high risk group displayed significantly higher amounts of disruptive behavior and received significantly higher rates of reprimands from their teachers than the low-risk group. Mean base rate analyses indicated that students from both risk groups received comparably low rates of praise from their teachers. Similar results were reported by Lago-DeLello (1998), with students identified as having disruptive behavior receiving a significantly higher number of reprimands from their teachers than those considered to be typical

students. Academic engagement for these students was also found to be significantly lower than that of their peers who displayed appropriate behavior in the classroom. In both studies, praise was rarely given to students with disruptive behavior for displaying on-task behavior, but reprimands were often used when they displayed disruptive behavior.

The effect of praise on student behavior. The effects of praise on on-task behavior have also been well documented. Numerous studies show that the use of praise as a form of teacher attention results in increased on-task behavior, increased academic performance, healthier self-esteem, and positive classroom climate (e.g., Gable et al., 2009; Kalis et al., 2007; Kamps et al., 2011; Lane et al., 2008; Sutherland et al., 2000; Wills et al., 2010). Sutherland and his colleagues (2000) evaluated the effects of varying rates of behavior-specific praise on student on-task behavior. They collected frequency data on the rates of non-behavior-specific praise (e.g., "Good job!") and behavior-specific praise (e.g., "Great job sitting up, ready to listen!") as they were used by a fifth grade teacher during his social skills class. They also collected student on-task data. Students were considered on-task if they were following directions given by the teacher, paying attention to the speaker (peer or adult), or working on assigned tasks. Results from the study demonstrated an increase in student on-task behavior when behavior-specific praise was used to acknowledge on-task behavior (i.e., mean rate at baseline = 1.3; mean rate at intervention = 6.7). There was no significant change in the occurrence of non-behavior-specific praise from baseline to intervention (i.e., mean rate at baseline = 3.2; mean rate at intervention = 3.7) giving no clear indication on whether on-task behavior increased as a result of its use.

In summary, with the overwhelming evidence presented on the effects of student behavior on teacher behavior in the classroom environment, researchers need to consider using intervention programs that work simultaneously with students and teachers (Brophy & McCaslin, 1992;

Kamps et al., 2011). If students and teachers can learn to effectively reinforce appropriate behaviors in each other, enduring ideal learning conditions can be achieved and maintained.

Class-Wide Function-related Intervention Teams (CW-FIT)

Research continues to emphasize the benefits of using rules, behavioral expectations, and consequences (e.g., praise, reprimands, rewards) for appropriate and inappropriate behavior as part of the classroom management system (Babyak et al., 2000; Gable et al., 2009; Kerr & Nelson, 2006: Marzano et al., 2003). Class-Wide Function-related Intervention Teams (CW-FIT) is a class-wide, multi-tiered, group contingency behavior intervention designed to teach students appropriate behavior and reinforce the use of these behaviors through a game format. The multi-tiered component of CW-FIT implementation allows the intervention to be used at a class-wide (Tier 1), small group (Tier 2), and/or individualized (Tier 3) level. Movement through each tier is dependent on the level of response to intervention (Wills et al., 2010). For the purposes of this paper, the focus shall be on the class-wide, or Tier 1, level of intervention.

The use of classroom rules, and positive teacher attention in the form of praise as classroom management strategies are combined under CW-FIT to provide the teacher with a comprehensive toolkit for behavior management. When these strategies are implemented under CW-FIT they help teachers maximize student learning time, increase potential for rates of correct responding by students, and equip the teacher to monitor group-individual performance (Gable et al., 2009; Kamps et al., 2011; Wills et al., 2010).

CW-FIT components. The CW-FIT Program includes four elements: (a) teaching socially-appropriate communicative skills, (b) differential reinforcement using an interdependent group contingency, (c) extinction or eliminating potential reinforcement (attention, escape) for disruptive behavior, and (d) using self-management, help cards, and functional assessment (Wills

et al., 2010). At the teacher level, the intervention is designed to increase teacher praise and inadvertently decrease reprimand use; at the student level it is designed to increase on-task behavior and decrease disruptive behavior (Wills et al., 2010).

During the teacher's implementation of the teaching component in the classroom, behavioral skills are broken down into a task analysis, the steps for each behavior skill are written and mounted on posters, and the behaviors are explicitly taught to students at the beginning of the class lesson. The behaviors that are taught include staying seated, getting the teacher's attention appropriately, and ignoring inappropriate behavior (Wills et al., 2010). By way of a game format, differential reinforcement (e.g., verbal praise and points) is provided through the use of an interdependent group contingency (Thorne & Kamps, 2008). During this game phase, the class works in teams for points for a predetermined goal. The teams earn these points contingent on team displays of appropriate behavior at designated timer intervals provided by the teacher. At the end of the game, the points are tallied to determine which teams have met their goal (Wills et al., 2010). Those teams that meet their point goal receive their rewards immediately. Some rewards include pencils, dance parties, and taking shoes off.

CW-FIT implementation. Before the beginning of each lesson when the CW-FIT game was played, precorrects (i.e., a summary of the expected behavior) are given to remind the class of the classroom behavioral expectations. Class teams work toward a point goal that is agreed upon by the students and teacher. A timer is set to randomly go off every one to three minutes before the teacher finally begins instruction. Timer intervals serve as a prompt to scan the room and praise teams displaying appropriate behavior. A major goal for the CW-FIT intervention is to train teachers to attend more to displays of appropriate behavior than to disruptive behavior, and consequently to provide more praise than reprimands (Vollmer et al., 1993; Wills et al.,

2010). Given this synopsis, CW-FIT is a classroom intervention that can successfully combine the good classroom management strategies of classroom rules, use of teacher praise, and regulation of reprimand use.

Although CW-FIT has provided empirical data on the reduction of student disruptive behavior and increase of the use of teacher praise through its comprehensive classroom management system (Babyak et al., 2000; Wills et al., 2010), the contingent relationship between the schedule for teacher praise and reprimands and student on-task and disruptive behavior is currently unexplored. The current study seeks to analyze this relationship.

Theory of Change

The Theory of Change (ToC) is a theory-based evaluation which identifies the beliefs and assumptions behind a project in order to find how and why the project has worked or failed (Weiss, 1997). Connell and Klem (2000) looked at the ToC and how it relates to urban education reform. Their definition of ToC entails the use of a systematic and cumulative study to investigate the links between activities, outcomes, and contexts. The use of ToC as an evaluation framework helps researchers clarify the goals behind conducting the study, reveal the relationships between the goals and the research activities, and identify potential outcome measures for evaluation (Connell & Klem, 2000; Connell & Kubisch, 1996; MacKenzie & Blamey, 2005). Moreover, ToC is not associated with any particular outcome measure, giving researchers freedom to use any suitable outcome measure as it related to their study. Ideally, the ToC should be constructed at the beginning of the project. Nonetheless, it can be applied retrospectively to a study in order to clarify the original intentions of the study (Connell & Kubisch, 1996). In the current study, the activities referred to in the ToC are represented by the baseline and CW-FIT phases. The outcomes are the results from the statistical analysis

conducted to evaluate the teacher and student variables. The activities and outcomes all come together within the context of the classroom setting. The link made between each of the components can provide information about whether or not CW-FIT produces the changes in teacher and student behavior to encourage more use of praise by teachers, and more on-task behavior from students.

The Theory of Change provides a structure for evaluation. Brophy (2008), states that with using ToC, the context within which the variables exist is important, and because of the complexity of the interactions of information and communication in the environment, new measures "*must depict rich pictures of what is being achieved*" by a study (Brophy, 1998; p16). For the present study, analyzing how the contingent use of teacher reprimands and praise given student disruptive and on-task behavior are linked in the context of the classroom requires a new measure like the contingency space analysis .

Analyzing the Reprimand-Disruptive and Praise-On-task Behavioral Relationship

The relationship between teacher attention in the form of praise and reprimands and student on-task and disruptive behaviors can be analyzed using conditional probabilities. For example, a simple conditional probability refers to the number of times the behavior occurred and was immediately followed by a consequence, divided by the total number of behavioral occurrences.

Conditional probabilities. Although not unanimously, mathematicians have noted that a probability is a way of representing a frequency of occurrence (Skinner, 1953). Conditional probabilities in math are computed based on the assumption that some event has already occurred (Hildebrand, 2009). In behavioral research, the same understanding of conditional probabilities applies to operant conditioning (Martens, et al., 2008). The conditional probabilities

in operant conditioning, that a response will occur given a stimulus, are well observed in experiments with animal subjects such as rats, mice, and pigeons (Skinner, 1950; Hammond, 1980). Animal studies are common when studying stimulus-response variables because animals can be exposed to controlled, lab conditions in a constant manner for long periods of time, which is impossible, and possibly unethical, for human subjects. Frequency of response is the observed dependent variable in the experimental situation (Skinner, 1953).

Previous studies have looked at the use of conditional probabilities to analyze sequential recordings of behavior and the events that follow its occurrence (Hammond, 1980; McKerchar & Thompson, 2004; Pence, Roscoe, Bourret, & Ahearn, 2009; Skinner, 1950). Pence and her colleagues compared the ABC method, the conditional probability method, and the conditional and background probability method regarding problem behavior of six individuals. They conducted each analysis for each of the participants regarding environmental events as they preceded problem behavior, and compared the results. For the purposes of this study, only the results from the conditional probability method are reported. Results indicated that for every individual, there was a conditional probability that problem behavior was preceded by a combination of attention, escape, and/or materials. Pence and her colleagues concluded that although descriptive analysis should not be used as a replacement for functional analysis, the results of the descriptive analyses do suggest that such methods can be used to identify contingencies between problem behavior and the environment.

Hammond (1980) analyzed the conditional probabilities that rats would take water reinforcements at varying levels. As a result of the study, he determined that the three levels of conditional probability of reinforcement were, (a) very high; 1.0, (b) high; .20, or (c) moderate; .05. Given the absence of the behavior, which was pressing of the lever, the conditional

probability was 0. The important processes in behavior, such as contingencies, are revealed in this continuous, orderly, and reproducible fashion. The results from these studies can be extrapolated to human beings to the extent that they reveal the association between stimulus and response (Ormrod, 2008; Skinner, 1953). In the study conducted by McKerchar and Thompson (2004) to determine the generalizability of the social consequences commonly manipulated in functional analyses in typical preschool classrooms, the probability of teacher responses given child behavior was calculated and compared to response-independent probabilities of teacher responses. Their results indicated that attention was the most common classroom consequence for all the children. Additionally, they found that the mean conditional probability that teacher attention followed disruptive behavior was .49, and .43 for compliance. These results indicated that the preschooler baseline behavior is normative provided a link as similar conditional probabilities were initially found with the experimental rats in the Hammond (1980) study.

Contingency space analysis. Recently, researchers have proposed an adaptation to the use of conditional probabilities termed contingency space analysis (CSA; Martens et al., 2008). CSA incorporates two conditional probabilities to allow researchers a better understanding of the probability of a particular consequence given the occurrence or nonoccurrence of a target behavior. Thus, it provides information about the relative "payoff" for engaging or not engaging in a particular behavior.

Certain data requirements are necessary to use this analytic technique. A CSA can be conducted when data on real-time sequential recordings of behavior and consequences are available. That is, the requirements include (a) a definition of two mutually-exclusive behavior categories, (b) a record of the delivery of consequences to both behavior categories through

partial-interval recording or real-time recording, and (c) the sequential recording of the occurrences of behavior and consequences.

To determine the degree of contingency—or the probability that a particular consequence will follow some or all behavior occurrences—researchers need to consider the following: (a) the occurrence of a target behavior followed by a consequence, (b) the occurrence of a target behavior that is not followed by a consequence, (c) the non-occurrence of a target behavior followed by a consequence, and (d) the non-occurrence of a target that is not followed by a consequence. Dependent consequences follow many or all instances of a target behavior but never occur during its absence. This contingency is considered so perfect that it would be best analyzed using functional analyses. Contingent consequences may occur in the absence of the target behavior but happen more after the occurrence of target behavior.

The resultant data are graphed together in what is known as the operant contingency space where the two probabilities (i.e., consequence given for each mutually-exclusive behavior category) can be used to evaluate the degree of contingency between behavior and one or more consequences. In this "space" the *x*-axis depicts the probability of a particular consequence given the occurrence of one behavior category (e.g., on-task behavior) and the *y*-axis depicts the probability of a consequence given the occurrence of a mutually-exclusive behavior category (e.g., disruptive behavior). A diagonal line coming from the origin (i.e., where the *x* and *y* axis intersect) with a slope of one is termed the unity diagonal; this line divides the operant contingency space into two triangles. Using the examples of the behavior categories provided above, data points falling above the unity diagonal represent consequences more likely to occur given the occurrence of disruption, while data points falling below the unity diagonal represent consequences more likely to occur given on-task behavior. Data points that fall on the unity

diagonal indicate that a consequence is as likely to occur for each behavior category. The advantage to graphing consequence data in this manner is that the analytic presentation can be simultaneously used to evaluate conditional probability or schedule of two behaviors, and the degree of contingency between the behaviors and one or more social consequences.

Treatment Integrity

Research studies need treatment integrity checks because inaccurate and inconsistent treatment implementation can result in false negatives (i.e., not finding effects where they exist) or false positives (i.e., finding effects where none exist) (Cohen, Kincaid & Childs, 2007; Lane, Bocian, MacMillan, & Gresham, 2004; Paulson, Post, Herinckx, & Risser, 2002). Treatment integrity data collection also helps researchers evaluate whether or not to revise the intervention itself, or the method of implementation (Lane et al., 2004).

Definition. Treatment integrity refers to the degree to which an intervention is implemented by research participants as intended (Wood, Umbreit, Liaupsin, & Gresham, 2007). Cordray and Pion (2006) recount the original notions of treatment strength and integrity. Ever since the issue of treatment integrity was brought to light, many implementation measures include a treatment integrity measure to assess the intervention's efficacy and effectiveness (Cordray & Pion, 2006). Sechrest, West, Phillips, Redner, & Yeaton (1979) coined one of the first definitions for treatment integrity. According to their definition, treatment integrity is the fidelity with which the treatment is actually delivered (Sechrest et al., 1979).

Theoretical background. Treatment integrity measures are not applied as often or as well as they should for experimental research. Gresham, Gansle, and Noell (1993) reviewed 158 articles for the *Journal of Applied Behavior Analysis* and found that only 16% of the articles reported levels of treatment integrity, only 15.8% (25 out of 158) of the studies measured and

reported levels of integrity, and only 34.2% provided an operational definition of their independent variable. The lack of operationally defined independent variables resulted in low interobserver agreement for many of the studies. Gresham et al. (1993) set out positive parameters in the rubric they used to determine which articles met criteria for the meta-analysis. In other words, studies coded 'yes' on the rubric had evidence that treatment integrity was assessed during every observation, and reported as a percentage, and therefore qualified for the meta-analysis. The CW-FIT intervention would meet the positive criteria since treatment integrity was measured and reported in the outcome data.

Prior to the Gresham et al. (1993) meta-analysis, Moncher & Prinz (1991) reviewed 359 outcome studies. They targeted three components in the articles, namely, the use of a treatment manual, supervision of treatment agents, and measurement of adherence to protocol. Results indicated that 18% measured adherence to protocol, 6% practiced all of the three components, and 55% of the studies did none of the three. Additionally they found that only 13% of the studies reported assessing practitioner competence in utilizing the protocol, despite how practitioner competence affects treatment outcomes.

Importance of treatment integrity. Without treatment integrity, it is difficult to replicate an intervention. An intervention should be replicable. In other words, equivalent environmental manipulations associated with earlier observations should be easily duplicated (Johnston & Pennypacker, 1980). Treatment integrity measures help in building a replicative history by assessing the degree to which the treatment is implemented with fidelity (Gresham et al., 1993; Mowbray, Holter, Teague, & Bybee, 2003). Another important aspect of treatment integrity is that it increases statistical power of a study by eliminating extraneous variables. When changes in student and teacher behaviors can be accounted for by the intervention as the

main independent variable, the data collected can be used to reject the null hypothesis (Gresham et al., 1993).

Using CSA for treatment integrity analysis. As earlier stipulated, CSA will be used to compare probabilities of reprimands and praise for disruptive and on-task behavior during baseline and CW-FIT. The CSA process can be used as a treatment integrity check for the use of the consequences (praise and reprimands) given behaviors (on-task and disruptive behavior) as it provides a quantifiable way to determine if the implementation of CW-FIT mirrors the training the teachers received with regards to the reinforcement schedule.

Purpose of the Current Study

The purpose of the current study focuses primarily on the conditional probabilities related to the use of reprimands and praise as teacher attention, and their relationship with student disruptive behavior and on-task behavior from baseline to CW-FIT. The study will occur in the context of the use of CW-FIT as a classroom management system. The information provides a unique form of treatment integrity analysis of whether teachers' classroom use of reprimands and praise on student on-task and disruptive behavior was consistent with the way teachers were trained to provide praise, as well as how the theory of change affects the reinforcement schedule from baseline to CW-FIT. The conditional probability levels suggested by Hammond (1980) were used as guidelines to determine the significance of the conditional probabilities. More detailed information regarding CW-FIT and how it serves as the foundation for this study will be discussed in the methods chapter (Chapter III).

Summary

Contingencies that reinforce student disruptive behavior need to be identified and addressed to maximize the effectiveness of classroom management systems (Fisher, Ninness,

Piazza, & Owen-DeSchryver, 1996; Martens et al., 2008; Vollmer et al., 1993). The environment within which the student and teacher interact on this behavior-response continuum plays a significant role in how an intervention works to change behavior for all parties involved. As has been mentioned previously, effective classroom management will influence the frequency of student disruptive behavior upward or downward and addressing any existing contingencies that may be reinforcing the inappropriate behavior will potentially increase instructional time for the teacher and learning time for the students (Owen et al., 2012). The existing body of research on teacher and student behaviors is extensive (e.g., Franzen & Kamps, 2008; Kamps et al., 2011; Reinke et al., 2008; Vollmer et al., 1993; Wills et al. 2010) and CSA provides an important tool not only for the analysis of conditional probabilities of consequences given behaviors, but also as a quantifiable treatment integrity check for CW-FIT as a classroom management system.

Chapter III

Methods

The chapter describes the current study in terms of the methods used for data collection, stages of data collection, and the analyses performed. Data used for this study were archival and were collected for the Class-Wide Function-related Intervention Team (CW-FIT) program during the second and third years of the project. The author of this dissertation made a significant contribution to the data collection process through training research staff and research participants, collecting data, and entering all the data into the research database. Thus, the chapter presents a description of the procedures, instrumentation, and measures used during the data collection period along with an overview of the CW-FIT program as it relates to the current study.

Participants

Teachers. The CW-FIT research team informed the staff in each school building about the project at their building's general staff meeting, and those teachers who were interested in participating volunteered to be a part of the study at that time. A total of 59 teachers from 10 urban and metropolitan, Midwestern public schools initially volunteered to be a part of the study. All teachers in the current study received the CW-FIT intervention as a result of being part of the experimental group. In the second year of the study, 27 teachers were assigned to the experimental group while in the third year 23 teachers were assigned to the experimental group. The final number of participating teachers was 50, as 9 teachers were excluded from the study for various reasons, e.g., difficulty committing to the additional work of data collection CW-FIT required of them, personal/family reasons, high (80% or above) overall on-task data points

during baseline (Kamps et al., 2011). Table 1 summarizes the demographic data of the teachers that participated.

The study sample included 50 teachers with teaching experience ranging from bachelor's degrees to masters level degrees. Among the teachers there were 4 males and 46 females. There were 6 Kindergarten classrooms, 7 first grade classrooms, 6 second grade classrooms, 9 third grade classrooms, 9 fourth grade classrooms, 7 fifth grade classrooms, 2 sixth grade classrooms, and 3 special education classrooms.

Table 1

Teacher Demographic Information

Demographic information	
Total number of teachers	50
Male	4
Female	46
Lowest degree held	Bachelor of Education
Highest degree held	Masters of Education
Number of teaching years	1-30 years
Percentage of ethnicity represented	
White	96%
Black/African American	4%
Hispanic	0%

Students. Table 2 summarizes the demographic data for the participating students. One hundred target students participated in the intervention following a selection process. An initial meeting was held with the teacher participants during their in-service days or at the end of their contract day to select the student sample. These 100 target students had been identified by their class teachers as having significantly higher rates of disruptive behavior. The age range for the students that participated was 6-12 years of age, with an average age of 7.8 years. The students were in grades K-6.

Table 2

Student Demographic Information

Demographic information	
Total number of target students selected for study	100
Total number of target students per classroom	1–4
Number of male students	77
Number of female students	23
Percentage of students in special education	25%
Percentage of students on free and reduced lunch	64%
Percentage of cultural diversity	
White	52%
African American/Black	30%
Hispanic/Latino	12%
Asian	1%
Unknown	2%

Inclusion criteria. During the initial meeting, teachers nominated target students from their classrooms using a rank ordering form adapted from Walker and Stevenson (1991; See Appendix A). The layout of the original form was modified so that on one side of the rank ordering sheet were the criteria for categorizing a student as an "externalizer", and on the other side, the criteria for categorizing a student as an "internalizer". Unlike the original form, there was only one table to complete on each side. Each sheet provided definitions and examples of what was meant by the terms "externalizer" and "internalizer" to assist the teachers as they determined which of their students met either criteria. The definitions that distinguish externalizers from internalizers can be found in Appendix A. Students targeted for the study were nominated by teachers because they were identified as being at-risk for behavioral problems due to the high frequency of disruptive behavior they displayed in the classroom. Student nominations were recorded on the rank-order sheets (see Appendix A) where the teacher listed two or more students who were at-risk for either an externalizing or an internalizing

behavior problem. Only students who were ranked first or second on the list for externalizing behavior problems were considered for participation as students at-risk for behavioral disorders to target the students most at-risk.

The list of students nominated by their teachers as being at risk for behavioral disorders was further narrowed down using the Problem Behavior Scale cutoff scores (18 for boys and 14 for girls) provided for elementary age students K-6 in the Social Skills Rating Scale (SSRS; Gresham & Elliott, 1990). The SSRS is a norm-referenced rating scale that is used as a screening tool to identify children who have behaviors that may interfere with the development of positive social or interpersonal skills. These problem behaviors may in turn negatively affect teacher-student relationships. The SSRS teacher form consists of three scales; the Social Skills Scale, Problem Behaviors Scale, and Academic Competence Scale. The Problem Behavior Scale was the primary screening tool as it provided the baseline information necessary for the inclusion criteria for target students. The SSRS was completed as a pre- and post-measure for the study.

Each item on the SSRS uses a likert scale (0 = *Never*, 1 = *Sometimes*, 2 = *Very Often)* to describe the frequency of an individual's typical behavior. Raw scores from the forms are transferred to subscale scores, and can be converted into standard scores. Cutoff scores were based on the total Problem Behavior scores that provided a *less than average* to *more than average* range as given in the SSRS manual. To qualify, the total Problem Behavior raw score cutoff was 18 for boys and 14 for girls. This score indicated that the student exhibited more problem behaviors than other peers his or her age. The coinciding standard score (*T* score) was 70 and above for both boys and girls. Consequently, 100 students were selected as target students, and based on the results from the SSRS screener and teacher ranks some teachers had more target students than others. The range of target students per classroom was 1-4.

Exclusion criteria. Boys scoring below 18 and girls scoring below 14 on the SSRS screener were excluded as target students. Any student who was nominated by teachers and was found to have only internalizing behaviors was excluded from the sample as well as there was no way to identify these behaviors by the main data collection method of direct observation. Students whose parents did not return signed consent forms were also excluded from the study in accordance with the research ethics protocol.

Additionally, all 150 students from the comparison classes (both peer models and students identified with behavior problems) were not included since they did not receive the intervention during the data collection phase of the study. Comparison teachers were later offered the option of using the intervention after their role in the study was complete. Teachers nominated in rank order those students who they felt demonstrated consistent, appropriate classroom behavior and they served as peer models. At least two to three peer models per class were nominated by their teachers, but they were not included in the study.

The original sample of target students for the two years of the study was 118, but 18 students data were not included in the study. Fifteen students' data were excluded from the final analysis because their baseline data scores were above 80% which was considered acceptable on-task behavior (Kamps et al., 2011). Three students' data were also excluded because they moved to a different school during the course of the study, resulting in incomplete data collection for them. This made a total of 18 students whose data were not included in the final analyses. Consequently, 100 students identified as having significant behavior problems were selected to participate in the study.

Setting

Across the two years of the study, a total of 50 teachers participated in the CW-FIT experimental group. Each teacher in the study selected a "problem time" of the day for the research team to use for data collection. Teachers selected math, reading, and writing as the main academic times during which they experienced the most problem behaviors from students. Observations and data collection were scheduled during math (n = 24 classrooms), reading (n = 17 classrooms), and writing/spelling (n = 6 classrooms), science (n = 1), and other, e.g., morning work (n = 2 classrooms). Many classes that signed up for writing time were also doing a reading activity at the time of observation. Observations were conducted in an unobtrusive manner. Observers positioned themselves where they could clearly see the student without obstructing the teacher's classroom instruction or the learning of the students. Observers were often in the back or to the side of the class depending on whether the teacher had a classroom arrangement of table clusters, rows of desks, or carpet squares.

Measures

Multi-Option Observation System for Experimental Studies (MOOSES). The data system commonly known as MOOSES was originally developed by John Tapp at Vanderbilt University (Tapp, Wehby, & Ellis, 1995). This system was used to collect observation data during this research project. It allowed the researchers to define their observation codes and to collect and analyze real time data in the designated classrooms. Frequency and duration data were collected by trained observers using handheld devices with MOOSES software installed on them (miniMOOSES). For the duration of the study both teacher and student behavior was

recorded in real time using frequency counts that were collected during a 15-min observation (Tapp et al., 1995).

At the beginning of the study, researchers devised codes and definitions for the behaviors to be observed during data collection. Each code was specific to a behavior that was associated with the student, the teacher, or the classroom activity. Once the codes were established, they were programmed into personal digital assistants (PDAs). The PDAs were used for data collection during each individual student observation. The specific codes and behavioral definitions referred to for the current study's observations are in Appendix B.

Inter-rater reliability of the accuracy attained in coding observations was established by having two observers conduct a MOOSES observation at the same time with one of the observers being the lead or primary observer. Tallies from the reliability observer were compared to the lead observer's tallies for agreement. To train observers to synchronize coding of behavior during observations, the lead observer would do a countdown to make sure both observers started their miniMOOSES at the exact same time. The difference between their tallies of the same event had to be less than 3s for it to count as an agreement; that is, they had to code the same behavior within a 3-s window. The MOOSES program software was used to calculate inter-rater reliability estimate for 20% of the total number of observations. The number of agreements was divided by the total number of agreements and disagreements, which was multiplied by 100 to determine the percentage of agreement during the observation. The cutoff for reliability was coding that had 80% agreement between the two observers. Retraining was done until the observer achieved 80% agreement.

Excel spreadsheet. The raw data from MOOSES was in a format where each behavior was coded the second that it happened. To use CSA, the raw data needed to be in a partial

interval recording format. Each 900-s observation period was thus divided into 10-s intervals. Microsoft Excel was used to break down each observation file into the partial interval format, and to sort each code into the appropriate interval. For example, if the teacher delivered a reprimand at 63s according to MOOSES, then a reprimand would be coded as occurring during the 10-s interval between 60s and 69s. To fill in the contingency tables, it was necessary to determine when specific behaviors and consequences occurred in the same intervals. For example, if a disruptive behavior occurred in the 60 to 69-s interval, and a reprimand occurred after the disruptive behavior during the same interval, then these two events were coded as occurring together. If disruptive behavior occurred in the 60 to 69-s interval and no reprimand occurred during the same interval, then the event was coded as disruptive behavior occurring without a reprimand. All the different combinations of behaviors (i.e., disruptive and on-task behavior) and consequences (i.e., reprimands and praise) were coded to fill in all cells of the contingency tables.

Variables

Data were collected on four variables during observations. Two to three observations were conducted on each student during baseline and at least four observations during the intervention. Once a baseline had been established, arrangements were made to prepare the teacher for the intervention; it took two to three observations to establish a baseline. Four to five data points during baseline are recommended to establish if there is an effect. Teacher behavior observations occurred at the same time as student observations.

Table 3

Variables Considered During Data Collection

Type of Data Collected	Variables
Verbal disruptives to peers	Student disruptives
Verbal disruptives to adults	
Motor/physical disruptives	
Negative verbal disruptives	
On-task	Student on-task behavior
Teacher praise	Teacher praises
Teacher reprimands	Teacher reprimands

The dependent variables chosen for this study were student disruptive behavior, student on-task behavior, teacher reprimands, and teacher praise. Disruptive behavior and on-task behavior displayed by students, and reprimands and praise towards individual students or groups of students were recorded on a frequency basis during each 15-min or 900-s observation. For the purpose of data analyses, each 15-min observation was overlaid with a partial-interval recording system. There were ninety 10-s intervals used per observation. A detailed inspection of the data found that longer intervals would not produce clearer results. Frequency recordings were conducted for disruptive and on-task behavior. On-task behavior was also recorded as duration data. Each student received at least four 15-min observations, though many students had more than four observations. Therefore, to establish uniformity in the number of observations analyzed for each student, an aggregate of two baseline observations, and an aggregate of three CW-FIT observations were analyzed per student. Table 3 outlines all the specific variables that were considered during the baseline and intervention phases.

Disruptive behavior was represented by verbal and motor/physical variables. Verbal disruptives included disruptives directed to peers, disruptives directed to adults and negative disruptives. Verbal disruptive behavior to peers or to adults was a code that represented verbal

statements that were inappropriate for the situation. Examples of verbal disruptive behavior included (a) chatting to peers during work time if it was not task related, (b) talking when not called upon to do so, (c) teasing laughter meant to humiliate a peer, and (d) yelling at the teacher in trying to be heard over the rest of the class. This code was applied more than once to represent two or more separate occurrences if at least 3s had passed between the end of one incident and the beginning of the next, or if another student responded to separate the event. This code was applied in conjunction with an off-task code to distinguish it from students' on-task behavior.

Negative verbal disruptive behavior was a code that represented verbal statements towards peers or adults that were argumentative, taunting, name-calling, put downs, and/or provocative in nature. Tone and volume of voice was considered an indicator of a negative verbal statement, but had to include content as described to be counted. This code also included laughing at a peer when in trouble. The same 3-s rule was applied here to separate each occurrence.

Motor/physical disruptive behavior was a code that represented a general category of inappropriate behaviors including the inappropriate use of any materials. Examples of motor/physical disruptives included (a) tapping a pencil on the desk, (b) rocking in the chair, (c) throwing papers or objects on the floor or toward a peer, and (d) drumming or banging on the table. A physical disruptive was coded as one occurrence unless the topography (what the behavior looked like) changed or the behavior ceased for 5s or longer.

On-task behavior involved students appropriately working on the assigned/approved activity. Examples of on-task behavior included (a) attending to the material and the task, (b) making appropriate motor responses (e.g., writing, following rules of a game, looking at the teacher or student speaking), (c) asking for assistance (where appropriate) in an acceptable

manner (e.g., raising hand), and (d) waiting appropriately for the teacher to begin or continue with instruction (e.g., staying quiet and staying in one's seat). If the student displayed verbal and motor/physical disruptive behavior for three or more consecutive seconds, they were no longer considered to be displaying on-task behavior and the on-task code was switched off at that point.

Teacher praise was one of two teacher consequences coded during each 15-min observation. Individual praise statements were those directed to the target student only, while group praise statements were directed to any group of students of which the target student was a part. Verbal statements (e.g., "Give yourselves a high five"), physical gestures (e.g., hugs, pats) or tangibles (e.g., tokens, points) that indicated approval of behavior over and above simple acknowledgement of a correct response to a question were tallied. Tone of voice was also indicative of praise provided that the content could be clearly heard. Long and detailed praise statements counted as one episode, unless at least 3-s passed between the end of one statement and the beginning of the next, or the content changed.

Teacher reprimands were the second of the two teacher consequences coded during the observations. Teacher statements were coded as reprimands as long as they were intended to correct behavior as it was occurring or after it had occurred. Group reprimands included those directed to groups of students of which the target student was a part. Verbal comments such as scolding or negative statements about behavior with the intent to stop the student from misbehaving were considered to be reprimands. Verbal content had to be clearly distinguished from an instructional directive. Gestures used with the same intent as verbal comments were also considered to be reprimands. Threats were also counted as reprimands along with statements of negative consequences by the teacher. A reprimand code was assigned at the end of the first

reprimand statement, and reprimands were coded separately if at least 3-s passed between the end of one reprimand and the beginning of the next.

Intervention Program

The CW-FIT is a class-wide, multi-tiered, group contingency behavior intervention designed to teach students appropriate behavior and reinforce the use of these behaviors through a game format. The multi-tiered component of CW-FIT implementation allows the intervention to be used at a class-wide (Tier 1), small group (Tier 2), and/or individualized (Tier 3) level. Movement through each tier is dependent on the student's level of response to intervention (Wills et al., 2010). For the purposes of this study, the focus shall be on the class-wide, or Tier 1, level of intervention.

The CW-FIT intervention included a teaching component where behavioral skills were broken down into a task analysis, the steps were written on posters, and the behaviors were explicitly taught to students at the beginning of the instructional lesson designated for data collection and observation. One fundamental CW-FIT component that separated the experimental classrooms from the comparison classrooms was the use of the skill posters to represent classroom rules. Each behavior skill was previewed before the teacher started to teach the academic lesson so that the students were reminded of the behavioral expectations (Wills et al., 2010). Three main behavioral skills were taught during training: (a) following directions the first time, (b) how to get the teacher's attention, and (c) ignoring inappropriate behavior. Teachers were provided with the option to pick one or two additional skill(s) according to their classroom needs.

In order for the students to learn the behavioral skills being taught to them it was important to set a goal for them to work towards. The behavioral effects of setting specific and

sufficiently challenging goals increase the potential for improved task performance (Locke, Shaw, Saari, & Latham, 1981). Goal setting was an important component of CW-FIT because it provided the students with a target to work towards. Before the class participated in playing the CW-FIT game, a goal was set for the entirety of "CW-FIT playing time." The goal had to be attainable within the designated time period of play. For example, if the class played the game for 45-min, the total number of points the teams worked towards had to be attainable within those 45-min. The decreased frequency of inappropriate behavior was encouraged by strengthening the occurrence of appropriate behavior through reinforcement (i.e., use of a point system and prizes). Points were earned during game play as reinforcement for appropriate behavior and earning reinforcement was based on a group contingency. In other words, students worked in groups, clusters, or rows and all the students in the group had to display the desired behaviors in order to earn the required points.

Procedure

CW-FIT team training. In preparation for the implementation of CW-FIT in the school buildings, the research team, which included graduate research assistants and behavior coaches, went through a mandatory, two-day summer training on the components of CW-FIT. Behavior coaches were district-hired employees with salaries paid by a subcontract from the University of Kansas. Each school that participated in the study was assigned a 40% – 50% full-time equivalent (FTE) coach. A head coach was also hired under the same subcontract to oversee and supervise all the behavior coaches, as well as advocate for them at the university office for supplies.

On the morning of the first day of training, all the CW-FIT team members received an information packet that included PowerPoint slides with all the information about the history,

research, and implementation of the CW-FIT game, MOOSES code definitions, handheld observation tool (miniMOOSE), a timer, reinforcer menu samples, sample skill posters, goal sheets, and the scripts that were used to introduce each behavioral skill when in the classroom. The principal investigator then presented a descriptive overview of how to play the CW-FIT game, the research evidence behind CW-FIT, and previous results from the use of CW-FIT within other classrooms in previous years. After the presentation, questions were fielded, and then everybody practiced teaching a skill in small groups; one person played the role of the teacher and the rest acted as the students, with one pretending to be the disruptive student. During the entire training day, the project coordinator went around passing out tickets to anyone who was listening attentively or actively participating in the training. These tickets were later exchanged for a prize from the prize bucket.

During the afternoon session of the training day, the research assistants and behavior coaches were taught how to use the MOOSES observation tool by the project coordinator. They watched a pre-recorded video of a class session and chose a target student whose behavior they observed and coded according to the prescribed MOOSES code definitions. The research assistants and behavior coaches were the primary data collectors. They therefore practiced how to count out the 3s that separated on-task behavior and disruptive behavior, or consecutive episodes of disruptive behavior. The trainees also learned how to start and stop the miniMOOSE timer so that the observations ran for 15-min at a time. They also learned how to code teacher reprimand and praise. The project coordinator provided guidance with coding by calling out what codes matched the observable behavior on the video. The trainees practiced conducting observations at least three to four times so that they would become familiar with using the observation codes and tools before starting in the classrooms. Trainees were informed that their

reliability training would occur in an actual classroom as soon as schools were back in session, and the project coordinator would work to have each observer at 80% interrater reliability. This would entail coding the exact same behavior code within a 3-s window.

During the second day of training, the focus was on learning how to introduce the CW-FIT game to the class, and also to support the teachers as they introduced subsequent skills to their classes. The trainees watched a video of a teacher playing the CW-FIT game and then brief video clips highlighting each of the game components, e.g., how to introduce a behavioral skill to the class, how to give precorrects, how to give praise, how to use the timer, and how to tally the points. The trainees followed along on the scripts from their information packet. A sample of the scripts is available in Appendix C. Trainees were also provided with opportunities to role play various scenarios possible during "game" time. Behavior coaches were taught to provide both positive and corrective feedback to the participating teachers about their progress throughout the implementation of the intervention. Feedback was provided through verbal and written reports of MOOSES data to the teachers, and additional modeling or coaching as needed.

Baseline. During baseline, teachers conducted their lessons and interacted with the students as they would on any given day. The difference was that the class was divided into groups or teams that the students would remain in for the duration of the study. Each team was composed of five to seven members. Not every team had a target student as there were only one to four targets per classroom. These "game" teams could be demarcated by the class rows, table clusters, or circle area markers so that anyone who observed the class could tell one team from another. Teachers informed their classes that they would be sitting in groups and identified which students were in those teams. Teachers used various methods to demarcate the teams, including color coding (e.g., Yellow group, Green group), numbers (e.g., Group 1, Group 2), or

by characters or animals (e.g., Lions, Tigers, Superstars, Troopers). The team names were placed on the tables, hung from the rafters above the team's desks, or verbally explained to observers.

Training. The participating teachers received a mandatory, two-hour training from the research team on how to implement the CW-FIT game in their classrooms. In the first hour of training, the researchers presented a brief, descriptive overview of how to play the CW-FIT game, the research evidence behind CW-FIT, and previous results from the use of CW-FIT within other classrooms in previous years. Behavior coaches were introduced to the teachers because they would serve as CW-FIT trainers and support staff within the buildings. The participating teachers were also provided with all of the CW-FIT materials they needed. The materials included poster mounting tape, a dry erase marker to tally points on the point chart, weekly goal sheets to keep track of the daily goals and team point totals, a timer to be used as an interval prompt, sample reinforcer menus, a sample of tangible reinforcers (e.g., stickers, pencils, erasers), contact information for the graduate research assistants and behavior coaches assigned to their buildings, skill posters, and a dry-erase point chart. Every teacher received the same three skill posters: (a) Follow Directions the First Time; (b) How to Get the Teacher's Attention; and (c) Ignoring Inappropriate Behavior. Teachers could choose one or two additional skills to work on (e.g., Staying in Your Seats, Talking with a Quiet Voice) if addressing these behaviors would be beneficial for students in their classroom. During the two hours of training by project staff and coaches in the CW-FIT procedures, teachers were trained on how to implement the intervention.

Training followed manualized procedures and included each of the intervention components: (a) skill teaching, demonstration, and practice using the scripts; (b) introduction to the "game", teams, points, setting goals, rewards; (c) practice giving specific praise and points for targeted skills; (d) practice using the timer and point delivery together; (e) creation of a

reinforcer menu; and (f) troubleshooting through potential problems and solutions using the intervention. Brief video clips from teachers who had used the CW-FIT intervention in the past were shown to the participating teachers. The teachers were also informed that the behavior coaches would provide both positive and corrective feedback about the teachers' progress periodically throughout the implementation of the intervention. Feedback was provided through the fidelity checklist, verbal and written reports of MOOSES data to the teachers, and additional modeling or coaching as needed. The teachers were trained on how to provide praise to the students, but the teachers' choice to use of reprimands was not nullified. The goal was to increase the use of praise and reduce disruptive behavior, and the anticipated result was a subsequent reduction in use of reprimands.

Teachers prioritized the skills they introduced first based on the most pressing behavioral needs in the classroom. Once all of the skills had been introduced to the class, usually within three to five days, subsequent sessions of the CW-FIT game were preceded by brief reminders of behavioral expectations, rather than a full explanation and modeling. The brief prompts given to the students about what behavioral skills they needed to display during CW-FIT time were called precorrects. During the training session, the researchers also role-played various scenarios that were to be expected during the game and described how they and the behavior coaches would assist the teachers in implementing the intervention in their classrooms. One example of the possible scenarios included when a student in a group tries to sabotage the group's attempt to earn their reward by continually being disruptive. The response was that the teacher had the option of making that student his or her own group. At the end of the training the teachers signed up with their respective building behavior coach to set up times when the coach or project staff member could come into their classroom to help teach the game.

Intervention. The CW-FIT intervention is designed to address classroom behaviors in order to decrease disruptive behavior and increase prosocial classroom behavior. The CW-FIT intervention consists of a package including clearly stated behavioral expectations for classroom conduct, goal setting, and group reinforcement. Behavior expectations were provided on posters and the teacher awarded points - one point at a time - to each team/group of students in her class when they followed these behavioral expectations. These points were earned towards a predetermined team/group goal. Each team/group that earned its goal received a reward. Each behavior skill (i.e., behavioral expectation) was displayed on a 28 cm by 43 cm poster hung in a conspicuous location within the classroom. The posters consisted of a title specifying the behavioral skill (e.g., Staying in Your Seats) followed by a task analysis indicating the sub-components/behaviors. As stated previously, teachers were required to address a minimum of three behavioral skills, but could address one or two additional skills as desired. Thus, classrooms had up to five posters.

The teacher described the task analysis for each behavioral skill using scripts provided by the research team and had students verbally repeat each step out loud. The teacher also modeled examples of the skills, for example, how to get the teacher's attention appropriately (e.g., raising one's hand) and inappropriately (e.g., shouting out). Next, the teacher set a point goal with students and determined the reinforcer. The point goal was set up so that the groups all had equal opportunity to meet their goal within the CW-FIT 'game' time. Thus, the timer had to go off for at least 75%–80% of the timer intervals so that points could be awarded often enough for groups to meet their goal (e.g., if the goal equaled 20, the number of timer beeps equaled 15 or 16). These points were tallied on an erasable point chart that was divided into six columns with each column representing a team. Classes were limited to forming six teams or less because the

research team determined that it would be more difficult for teacher to accurately and efficiently evaluate more than six teams.

The research team provided sample reinforcer menus to the teachers. The reinforcers on the list ranged from pencils and erasers to dance parties and special seat opportunities. The teachers did not have to use the sample reinforcer list but it gave them some preliminary ideas to brainstorm with their classes; each teacher ultimately determined his or her final reinforcer list with the class. The reinforcers used during the CW-FIT "game" were selected from a list of reinforcers. The teacher helped the class choose from their reward menu. Students ranked the most popular reinforcers on the list to create the class menu.

At the start of the CW-FIT "game", teachers set a timer between one and three minutes (Wills et al., 2010) and began the daily academic lesson. The timer duration of one to three minutes was determined by the research team as the most reasonable schedule for reinforcement to provide opportunities for teams to score points during 75%–80% of the timer intervals during which the game is played that day. This shorter timer duration also helped to keep teams interested in the "game" as the timer beep associated with reinforcement goes off more frequently. When the timer beeped, teachers scanned the room, observed each separate team/group, and provided feedback to students. The feedback consisted of either (a) behavior-specific praise (e.g., "Nice job Ann, raising your hand to give your answer,") and one point per team was awarded to the teams containing students who displayed appropriate target behaviors upon hearing the timer beep, or (b) a reminder of the poster skill behaviors required to earn points and praise for those behaviors as they were displayed. After tallying awarded points, teachers reset the timer and continued the lesson. Feedback provided at the end of each interval typically lasted between 10-15s; however, teachers were able to deliver praise and reprimands

throughout the observation period/lesson to individual target and peer students or to groups/teams.

Research Design

The current study used a descriptive approach of a subcomponent of a larger randomized control study to evaluate the effects of the CW-FIT intervention on teacher use of praise/reprimands and target student behavior (disruption/on-task behavior). There was an AB design followed in this research. A two phase, quasi-experimental design comprising a no-intervention baseline phase (A) and an intervention phase (B). The existence of a no-intervention baseline allowed for the evaluation of any possible changes in student disruptive and on-task behavior, and in the use of teacher praise and reprimand in relation to these student behaviors during the CW-FIT intervention.

Data Analysis

The data analyses used to answer the research questions were conditional probabilities with an emphasis on contingency space analysis (CSA). Approximately 100 conditional probabilities of teacher reprimands or praise given student disruption or on-task behavior were calculated for each of the eight conditions (i.e., four conditional probabilities within the baseline and CW-FIT phases) referenced in the research questions. The mean, median, mode, minimum, maximum, and ranges of these data were also calculated to depict the frequencies of the conditional probabilities for baseline and CW-FIT phases, respectively. CSA was then was used to plot the conditional probabilities.

Conditional probabilities were also used as a screener for treatment integrity. An expected schedule of praise that teachers used given on-task behavior was calculated. A timer was set to go off anywhere between 1-3min to prompt the teachers to use praise given on-task

behavior. From that information a range of expected conditional probabilities that the teacher would use praise given on-task behavior was determined. If the timer went off every three minutes, it would go off once every eighteen 10s intervals The minimum expected conditional probability value was calculated by dividing 1 by 18 or an expected conditional probability of .06. If the timer went off once every minute, it would go off once every six 10s intervals. The maximum expected conditional probability was calculated by dividing 1 by 6, or an expected conditional probability of .17. Given their training and that the students were on-task, the range of expected conditional probabilities that teachers used praise given on-task behavior were expected to fall between .06 and .17. Such a range was used to estimate how well the teachers implemented the intervention.

In considering these data analyses, a look at the definition of conditional probabilities was fundamental. The probability of an event is the relative frequency at which it occurs when the identical situation is repeated a large number of times. General conditional probability represents the chance that given event A, event B is likely to occur (Watson, 1997). Conditional probabilities may be applied to investigate how different treatments or exposures influence the probability that teacher reprimands and praise are likely to be preceded by student disruptive and on-task behaviors, respectively (Gottman & Roy, 1990). In the formula below, A represents student behavior and B represents teacher behavior.

$$P(B|A) = P(A \text{ and } B) / P(A)$$

The relationship between teacher attention in the form of praise and reprimands and student disruptive and on-task behaviors was analyzed using CSA. The computation of CSA was based on observation data overlaid by partial interval recording using 10-s intervals. The data layout for a CSA depicted the conditional probabilities of teacher reprimands and praise given

student disruptive and on-task behavior. These conditional probabilities were presented in quadrants in a 2 x 2 matrix. Quadrant A represented the probability of a consequence (i.e., reprimand or praise) given the occurrence of disruptive behavior. In quadrant B, the consequence (i.e., reprimand or praise) was preceded by on-task behavior. Quadrant C depicted a situation in which neither consequence (i.e., reprimand or praise) followed disruptive behavior. Finally, quadrant D represented a situation in which on-task behavior was not followed by either consequence (i.e., reprimands or praise).

The currently proposed model of contingency space analysis (CSA) as presented by Eckert, Martens, and DiGennaro (2005), and Martens, DiGennaro, Reed, Szczech, and Rosenthal (2008) was used. With contingency space analysis, the goal is to calculate a conditional probability of the occurrence of a consequence given a particular target behavior, and the occurrence of a consequence given the absence of that behavior. Through a CSA, a comparison can be made regarding the conditional probability of teacher attention following student disruptive and on-task behavior. The CSA listed teacher attention on each axis with the data points specifying the form of attention.

To better understand CSA an example is provided containing hypothetical data. Suppose a researcher was interested in determining the teacher behavior that maintains student disruption, defined as any instance where the student is out of his seat or moving around the classroom, talking out of turn either to peers or adults without prior permission, or throwing materials in class. To conduct a CSA, a researcher would need to record instances of student disruption and a mutually exclusive behavior, such as on-task behavior. In addition, collecting data on the teacher behaviors that follow disruption and on-task behavior, such as praise or reprimands, would also be necessary. One matrix would depict the four possible events in this scenario during baseline

while another would depict the same events during a hypothetical CW-FIT intervention (Martens et al., 2008).

To calculate the conditional probability for teacher reprimands given student disruptive behavior, the values across the first row of cells in each 2 x 2 matrix were totaled to obtain the sum of behavioral occurrences (e.g., disruptive behavior given occurrence of reprimands plus disruptive behavior given occurrence of no reprimands). Next, the value in quadrant A in the reprimands matrix depicting the presence of both a behavior and a consequence (e.g., student disruptive behavior and teacher reprimand) was identified. Finally, the sum of row values was divided by the value in quadrant A. Quadrant A represented the value for teacher reprimands given disruptive behavior and it was divided by the total number of disruptive behavior occurrences.

Data from the baseline and CW-FIT conditions were used to calculate conditional probabilities for each of the teacher attention and student behavior scenarios. The conditional probability formula was (*B and C*) / *B* (where B was student behavior and C was consequence). These probabilities were subsequently used in CSA. The resulting conditional probabilities provided a quantifiable way to analyze the relationship between teacher consequences and student behavior. To clarify the link between the data matrices and the conditional probability data used in the CSA, student disruptive behavior and teacher reprimands were considered.

Figures 1 and 2 depict the operant contingency space where the results of the conditional probability calculations were plotted. The coordinates for the *y*-axis represented the conditional probability reprimands or praise followed disruptive behavior, and the coordinates for the *x*-axis represented the conditional probability that reprimands or praise followed on-task behavior. The diagonal that cuts through the graph is known as the unity diagonal. Data points that represent a

consequence which is just as likely to occur given the occurrence or nonoccurrence of the target behavior fall on the unity diagonal. In other words, the consequence occurs independent of the behaviors being displayed (Martens et al., 2008).

The closed data points in Figures 1 and 2 represent the conditional probability of teacher reprimands given the occurrence of student disruptive behavior and on-task behavior. The cross data points represented the conditional probability of teacher praise given student disruptive behavior and on-task behavior. Figure 1 depicts baseline CSA data which suggests that reprimands were contingent on student disruptive behavior (i.e., the closed data point is above the unity diagonal) and were delivered on a richer schedule for disruption (0.95) than on-task behavior (0.33). Unfortunately, reprimands were delivered more often than desired for on-task behavior (33% of opportunities). These data also suggested that, despite praise being delivered on a richer schedule for on-task behavior (0.25) than disruption (0.06), the probability of praise given on-task behavior remains lower than desired. Figure 2 depicts a CSA during CW-FIT and shows a change in the conditional probabilities of reprimands and praise. The conditional probability of reprimands given on-task behavior (0.02) decreased during CW-FIT compared to baseline (0.33), which is a desired change. The conditional probability of reprimands given disruptive behavior, however, remained high (0.91), which is undesired. The conditional probability of praise given on-task behavior was high during CW-FIT (0.94), which was an improvement over the baseline probability (0.25). The conditional probability of praise given student disruption remained low during CW-FIT (0.05). It might be concluded that the CW-FIT was successful in that reprimands were no longer used given on-task behavior (2% of the opportunities) and praise was used often given on-task behavior (94% of opportunities). These were positive changes. Unfortunately in this hypothetical example, however, the intervention

was not successful in reducing the reprimands used given disruptive behavior (91% of opportunities). The CSA clearly shows that there is a very high probability of a teacher reprimand given disruptive behavior, but virtually no probability of a teacher reprimand given on-task behavior after the CW-FIT.

The hypothetical data plotted in Figures 1 (baseline) and 2 (CW-FIT) contain two data points for a single student for one observation. In the present study, data for multiple students will be presented within the CSA plot possibly producing a cluster of data points if the consequences experienced by students are similar. It is hypothesized that, during baseline, the conditional probabilities of reprimands given disruptive behavior will be high and fall above the unity diagonal and the conditional probabilities of praise given on-task behavior will be near zero and fall below the unity diagonal or near the origin. It is also hypothesized that the conditional probabilities will change during intervention. With the implementation of CW-FIT, it is the author's hypothesis that the probability of teacher reprimands given disruptive behavior should decrease (remain above the unity diagonal, but fall closer to zero), and the probability of teacher praise given on-task behavior should increase (below the unity diagonal and fall closer to one).

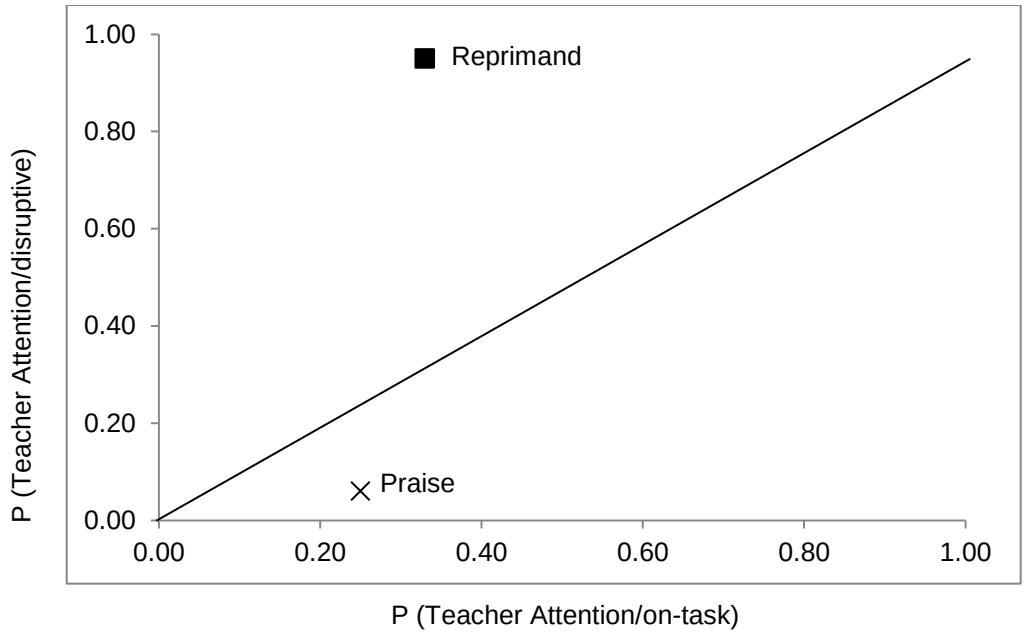

Figure 1. A sample contingency space analysis during baseline of the conditional probability of teacher reprimands or praise following student disruption and/or on-task behavior.

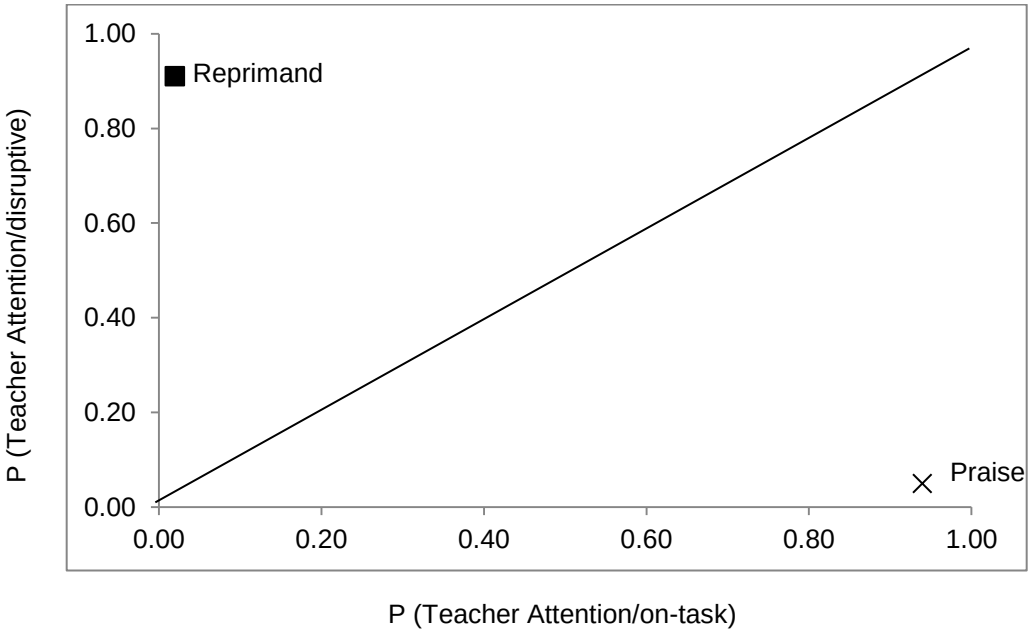

Figure 2. A sample contingency space analysis during CW-FIT of the conditional probability of teacher reprimands or praise following student on-task and disruptive behavior.

Chapter IV

Results

Data Screening

One assumption required for the calculation of conditional probabilities is that A occurs given event B. In other words, to calculate conditional probabilities, the denominator, which is event B, has to be greater than zero. Within the data set, 12 conditional probabilities regarding reprimands or praise following disruptive behavior could not be calculated because no disruptive behavior was observed or recorded in these instances. Two conditional probabilities could not be calculated using data collected during the baseline phase and 10 could not be calculated using data collected during the CW-FIT phase. All 12 conditional probabilities involved reprimands or praise following disruptive behavior. Because conditional probabilities for these 12 cases could not be calculated, they were excluded from the analyses.

Summary Statistics for the Calculated Conditional Probabilities

As earlier mentioned, approximately 100 conditional probabilities of teacher reprimands or praise given student disruption or on-task behavior were calculated for each of the eight conditions (i.e., four conditional probabilities within the baseline and CW-FIT phases) referenced in the research questions. The results were presented using histograms, box plots, and bar graphs, respectively.

The conditional probabilities depicted the schedule of obtained consequences (possibly reinforcement or punishment) observed in the study. To help with defining the practical utility of these schedules, Hammond's (1980) proposed descriptions for three levels of a reinforcement

schedule were used in this study. When interpreting conditional probabilities using these guidelines (a) 1.0 was considered very high (i.e., very dense), (b) .20 was considered high (i.e., dense), and (c) .05 was considered moderate. Although the original study was conducted with rats, the results can be extrapolated to human beings to the extent that they reveal the association between a behavior (i.e., student disruption or on-task behavior) and its consequence (i.e., teacher reprimands or praise). Further, for this study, conditional probabilities ranging from .01 to .04 were considered "lean" (i.e., weak) and greater than .50 were considered very dense. Details of these analyses as they relate to each research question are provided in the paragraphs that follow.

1. **What are the conditional probabilities of (a) teacher reprimands given student disruption, (b) teacher reprimands given on-task behavior, (c) teacher praise given student disruption, and (d) teacher praise given on-task behavior during the baseline phase?**
    a. **What are the conditional probabilities of teacher reprimands given student disruption during the baseline phase?** Ninety-nine conditional probabilities of teacher reprimands given student disruption were calculated. The conditional probabilities ranged from 0 to .33 (*SD* = .07). The mean of these conditional probabilities was .06 (*Mdn* = .03). The mode was 0, with 43% of the conditional probabilities equaling 0. A conditional probability of 0 indicates that student disruption does not appear to be associated with teacher reprimands. The mode is clearly shown by the histogram in the upper left hand side of Figure 3 (i.e., RepDisrBaseline), with a high number of 0s clustered at the zero point in the histogram.

Eight percent of the conditional probabilities ranged from .20 to .33, meaning that for these cases, during baseline, reprimands were used on a dense schedule given disruptive behavior. Thirty-six percent of the conditional probabilities ranged from .05 to .19, indicating a moderate schedule. Thirteen percent of the conditional probabilities ranged from .02 and .04 indicating that use of reprimands for these cases was used on a lean schedule given student disruption.

b. **What are the conditional probabilities of teacher reprimands given on-task behavior during the baseline phase?** One-hundred conditional probabilities of teacher reprimands given student on-task behavior were calculated. The conditional probabilities ranged from 0 to .15 (*SD* = .03). The mean of these conditional probabilities was .04 (*Mdn* = .03). The mode was .01, with 20% of the probabilities equaling .01. Nine conditional probabilities were zero in this condition, indicating that the student on-task behavior was not associated with teacher reprimands in nine percent of the cases.

As shown in the histogram in the lower left hand side of Figure 3 (i.e., RepOnTaskBaseline), all of the conditional probabilities were less than .20 (i.e., none was considered a strong schedule). Thirty-two conditional probabilities ranged from .05 to .15, indicating that for 32% of these cases, reprimands were used on a moderate schedule. In most cases, reprimands were used on a lean schedule given on-task behavior with 68% of conditional probabilities ranging from .01 to .04.

c. **What are the conditional probabilities of teacher praise given student disruption during the baseline phase?** Ninety-nine conditional probabilities of teacher praise given student disruption were calculated. The conditional probabilities ranged from 0 to

.13 (*SD* = .02). The mean of these conditional probabilities was .01 (*Mdn* = 0). The mode was 0, with 84% of the conditional probabilities equaling 0. As shown on the histogram in the upper right hand side of Figure 3 (i.e., PrDisrBaseline), the majority of the data points were at the origin. In other words, praise was not used at all by teachers in 84% of the cases given student disruption.

Of the 16% of the conditional probabilities that were not 0, 6% of the conditional probabilities ranged from .05 to .13, indicating that praise was used on a moderate schedule given student disruption. The remaining 10% ranged from .01 to .04 indicating that praise for these cases was used on a lean schedule given student disruption.

d. **What are the conditional probabilities of teacher praise given on-task behavior during the baseline phase?** One-hundred conditional probabilities of teacher praise given student on-task behavior were calculated. The conditional probabilities ranged from 0 to .05 (*SD* = .01). The mean of these probabilities was .01 (*Mdn* = .01). The mode was .01, with 44% of the conditional probabilities equaling .01, which is depicted in the histogram in the lower right corner of Figure 3 (i.e., PrOnTaskBaseline).

Thirty-six percent of the conditional probabilities equaled 0. There were two conditional probabilities with a value of .05, meaning that for 2% of the cases, praise was used on a moderate schedule given on-task behavior. There were 62 conditional probabilities ranging from .01 to .04, meaning that for 62% of the cases, praise was used on a lean schedule given on-task behavior.

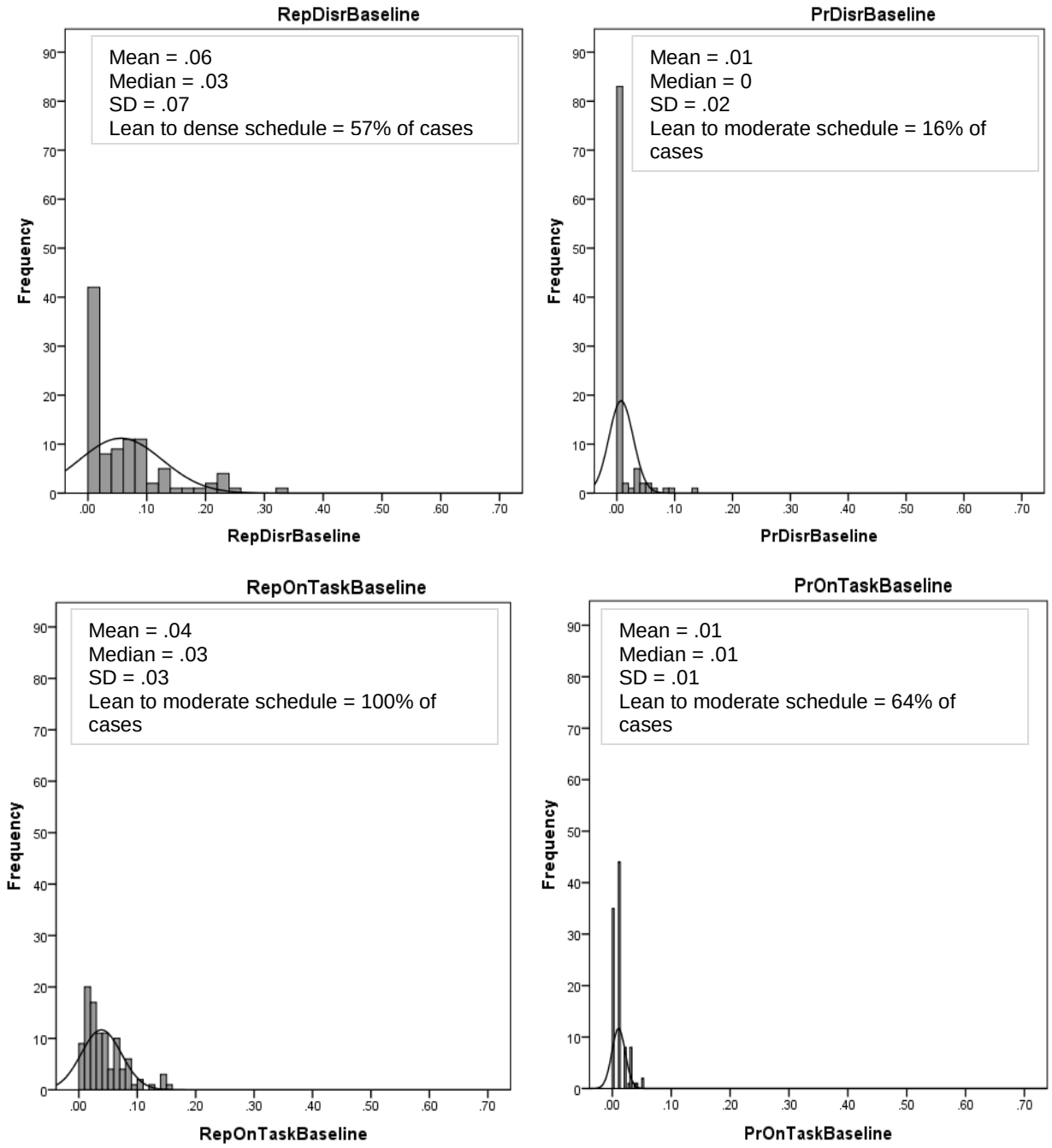

Figure 3. Histograms representing the frequency of the obtained conditional probabilities during baseline. RepDisrBaseline = Reprimands given disruptions during baseline; PrDisrBaseline = Praise given disruptions during baseline; RepOnTaskBaseline = Reprimands given on-task behavior during baseline; PrOnTaskBaseline = Praise given on-task behavior during baseline.

To summarize the analyses of the four conditions represented by the histograms during baseline, the conditional probabilities that reprimands followed disruptive behavior had the highest mean and median and the largest range of scores. In other words, compared to all possible conditional probabilities analyzed in the baseline phase, the conditional probabilities that reprimands followed disruptive behavior were, on average, the highest. The schedule for the non-zero conditional probabilities ranged from lean to dense; a lean schedule was observed in 13% of cases, a moderate schedule was observed in 36% of cases, and a dense schedule was observed in 8% of cases.

The mean, median, and mode of the conditional probability that praise followed on-task behavior all equaled .01 indicating that on average, praise was used on a very lean schedule given on-task behavior. The histogram in the lower right panel of Figure 3 depicts a symmetric or normal distribution of the conditional probabilities (i.e., schedules) for the participating students with the mean, mode, and median passing through the middle of the normal curve. The schedule for the non-zero conditional probabilities ranged from lean to moderate; a lean schedule was observed in 62% of cases, and a moderate schedule was observed in only 2% of cases. A dense schedule was not observed for any of the cases.

2. **What are the conditional probabilities of (a) teacher reprimands given student disruption, (b) teacher reprimands given on-task behavior, (c) teacher praise given student disruption, and (d) teacher praise given on-task behavior during the CW-FIT phase?**
    a. **What are the conditional probabilities of teacher reprimands given student disruption during the CW-FIT phase?** Ninety-five conditional probabilities of

teacher reprimands given student disruption were calculated. The conditional probabilities ranged from 0 to .67 (*SD* = .08). The mean of these conditional probabilities was .03 (*Mdn* = 0). The mode was 0, with 76% of the conditional probabilities equaling 0. The conditional probabilities ranged from 0 to .67.

Two of the conditional probabilities, .27 and .67 were considered large, indicating that in less than 1% of cases, reprimands were used on a dense to very dense schedule given student disruption. The conditional probability of .67 was considered an outlier. As shown on the histogram in the upper left hand side of Figure 4 (i.e., RepDisrCWFIT), it was the only conditional probability greater than .27. This outlier was unique because it was the highest conditional probability recorded in the study. Fourteen percent of the conditional probabilities ranged from .05 to .17, indicating that in these cases, reprimands were used on a moderate schedule. There were seven conditional probabilities that ranged from .02 to .04, indicating that in less than 1% of these cases, reprimands were used on a lean schedule.

b. **What are the conditional probabilities of teacher reprimands given student on-task behavior during the CW-FIT phase?** One-hundred conditional probabilities of teacher reprimands given student on-task behavior were calculated. The conditional probabilities ranged from 0 to .13 (*SD* = .02). The mean of these conditional probabilities was .02 (*Mdn* = .01). The mode was 0, with 37% of the conditional probabilities equaling 0. As shown on the histogram in the lower left hand side of Figure 4 (i.e., RepOnTaskCWFIT), most of the conditional probabilities that reprimands followed on-task behavior were below .10.

Of the non-zero conditional probabilities, 13% ranged from .05 to .13, indicating that reprimands were used on a moderate schedule given on-task behavior. There were 50 conditional probabilities that ranged from.01 to .04, indicating that for 50% of the cases, reprimands were used on a lean schedule given on-task behavior.

c. **What are the conditional probabilities of teacher praise given student disruption during the CW-FIT phase?** Ninety-five conditional probabilities of teacher praise given student disruption were calculated. The conditional probabilities ranged from 0 to .33 (*SD* = .06). The mean of the conditional probabilities was .03 (*Mdn* = 0). The mode was 0, with 72% of the conditional probabilities equaling 0. The mode is visible on the histogram in the upper right corner of Figure 4 (i.e., PrDisrCWFIT).

Four of the non-zero conditional probabilities ranged from .20 to .33, indicating that for 4% of the cases, praise was used on a dense schedule given student disruption. Eighteen percent ranged from .05 to .17 indicating that in these cases, praise was used on a moderate schedule given student disruption. There were seven conditional probabilities that ranged from .03 to .04 indicating that for 7% of the cases, praise was used on a lean schedule given student disruption.

d. **What are the conditional probabilities of praise given student on-task behavior during the CW-FIT phase?** One-hundred conditional probabilities of teacher praise given student on-task behavior were calculated. The conditional probabilities ranged from 0 to .26 (*SD* = .05). The mean of the conditional probabilities was .07 (*Mdn* = .05). The mode was .05, with 16% of the conditional probabilities equaling .05.

Only 3% of the conditional probabilities equaled 0. One of the conditional probabilities was .26, indicating that for 1% of the cases, praise was used on a high

schedule given on-task behavior. There were 62 conditional probabilities that ranged from .05 to .17, indicating that for 62% of the cases, praise was used on a moderate schedule given on-task behavior. There were 34 conditional probabilities that ranged from .02 to .04, indicating that for 34% of the cases, praise was used on a lean schedule given on-task behavior. The histogram in the lower right corner of Figure 4 depicts that during CW-FIT, the conditional probabilities that praise was used given on-task behavior occurred for a majority of the students, or 97% of the non-zero cases. Overall, for the vast majority of students, praise was delivered on a lean to moderate schedule given on-task behavior.

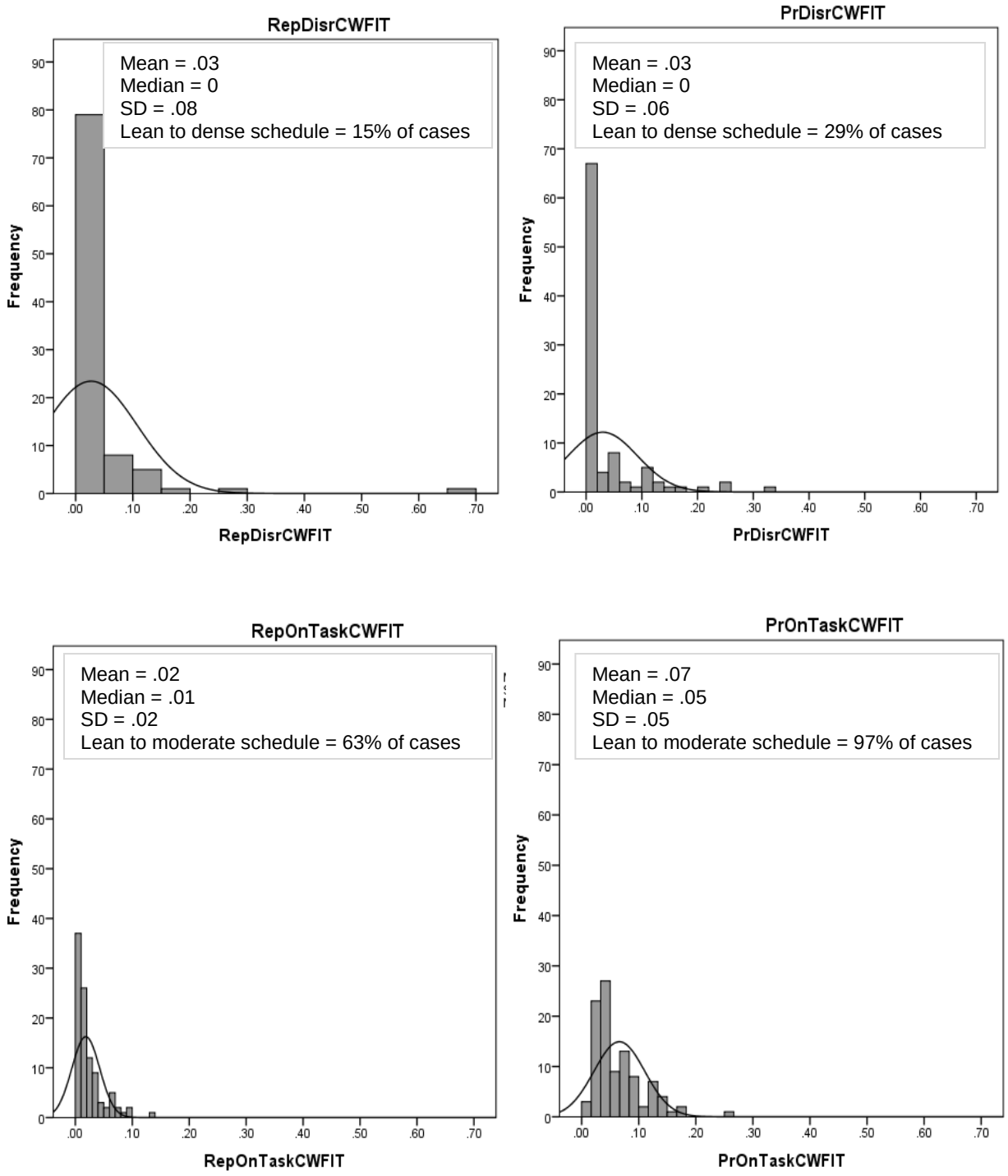

Figure 4. Histograms representing the frequency of the obtained conditional probabilities during CW-FIT. RepDisrCWFIT = Reprimands given disruptions during CW-FIT; PrDisrCWFIT = Praise given disruptions during CW-FIT; RepOnTaskCWFIT =

Reprimands given on-task behavior during CW-FIT; PrOnTaskCWFIT = Praise given on-task behavior during CW-FIT.

To summarize, the conditional probabilities that reprimands followed student disruption had the highest number of zeros (76% of cases), meaning that, compared to the other conditional probabilities, the conditional probability that reprimands followed disruptive behavior during CW-FIT occurred relatively infrequently. Additionally, the median (0) equaled the mode (0), supporting the low occurrence of these conditional probabilities. The schedule for the non-zero conditional probabilities ranged from lean to dense; a lean schedule was observed in less than 1% of cases, a moderate schedule was observed in 14% of cases, and a dense schedule was observed in less than 1% of cases.

Finally, the conditional probabilities that praise followed on-task behavior had the highest mean (.07) and median (.05), and the lowest number of zeros when compared to all of the other conditions. In other words, compared to all the other conditional probabilities, praise was used more often following on-task behavior during CW-FIT and with a large majority (97%) of the cases. The schedule also ranged from lean to dense; a lean schedule was observed in 34% of cases, a moderate schedule was observed in 62% of cases, and a dense schedule of reinforcement was observed in 1% of cases.

Comparisons of Conditional Probabilities Representing Baseline versus CW-FIT Phases

Eight box and whisker diagrams were created in four graphs to depict (a) the conditional probabilities that reprimands followed disruptive behavior during baseline and CW-FIT, (b) the conditional probabilities that reprimands followed on-task behavior during baseline and CW-FIT, (c) the conditional probabilities that praise followed disruptive behavior during baseline and

CW-FIT, and (d) the conditional probabilities that praise followed on-task behavior during baseline and CW-FIT. Each graph has two box-and-whisker diagrams, with one diagram representing baseline data and the other representing CW-FIT data. The box-and-whisker plots indicate if any of the quartiles are unusually larger than the rest (i.e., data skewedness). The quartiles are values that divide the data set into four equal parts, each depicting a quarter of the sample. There is the upper quartile, the lower quartile, and the interquartile range, which is the difference between the upper quartile and the lower quartile values. The whisker caps demarcate the minimum and maximum values after accounting for outliers. Finally, the median is used rather than the mean because the mean is affected by especially large or small values whereas the median stays reasonably stable in spite of these exceptional values.

What effect did CW-FIT have on the distribution of (a) the conditional probabilities of reprimands given student disruption, (b) the conditional probabilities of reprimands given on-task behavior, (c) the conditional probabilities of praise given student disruption, and (d) the conditional probabilities of praise given on-task behavior?

a. **What effect did CW-FIT have on the distribution of the conditional probabilities of reprimands given student disruption?** The boxplots in Figure 5 for the conditional probabilities that reprimands followed disruptive behavior clearly show that when compared to baseline phase, during the CW-FIT phase, on average teachers were less likely to reprimand disruptive behaviors. Moreover, going from baseline phase to CW-FIT phase, the variability of conditional probabilities decreased substantially because most of them were zero during this phase. During baseline, the data distribution was skewed toward the upper quartile, indicating that the mean (.06) was greater than the median (.03) as shown in Table 4.

During baseline, for 57% percent of the cases, the conditional probabilities that reprimands followed student disruption occurred on lean (13% of cases), moderate (36% of cases), and dense (8% of cases) schedules, with 43% of the conditional probabilities equal to zero. However during CW-FIT, some redistribution of conditional probabilities occurred within the upper quartile such that 77% of the conditional probabilities equaled zero, leaving only 23% of the conditional probabilities in the lean (7% of cases), moderate (14% of cases), and dense (2% of cases) schedules. The mean (.03) remained greater than the median (.0) within the CW-FIT phase, but both were lower than they had been during baseline (Table 4). In other words, going from baseline to CW-FIT there were, on average, decreases in the conditional probabilities that reprimands followed disruptive behavior. Moreover, during the CW-FIT phase, more teachers (i.e., 77% of the cases) no longer delivered a reprimand as a consequence for disruptive behavior.

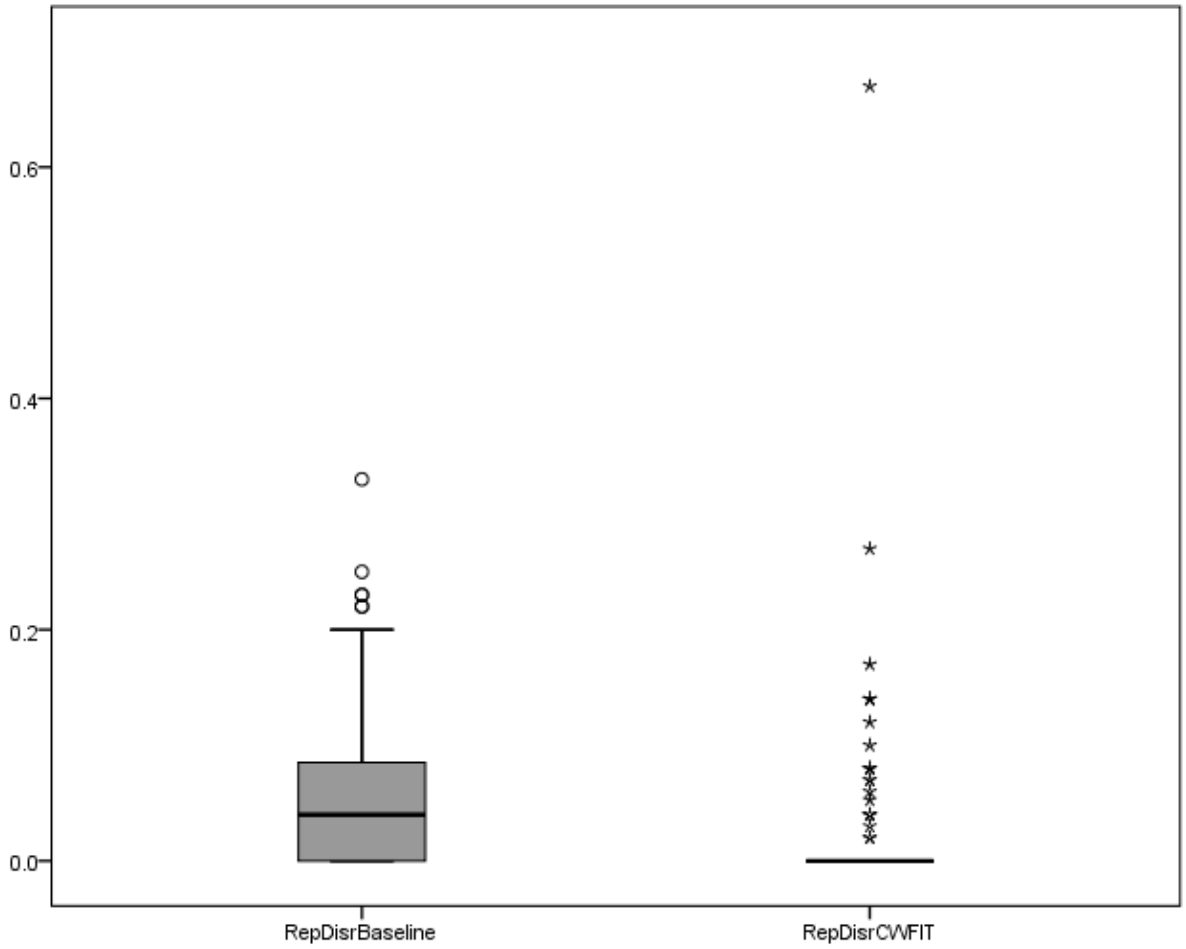

Figure 5. Boxplots comparing the conditional probabilities that reprimands followed disruptive behavior during baseline and CW-FIT.

Table 4

Comparison of Boxplot Statistics for Conditional Probabilities that Reprimands Followed Student Disruption During Baseline and CW-FIT

	RepDisr	
	Baseline	CW-FIT
Mean	.06	.03
Median	.03	0
Minimum	0	0
Maximum	.33	.67
Mode	0	0
Interquartile range	.08	0

Note. Rep-Disr = Reprimands given disruptive behavior.

b. **What effect did CW-FIT have on the distribution of the conditional probabilities of reprimands given on-task behavior?** The boxplots in Figure 6, summarizing the conditional probabilities that reprimands followed on-task behavior, show that on average, when compared to baseline, during CW-FIT phase, teachers were slightly less likely to reprimand on-task behavior and there was slightly less variability in the conditional probabilities. During baseline, the data distribution favored the upper quartile, indicating that during baseline, the mean (.04) was greater than the median (.03) as shown in Table 5. In other words, 91% of the conditional probabilities that reprimands followed on-task behavior during baseline ranged from lean to moderate schedules. During CW-FIT, the distribution continued to favor the upper quartile, but both the mean (.02) and the median (.01) decreased (i.e., the mean and median were lower than they were during the baseline phase). Going from baseline to CW-FIT, the conditional probabilities that reprimands followed on-task behavior reduced from a 91% to a 63% probability, excluding those conditional probabilities that equaled zero. Overall, during CW-FIT the conditional probabilities that reprimands followed on-task behavior decreased slightly.

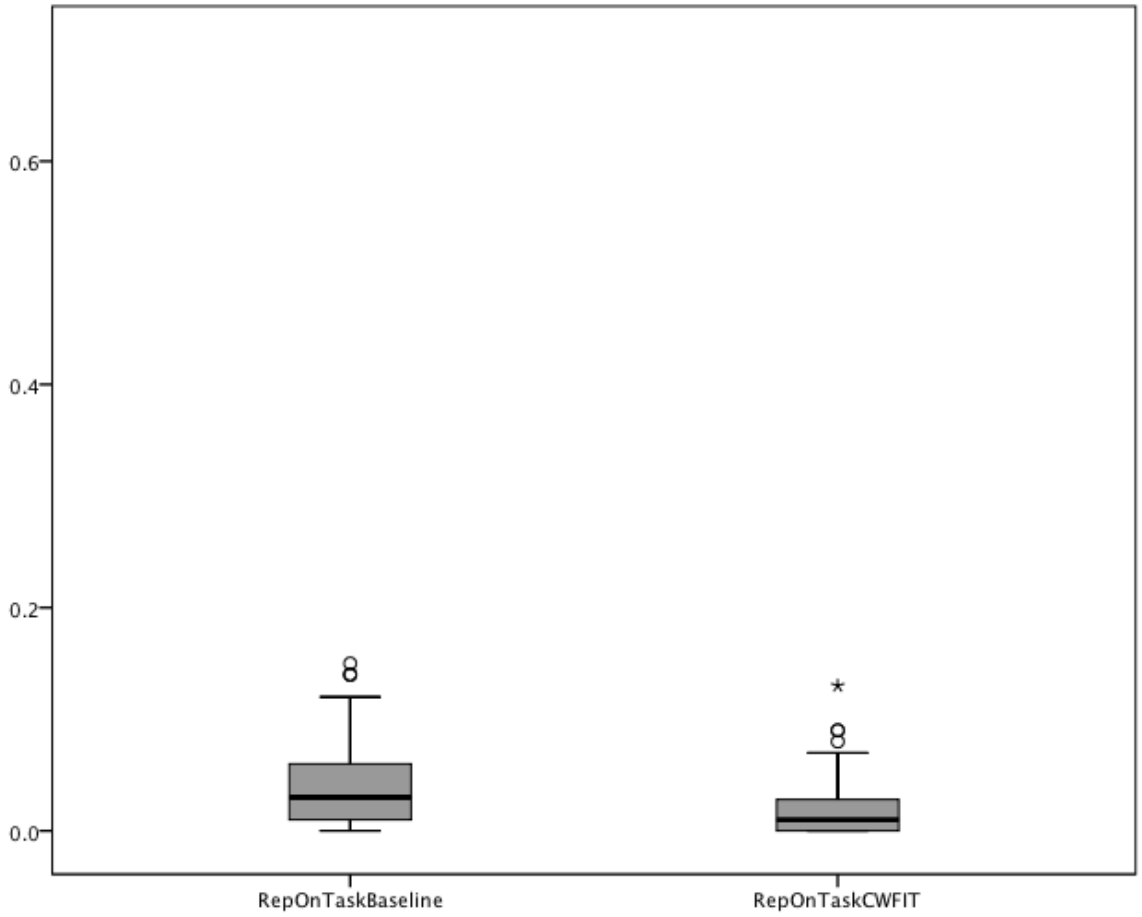

Figure 6. Boxplots comparing the conditional probabilities that reprimands followed on-task behavior during baseline and CW-FIT.

Table 5

Comparison of Boxplot Statistics for Conditional Probabilities that Reprimands Followed On-task Behavior During Baseline and CW-FIT

	RepOnTask	
	Baseline	CW-FIT
Mean	.04	.02
Median	.03	.01
Minimum	0	0
Maximum	.15	.13
Mode	.01	0
Interquartile range	.05	.03

Note. RepOnTask = Reprimand given on-task behavior.

c. **What effect did CW-FIT have on the distribution of the conditional probabilities of praise given student disruption?** The boxplots in Figure 7, summarizing the conditional probabilities that praise followed disruptive behavior, show that when compared to baseline phase, during the CW-FIT phase, teachers were on average more likely to praise disruptive behavior (the medians were the same, however) and there was more variability in the use of praise as a consequence for disruptive behavior. During baseline, the distribution was skewed toward the upper quartile. The mean (.01) was greater than the median (0), as shown in Table 6. Sixteen percent of the conditional probabilities ranged between a lean and a dense schedule, and 84% of the conditional probabilities equaled zero. During CW-FIT, the distribution favored the upper quartile with the mean (.03) being greater than the median (0). There was an increase in the mean, going from baseline to CW-FIT, indicating that on average the conditional probabilities that praise followed disruptive behavior increased. Compared with the baseline phase (16%), 28% of the conditional probabilities ranged from a lean to a dense schedule in the CW-FIT phase. Although this outcome is unconventional as an effect of CW-FIT, it should be noted that the majority (72%) of the conditional probabilities equaled zero.

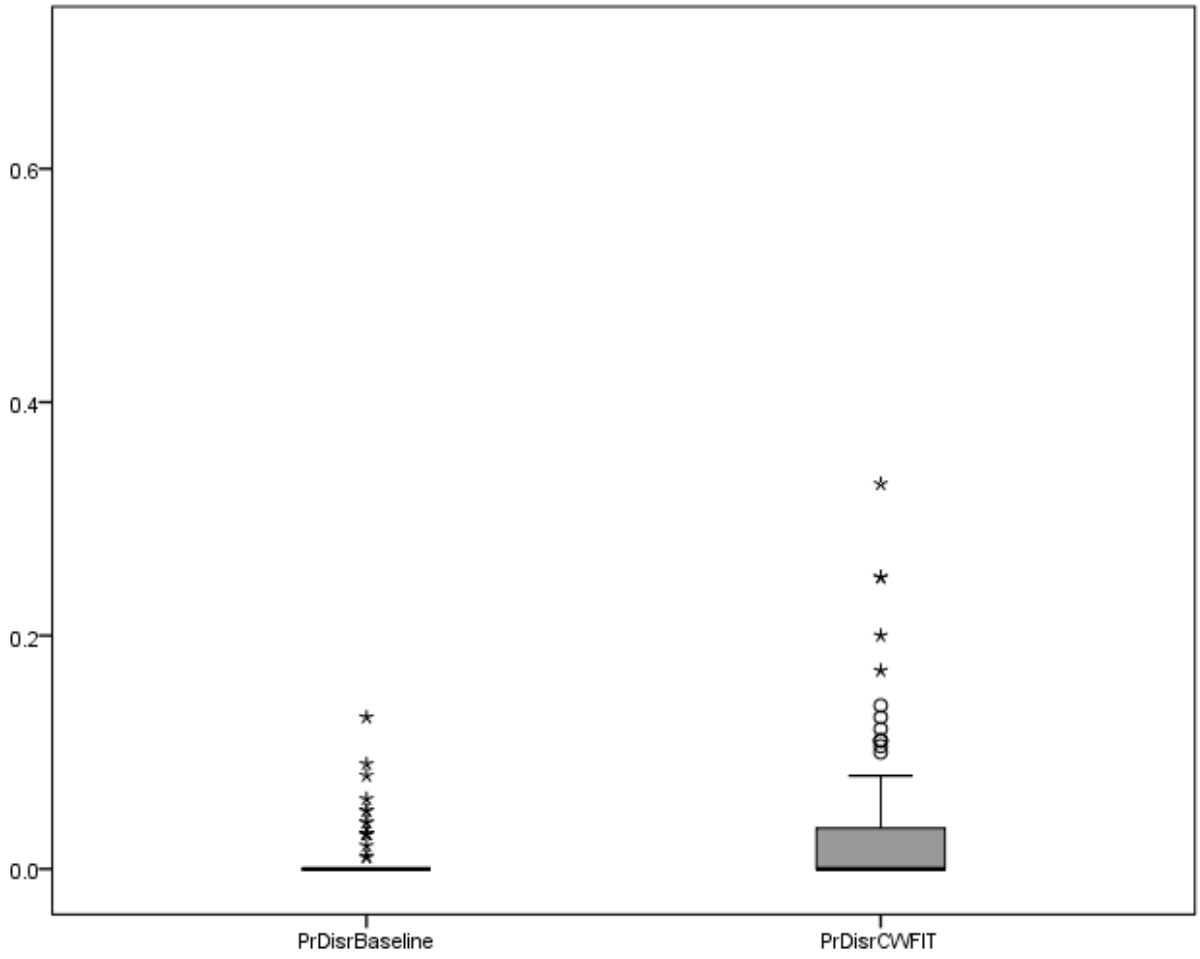

Figure 7. Boxplots comparing the conditional probabilities that praise followed disruptive behavior during baseline and CW-FIT.

Table 6

Comparison of Boxplot Statistics for Conditional Probabilities that Praise Followed Student Disruption During Baseline and CW-FIT

	PrDisr	
	Baseline	CW-FIT
Mean	.01	.03
Median	0	0
Minimum	0	0
Maximum	.13	.33
Mode	0	0
Interquartile range	0	.03

Note. PrDisr = Praise given disruptive behavior.

d. **What effect did CW-FIT have on the distribution of the conditional probabilities of praise given on-task behavior?** The boxplots in Figure 8, summarizing the conditional probabilities that praise followed on-task behavior, show that when compared to baseline phase, during CW-FIT phase, teachers were, on average, more likely to deliver praise as a consequence for on-task behavior and that there was greater variability in the use of praise. During baseline, there was little variability in the conditional probabilities, but the data distribution appears evenly across the quartiles. Table 13 shows that during baseline, the mean and median both equaled .01. Only 13% of the conditional probabilities during the baseline phase were moderate and none was dense or high. However during the CW-FIT phase, the data were redistributed to favor the upper quartile (See the boxplot on the right in Figure 8), indicating that the mean (.07) was greater than the median (.05). There was a wider spread of data points during CW-FIT than during baseline. Most notably, only 3% of the conditional probabilities were zero. In other words, although the schedule varied, at the very least, praise followed on-task behavior for 97% of the cases in the CW-FIT phase (i.e., compared to 64% in the baseline phase). Moreover, it is clear that teachers were more likely to praise on-task behavior after the intervention was implemented. In fact, the median (.05) of the conditional probabilities in the CW-FIT phase was the maximum conditional probability that was calculated during the baseline phase.

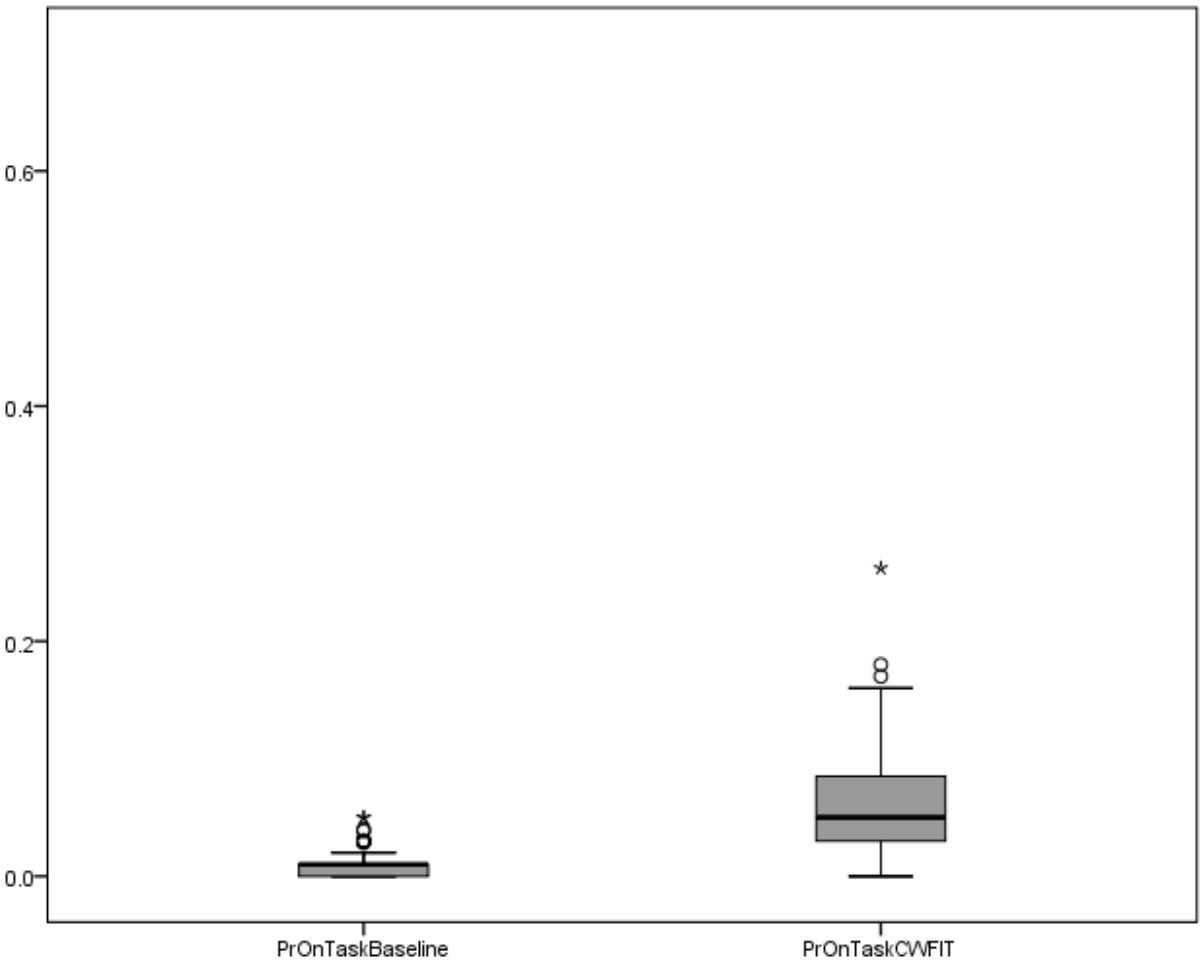

Figure 8. Boxplots comparing the conditional probabilities that praise followed on-task behavior during baseline and CW-FIT.

Table 7

Comparison of Boxplot Statistics for Conditional Probabilities that Praise Followed On-task Behavior During Baseline and CW-FIT

	PrOnTask	
	Baseline	CW-FIT
Mean	.01	.07
Median	.01	.05
Minimum	0	0
Maximum	.05	.26
Mode	.01	.05
Interquartile range	.01	.05

Note. PrOnTask = Praise given on-task behavior.

Overall, two particularly important findings emerged from this analysis. First, CW-FIT decreased the conditional probabilities that teacher reprimands followed student disruption, as shown by the changes in the schedules. Moreover, at baseline, reprimands were used given student disruption in 57% of cases, whereas during CW-FIT, reprimands were used given student disruption in only 16% of cases. Second, CW-FIT increased the conditional probabilities that teacher praise followed on-task behavior, as shown by the average changes in the schedules. Notably, during the baseline phase, praise was used given on-task behavior in 64% of cases, whereas during CW-FIT, praise was used given on-task behavior in 97% of cases.

Finally, there were two unconventional findings. First, during baseline, reprimands were used given on-task behavior in 91% of cases, while during CW-FIT, reprimands were used given on-task behavior in 63% of cases. It is very strange for reprimands to be used given on-task behavior. Therefore, it is likely that for these cases, reprimands were used for disruptive behavior, but they were not captured in the 10-s intervals used to record the data.

Second, during baseline, praise was used given student disruption in 16% of cases, where during CW-FIT, praise was used given student disruption in 28% of cases. It is unconventional for praise to follow student disruption (although note that in general a large number of zero values for these conditional probabilities was observed). The use of the 10-s intervals in recording may have influenced the conditional probability calculations (i.e., praise was provided for on-task behavior, but recorded in a different interval during which disruption was also recorded).

Contingency Space Analysis

After the conditional probabilities were calculated, the probabilities were graphed in coordinate space in order to conduct a contingency space analysis (CSA). This analysis allows an evaluation of the degree of contingency (i.e., positive or negative) between a behavior (i.e., student disruption or on-task behavior) and its consequences (i.e., reprimands or praise). The unity diagonal represented situations in which teacher attention (in the form of reprimands or praise) was equally likely to occur given student disruption or on-task behavior. That is, teacher attention was independent of student behavior. Data points falling above the unity diagonal indicated situations in which teacher attention was more likely to occur given student disruption (i.e., a positive contingency for disruption). Data points falling below the unity diagonal represented situations in which teacher attention was more likely to occur given student on-task behavior (i.e., a positive contingency for on-task behavior). Data points falling on the y- and x-axes depicted situations in which teacher attention was dependent (i.e., perfectly contingent) on disruptive behavior and on-task, respectively (Martens et al., 2008). In other words, data points representing a contingent relation are located above or below the diagonal in space. For the present analysis, the term *dependent* refers to events in which reprimands or praise follow some or all instances of disruptive or on-task behavior, but do not occur in the absence of either behavior (i.e., a perfect contingency), whereas the term *contingent* refers to events in which reprimands or praise follow disruptive or on-task behavior more often than the absence of behavior (Martens et al., 2008).

Baseline. Figure 9 depicts a contingency space analysis of teacher attention (i.e., reprimands and praise) for student behavior (i.e., disruptive and on-task behavior) during

baseline. Teacher attention in the form of reprimands is depicted by the closed squares. Teacher attention in the form of praise is depicted by the "X" data points.

Reprimands. Ninety-nine conditional probabilities of teacher reprimands given student behavior (disruption and on-task) were calculated and are depicted by the closed squares in Figure 9. Eight percent of these conditional probabilities occurred at the origin, which suggests that in those cases, reprimands did not follow student disruption or on-task behavior. Five percent of the conditional probabilities for reprimands were plotted on the unity diagonal, indicating that reprimands occurred independent of disruptive or on-task behavior. Forty percent of the conditional probabilities for reprimands were located above the unity diagonal, indicating that in these cases reprimands were contingent on disruptive behavior (i.e., positive contingency for disruptive behavior). There were no data points on the y-axis. Forty-six percent of the conditional probabilities were located below the unity diagonal. More specifically, 12% were located in the coordinate space and 34% were on the x-axis (i.e., dependent), suggesting that in some cases reprimands were contingent (12% of cases) on on-task behavior, but in many more cases reprimands were dependent (34% of cases) on on-task behavior during baseline. Taken together, these findings indicate that for a slightly higher proportion of cases, reprimands were contingent or dependent on on-task behavior (46%) relative to disruptive behavior (40%). As described earlier, it is possible that some reprimands were delivered as a consequence for disruptive behavior but were recorded in an interval where the student was displaying on-task behavior.

Praise. One hundred conditional probabilities of teacher praise given student behavior (disruption and on-task) were calculated and are also depicted by the Xs in Figure 9. Thirty-three

percent of these conditional probabilities occurred at the origin, which suggests that in those cases, praise did not follow student disruption or on-task behavior. Three percent of the conditional probabilities for praise were plotted on the unity diagonal, indicating that praise occurred independent of disruptive or on-task behavior in these cases. Fifteen percent of the conditional probabilities for praise were located above the unity diagonal, indicating praise was contingent on disruptive behavior in these cases. There were no data points on the y-axis. Forty-nine percent of the conditional probabilities were located below the unity diagonal, indicating that praise was contingent on on-task behavior (i.e., positive contingency for on-task behavior). There were no data points on the x-axis. Taken together, these findings indicate that there were more cases in which students were more likely to be praised for on-task behavior than praised for disruptive behavior.

Summary. The CSA during the baseline condition showed that 8% of the reprimand data points and 33% of the praise data points occurred at the origin indicating that in these cases, reprimands and praise did not follow student disruption or on-task behavior. Moreover, only 5% of the reprimand data points and only 3% of the praise data points were plotted on the unity diagonal, indicating that for very few cases, reprimands and praise occurred independent of student disruption and on-task behavior, or by chance. The remaining data points were indicative of a dependent or contingent relation; therefore, during baseline it was shown that teachers used reprimands (86% of cases) as a consequence given student disruptive and on-task behavior more often than they used praise (64% of cases) as a consequence given student disruptive and on-task behavior.

Further analysis, however, revealed more meaningful descriptions of the contingent and dependent relation between student behavior and teacher attention. For example, in general it

might be concluded that teacher attention was more likely dependent or contingent on on-task behavior than it was on student disruption: Teacher reprimands (12% of cases) and praise (49% of cases) were contingent on, or followed most occurrences of student on-task behavior, with some teacher reprimands (34% of cases) being dependent on or following all occurrences of on-task behavior. In comparison, fewer teacher reprimands (40% of cases) and praise (15% of cases) were contingent on student disruption. There was no dependent relation related to student disruption.

If the 34% of dependent teacher reprimand and on-task cases are not considered; however, there is a fairly similar percentage of the cases in which reprimands were contingent on student disruption (40% of cases) and praise was contingent on student on-task behavior (49% of cases). Likewise, the percentage of contingent relationships between teacher reprimand and on-task (12% of cases) and teacher praise and student disruption (15% of cases) was similar. Although it is unconventional for reprimands to follow on-task behavior and praise to follow student disruption, these occurred in a relatively low percentage of cases and thus they may represent a general error rate due to the nature of the interval recording procedure. That is, it is likely that in these cases, the reprimands and praises were not recorded in the same 10-s intervals as the disruptive or on-task behavior respectively and were recorded in a subsequent interval.

Of specific concern from a substantive standpoint, however, was the 34% of teacher reprimands that were dependent on on-task behavior. It does not make sense for teacher reprimands to be perfectly contingent on on-task behavior. Notably, the mode for the conditional probabilities of reprimands following on-task behavior was .01 indicating that the occurrence was infrequent. It is possible that this anomaly was a function of CW-FIT's group contingency,

teacher reprimands followed a target student's on-task behavior when at least one other student was being disruptive.

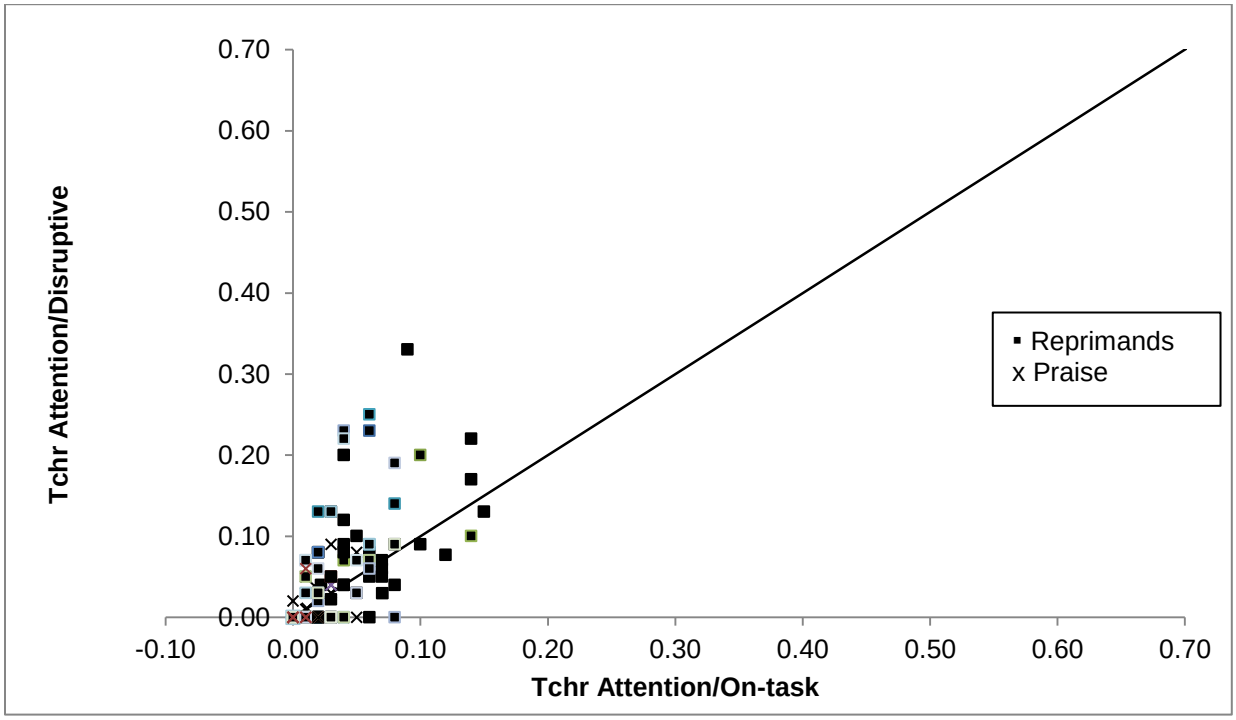

Figure 9. A contingency space analysis of teacher attention (i.e., reprimands and praise) for student behavior (disruption and on-task behavior) during baseline.

CW-FIT. Figure 10 depicts a contingency space analysis of teacher attention (i.e., reprimands and praise) for student behavior (i.e., disruption and on-task behavior) during CW-FIT. Teacher attention in the form of reprimands is depicted by the closed squares. Teacher attention in the form of praise is depicted by the "X" data points.

Reprimands. Ninety-five conditional probabilities of teacher reprimands given student behavior (disruption and on-task) were calculated and are depicted by the closed squares in Figure 10. Thirty percent of these conditional probabilities occurred at the origin, which suggests that reprimands did not follow disruptive or on-task behavior. One percent of the conditional

probabilities for reprimands were plotted on the unity diagonal, indicating that in this case reprimands occurred independent of disruptive or on-task behavior. Twenty percent of the conditional probabilities for reprimands were located above the unity diagonal, indicating that in these cases, reprimands were contingent on disruptive behavior (i.e., positive contingency for disruptive behavior). There were no data points on the y-axis. Forty-four percent of the data points were located below the unity diagonal. More specifically, 2% were located in the coordinate space and 42% were on the x-axis (i.e., dependent), suggesting that in some cases reprimands were contingent (2% of cases) on on-task behavior, but in many more cases they were dependent (42% of cases) on on-task behavior during CW-FIT. A detailed data analysis revealed that for some cases, the reprimand occurred in an interval where the student was displaying on-task behavior. However, on average, for a majority of occurrences in the data, teacher reprimands followed a target student's on-task behavior, indicating the likelihood that the teacher overlooked the individual's on-task behavior when one other individual in his/her group was being disruptive.

Praise. One hundred conditional probabilities of teacher praise given student behavior (disruption and on-task) were calculated and are depicted by the Xs in Figure 10. One percent of these conditional probabilities occurred at the origin, which suggests that praise did not follow disruptive or on-task behavior. There were no data points on the unity diagonal. Eighty-six percent of the conditional probabilities were located below the unity diagonal, indicating that praise occurred contingent on on-task behavior in these cases (i.e., positive contingency for on-task behavior). Eleven percent of the conditional probabilities for praise were located above the unity diagonal, suggesting that for these cases praise was contingent on disruptive behavior.

Taken together, there were many more cases in which students were more likely to be praised for on-task behavior than praised for disruptive behavior.

Summary. The CSA during the CW-FIT condition depicted that 30% of the reprimand data points and 1% of the praise data points occurred at the origin, indicating that in these cases, reprimands and praise did not follow student disruption or on-task behavior. Moreover, only 1% of the reprimand data points and none of the praise data points were plotted on the unity diagonal, indicating that for very few cases, reprimands and praise occurred independent of student disruption and on-task behavior. The remaining data points were indicative of a dependent or contingent relationship; therefore, during CW-FIT it was shown that teachers used praise (i.e., 97% of cases) as a consequence given student disruptive and on-task behavior more often than they used reprimands as a consequence given student disruptive and on-task behavior (i.e., 64% of cases).

Further analysis, however, revealed more meaningful descriptions for the contingent and dependent relationships between teacher attention and student behavior. For example, in general it might be concluded that teacher attention was more likely dependent or contingent on on-task behavior than it was on student disruption, and to a slightly higher extent than during baseline. Teacher reprimands (i.e., 2% of cases) and praise (i.e., 86% of cases) were contingent on student on-task behavior, with some teacher reprimands (i.e., 42% of cases) being dependent on on-task behavior. In comparison, fewer teacher reprimands (i.e., 20% of cases) and praise (i.e., 11% of cases) were contingent on student disruption.

If the 42% of dependent teacher reprimands and on-task cases are not considered however, there is a clearer depiction of the effect CW-FIT had as shown by the cases in which reprimands were contingent on student disruption (i.e., 20%) and praise was contingent on

student on-task behavior (i.e., 86%). More specifically, as a result of CW-FIT, the percentage of cases in which reprimands were contingent on student disruption decreased whereas the percentage of cases in which praise was contingent on student on-task behavior increased. Of specific concern from a substantive standpoint, however, was the 42% of teacher reprimands dependent on on-task behavior. It does not make sense for teacher reprimands to be perfectly contingent on on-task behavior. It is possible that this anomaly was a function of CW-FIT's group contingency, teacher praise followed a target student's disruption especially when it was a verbal disruption. That is, this anomaly does not have a meaningful interpretation.

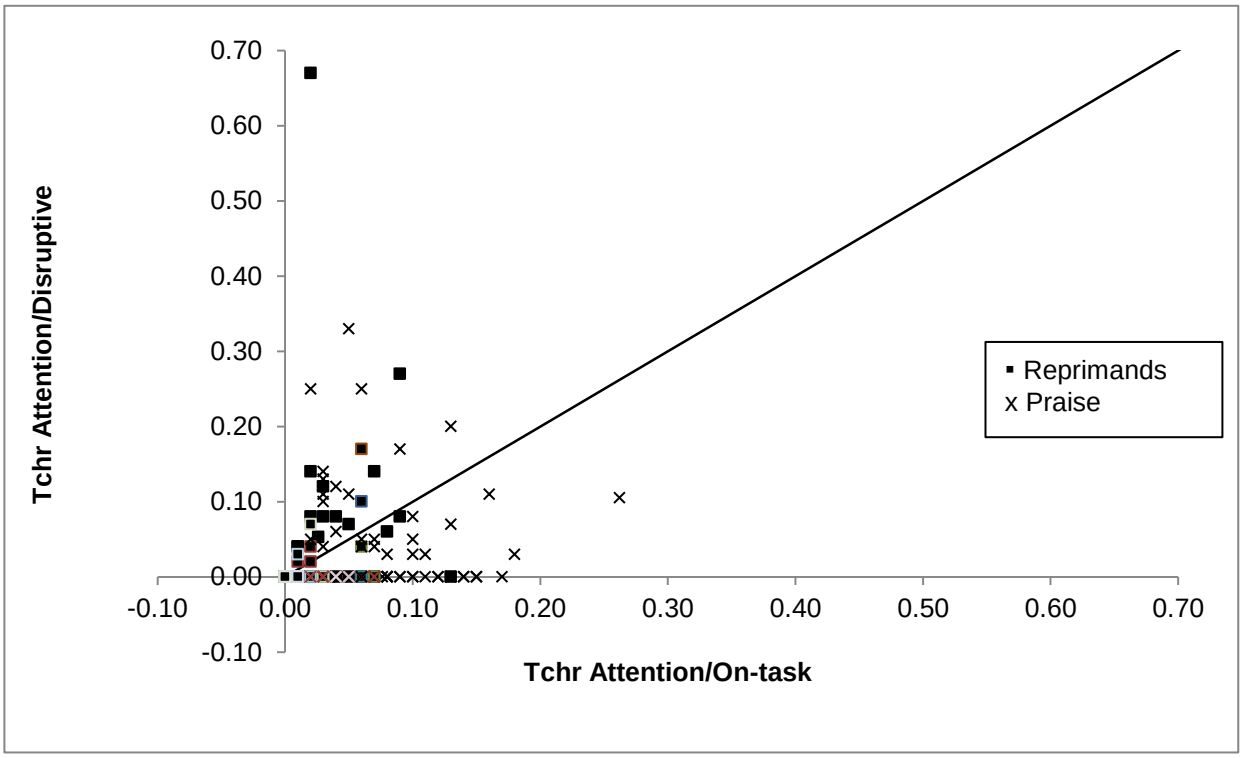

Figure 10. A contingency space analysis of teacher attention (i.e., reprimands and praise) for student behavior (disruption and on-task behavior) during CW-FIT.

Evidence of Change in Teacher Attention

After their training for CW-FIT, teachers were required to use praise when on-task behavior was observed in students. The teachers were encouraged to catch students being good, instead of relying on reprimands given student disruption. The CW-FIT system trained teachers to increase their use of praise given student on-task behavior beyond their use of reprimands given student disruption. Consequently, the conditional probabilities that teacher praise followed student on-task behavior were compared to the conditional probabilities that teacher reprimands followed student disruption during the baseline and CW-FIT conditions. The purpose was to evaluate whether CW-FIT had the desired effect on the teachers' use of reprimands and praise given student disruption and on-task behavior.

The bar graph in Figure 11 depicts the average conditional probabilities of teacher reprimands given disruptive behavior and of teacher praise given on-task behavior during baseline and CW-FIT, respectively. As shown on the left side of Figure 11, during baseline teachers were more likely to reprimand disruptive behavior than to praise on-task behavior. In contrast, as shown on the right side of Figure 11, during CW-FIT teachers were more likely to praise on-task behavior than they were to reprimand disruptive behavior. In other words, as a result of CW-FIT, praise as a form of teacher attention was given more for on-task behavior than reprimands as a form of teacher attention was given for student disruption. Additionally, a detailed frequency analysis of the data indicated that there was a decrease in student disruption for 89% of the students at the individual student level, going from baseline to CW-FIT.

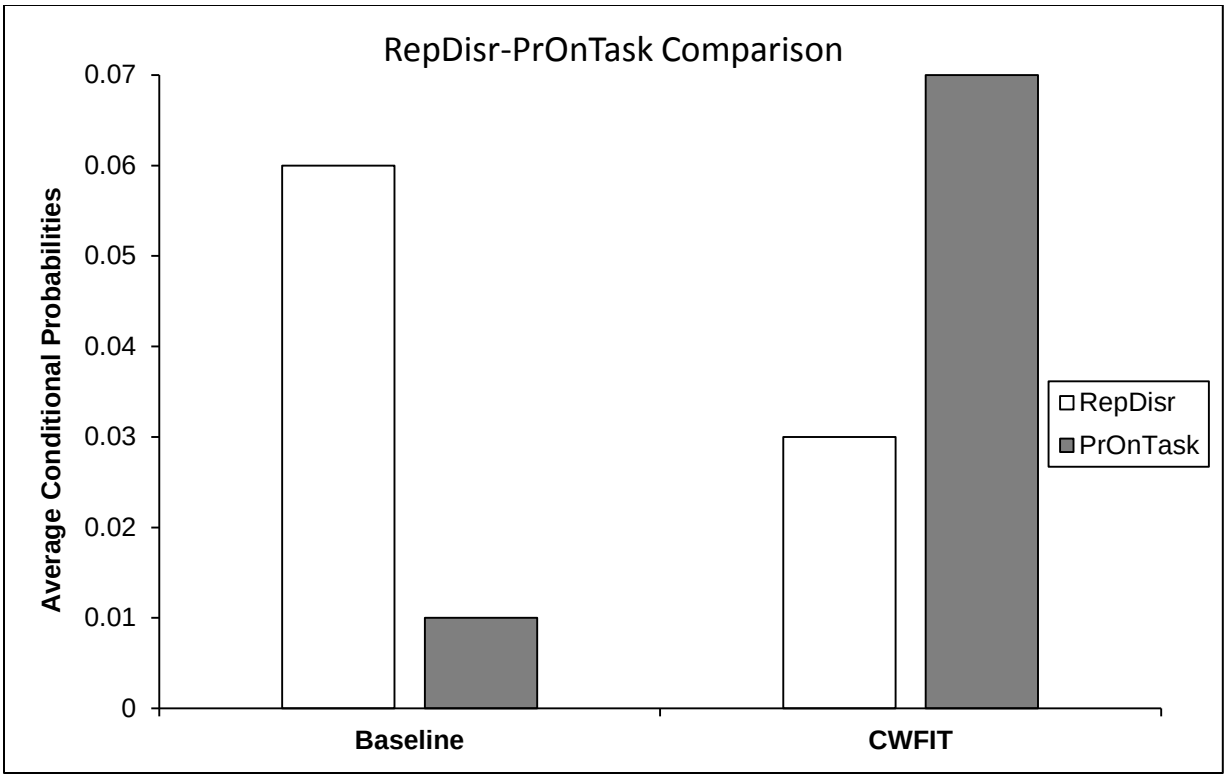

Figure 11. Bar graph showing the change in the conditional probabilities that reprimands followed student disruption, and praise followed on-task behavior from baseline to CW-FIT.

Expected and Observed Schedules of Praise

As reported earlier in the previous chapter, after baseline data were collected, teachers were trained to use praise every time the timer went off, and to occasionally provide surprise (unexpected) praise between intervals, especially to students who were not on task at the interval. The timer intervals were set anywhere from 1-3 min. Therefore, during the 15-min miniMOOSE observations, the expected conditional probability that praise was to be used given student on-task behavior was approximately within a range of .06 to .17 if only the timer was followed strictly and students were on-task. That is, given that the student received individualized praise and praise targeted toward his or her group, the conditional probabilities that teachers used praise given student on-task behavior were expected to be on a moderate to dense schedule (i.e., .06 to

.17). Therefore, this analysis may be used to estimate whether teachers implemented the intervention with integrity.

Results indicated the observed schedule that teacher praise was used given on-task behavior ranged of 0 to .26. Of these conditional probabilities for praise given on-task behavior, 62% of the observed cases fell within the expected schedule range of .06 to .17. With regards to treatment integrity screening, results indicated that the conditional probabilities that praise followed on-task behavior had a mean of .07 during CW-FIT, which was within the expected range. Last, it is important to note that the expected range assumes that students were always on-task in the interval and that teachers used praise only those times. It was likely that both cases were not always true as students may have been on-task and that teachers may have always used praise more often. Thus the expected range was an estimate, and estimates greater than the maximum range also provided evidence that the teachers followed the intervention with integrity.

Chapter V

Discussion

The primary purpose of the present study was to use conditional probability analysis and CSA to depict the effect of CW-FIT on the conditional probabilities that teacher reprimands and praise followed disruptive and on-task behavior. Three important findings emerged from the analyses. First, during baseline, teachers used reprimands as a consequence for student disruption more often than they used praise as a consequence for on-task behavior, and then during CW-FIT, teachers used praise as a consequence for on-task behavior more often than they used reprimands. Second, in general the conditional probabilities were lower than was predicted, suggesting schedules used with rats in laboratory settings may be different from those expected in classroom settings. Third, the increase in the likelihood that teachers used praise given on-task behavior, and decrease in the likelihood that teachers used reprimands given student disruption (see Figure 11) showed that CW-FIT changed teacher behavior so that they focused on mainly using praise given student on-task behavior. Last, using conditional probabilities to assess treatment integrity by estimating whether teachers were praising students for on-task behavior as would be expected if they were implementing the CW-FIT intervention correctly, it was shown that in the majority of cases, the teachers were using praise given student on-task behavior the way they were trained . Based on these major findings from the descriptive analyses, the following links and contributions can be made to the existing research base, specifically to the literature on, (a) conditional probabilities, (b) classroom management, and (c) teacher and student interactions.

Conditional Probabilities

Previous studies have described the use of conditional probabilities to analyze sequential recordings of behavior and the events that follow its occurrence (e.g., Hammond, 1980; Lerman & Iwata, 1993; McKerchar & Thompson, 2004; Pence et al., 2009; Vollmer et al., 2001). The three levels proposed by Hammond (1980) provided some rough estimates for the expectation that conditional probabilities for teacher consequences (i.e., reprimands and praise) given student behavior (i.e., disruptive or on-task) in a school setting will likely not be much higher than .20. At baseline, the mean for the conditional probabilities of praise given on-task behavior was .01, but it increased to .07 during CW-FIT. These numbers, although they may appear low, may be realistic in the real world setting because, if the teacher focused on just meting out consequences for every student behavior that occurred in the classroom, he or she would not be able to teach the curriculum at all. In the real world, on-task behavior (or behavior in general) can only be reinforced so much. The current study may be used to develop some type of initial guidelines regarding expectations of teachers' use praise (or reprimands) given on-task behavior (or disruptive behavior) per individual student because of the relatively large sample size of this study compared to others. For example, a very dense schedule of greater than .50 of praise or reprimand given on-task or disruptive behavior is highly unlikely based on the findings from this study. Lean to moderate schedules appear to be more of the norm, and should be considered to be practical for K-6 elementary classrooms and might be expected in future research.

One strength of the current study was the relatively large sample of children and teachers. Many studies that have used conditional probability analysis have used a small sample size, and a functional analysis has either been considered or implemented (e.g., Lerman & Iwata, 1993;

Pence et al., 2009). Pence and her colleagues compared three descriptive analysis methods—the ABC method, the conditional probability method, and the conditional and background probability method—to each other. All analyses were run on data collected from six individuals diagnosed with developmental delays and problem behaviors. Conditional probability analysis results indicated that, attention was the main consequence given student problem behavior for five of the six individuals across all analysis methods. The conditional probability range for all six individuals for attention given problem behavior was between 0 and .50. These results are relatively similar to the current study's outcomes for reprimands given disruptive behavior in range (i.e., 0 to .67). Additionally, both studies had only one data point in that dense range. A major difference between the two studies is that for the descriptive analysis, whereas Pence and her colleagues only collected data on general *student-directed* teacher attention and individual student problem behavior, the current study specified the kind of teacher attention being given (i.e., reprimands and praise), and data were collected on both individual student disruption and on-task behavior. The simultaneous analysis of the conditional probabilities that praise followed on-task behavior alongside the conditional probabilities that reprimands followed disruptive behavior highlights the importance of evaluating each form of attention contingent on student behavior. Understanding the interplay between these two conditional probabilities has practical utility for designing classroom interventions that effectively create a prosocial, learning environment for students with problem behaviors.

Exploring the nature of the contingencies that exist between teacher and students in the classroom is an effort to decrease the research to practice gap by identifying if and how often praise is used given on-task behavior, and whether the observed probabilities of these events are applicable in daily classroom routines. Similarly, McKerchar and Thompson (2004) conducted a

study to determine the generalizability of the social consequences commonly manipulated in functional analyses in typical preschool classrooms. Data were collected on 14 preschoolers regarding the occurrence of antecedent events, child behaviors, and teacher responses. The probability of teacher responses given child behavior was then calculated and compared to response-independent probabilities of teacher responses. Results indicated that attention was the most common classroom consequence for all 14 children. Material presentation as an antecedent, and escape from instructional tasks were second and third, respectively.

Similar to McKerchar and Thompson (2004), the current study analyzed the conditional probabilities that teacher attention (i.e., reprimands and praise) followed student behavior (i.e., student disruption and on-task behavior), and the contingencies thereof. Positive contingencies were identified between reprimands and student disruption and between praise and on-task behavior. On the other hand, the current study differs from the McKerchar and Thompson study in that praise was also taken into consideration as a form of teacher attention whereas McKerchar and Thompson only focused on teacher reprimand in relation to student disruption. They found that the mean conditional probability that teacher attention followed disruptive behavior was .49, and .43 for compliance. These results were higher than those obtained in the current study. During CW-FIT, the mean conditional probability that reprimands followed disruptive behavior was .03 (.06 during baseline), and the mean conditional probability that praise followed on-task behavior was .07 (.01 during baseline). One of the major differences between that study and the current study is that the McKerchar and Thompson study was performed in preschool classrooms, whereas the current study was performed in elementary school classrooms (i.e., K-5). Therefore, although in the real world behavior (or behavior in general) can only be reinforced so much, it may be reinforced much more frequently, at least with attention, for

preschool children than for elementary school children. Notably, there was a larger teacher to student ratio in the preschool classrooms, i.e., 1:2, where in the CW-FIT classrooms it was 1:25. This ratio difference provided more opportunities for the preschool students to receive teacher attention than in the CW-FIT classrooms. Finally, the preschoolers were observed in activities such as, circle time, recess, and free play which are typically more unstructured than the formal math and reading lessons where the students in the CW-FIT classes were observed. The limited instructional time in the preschool activities may have presented more opportunities for student behavior and teacher attention interactions.

Overall, the current study has novel merit in presenting specific teacher consequences (i.e., reprimands and praise) and student behavior (i.e., disruptive and on-task behavior) in its analysis, whereas a general comparison of conditional probabilities for attention were calculated in the other studies. Additionally, the sample of students observed during CW-FIT was not removed from their class for observations, but each student was observed as part of his or her class. Finally, that the current study was primarily conducted during a Tier 1 intervention within the regular classroom setting provides teachers the opportunity to integrate their training with their daily classroom routine.

Classroom Management

In order for teaching and learning to occur in the classroom, there needs to be a structured, predictable classroom management system (Gable et al., 2009). CW-FIT was implemented as a classroom management system to provide that structure in the participating classrooms. Students are usually more likely to engage in disruptive behavior if the teacher's behavioral rules of them are unclear (Grossman, 2004). The CW-FIT skill posters functioned as

the rules that teachers used to regulate disruptive behavior and maintain on-task behavior (Kamps et al., 2011; Reinke et al., 2008). A major goal of CW-FIT was to improve class-wide on-task behavior as well as reduce disruptive behavior (Conklin, 2010). The teachers were thus trained to use praise as a consequence for on-task behavior every time the timer went off, in order to condition them to focus on the on-task behavior and in response, provide behavior-specific praise.

The literature shows that teachers have been more likely to give attention to disruptive behavior than to on-task behavior because disruptive behavior interferes with and reduces instructional time (Kodak et al., 2007; Piazza et al., 1999). Results from the current study indicated that the various classroom management systems observed during baseline indeed supported the hypothesis that attention was more likely given to disruptive behavior. The results showed, however, that CW-FIT increased teachers' use of praise given on-task behavior, and decreased their reprimand use given disruptive behavior. CW-FIT provided teachers with a classroom management system that taught them to pay attention to on-task behavior more than to disruptive behavior. As depicted by the bar graph (i.e., Figure 11), during CW-FIT, on average, the conditional probabilities that reprimands followed student disruption decreased, while the conditional probabilities that praise followed on-task behavior increased. Additionally, the CSA graphs also depicted this changing trend. During baseline, the CSA depicted that teachers used reprimands as a consequence given student disruption and on-task behavior more often than they used praise. In contrast, however, during CW-FIT, teachers used praise as a consequence given student disruption and on-task behavior more often than they used reprimands.

The bar graph in Figure 11 provided a concise summary of the CW-FIT effects on

teacher and student behavior, and depicted that during baseline, there was a greater likelihood for teachers to reprimand disruptive behavior than they were to praise on-task behavior. Although the study did not analyze whether reprimands maintained disruptive behavior, Figure 11 implied that during baseline, the existing classroom management systems favored the likelihood that teachers used reprimands given student disruptive behavior more than they used praise given student on-task behavior. The same bar graph also depicted that during CW-FIT, teachers were more likely to praise on-task behavior than they were to reprimand disruptive behavior. This change in conditional probabilities from baseline to CW-FIT supported the hypothesis that CW-FIT resulted in a greater likelihood that teachers used praise as part of their classroom management given on-task behavior more than they used reprimands given disruptive behavior. The use of prompted, behavior-specific praise in an attractive game format created social validity for teachers and students. It made the CW-FIT program fun to do as part of their daily lessons, and made CW-FIT effective as a classroom management system toward individual students (Wills et al., 2010), and as a result of the implementation of CW-FIT, 89% of the students identified with problem behaviors decreased their disruption.

Previous CW-FIT research has shown that the CW-FIT classroom management system creates a prosocial, learning-friendly environment by increasing on-task behavior, reducing disruptive behavior, and increasing the likelihood that teachers use praise as a positive attention when students are on task (Conklin, 2010; Kamps et al., 2011; Wills et al., 2010). However, the current study is the first of the CW-FIT studies to use conditional probability analysis to replicate the intervention. Conklin (2010) analyzed the effects of CW-FIT on prosocial classroom behavior. As a novel extension on other CW-FIT studies but similar to the current study, Conklin measured actual student behaviors that were reduced and increased as a result of using CW-FIT.

Unlike the current study, Conklin's study targeted the group or class level whereas the current study focused on the individual student level. Additionally, whereas Conklin's study focused on both typical and at-risk students, the students of interest in the current study were those identified as being at-risk for behavioral disorders.

Another CW-FIT study was the Kamps et al. (2011) in which Kamps and her colleagues studied the group contingency aspect of CW-FIT for whole classes (Tier 1) as well as the effectiveness of Tier 2 for students with disruptive behaviors who are at risk for emotional/behavioral disorders (EBD). Results showed that at Tier 1, group on-task behavior improved during CW-FIT over baseline levels. At Tier 2, for target EBD risk students, results indicated decreased disruptive behaviors and increased on-task behavior during CW-FIT. Unlike the current study where the positive effects of CW-FIT for students at risk for behavioral problems are reported at Tier1, the results for these students were reported in Tier 2. Additionally, the conditional probability analysis of the actual use of teacher consequences given student behavior is an extension of the Kamps et al. study.

Finally, Wills et al. (2010) presents a comprehensive overview of the CW-FIT program and its effects through the project duration. The researchers reported on how the CW-FIT program as a multilevel group contingency was considered a classroom-level primary intervention because it was used with all students in a class. The authors described both the primary (i.e., Tier 1) and secondary (i.e., Tier 2) levels of CW-FIT in their article. Results showed that CW-FIT increased class-wide time on-task behavior during instruction, and reduced disruptive behavior of students at-risk for school failure. The current study is an extension on the Wills et al. study because it highlights the contingencies between reprimands and student

disruption, and praise and on-task behavior, thus quantifying how the teachers were more likely to use praise at the same time individual students identified as being at-risk for behavior disorders were on task.

Overall, the results from the current study add to existing CW-FIT literature by providing strong support that CW-FIT increased the likelihood that teachers used praise when students were on task, and decreased the likelihood that teachers attended to disruptive behavior. Although the teachers were trained specifically on how to use praise when they saw students displaying on-task behavior during CW-FIT, they also began to use fewer reprimands toward disruptive behavior. The documented use of behavior-specific praise to increase student on-task behavior during CW-FIT is supported by the literature. (e.g., Gable et al., 2009; Kalis et al., 2007; Kamps et al., 2011; Lane et al., 2008; Sutherland et al., 2000). The current study outcomes provide more evidence.

Evidence of Change

According to Connell and Klem (2000) Theory of Change entails the use of a systematic and cumulative study to investigate the links between activities, outcomes, and contexts. In other words, CW-FIT as a classroom management system, provided the empirical setting within which the study of teacher and student activities (i.e., consequences and behavior), outcomes (i.e., conditional probabilities of consequences given behavior), and context (i.e., classroom). One of the most important findings for evidence of change is how teacher behavior regarding their use of reprimands and praise changed to favor praise. Moreover, this change notably occurred when preceded by on-task behavior for 97% of cases during CW-FIT, compared to 64% of cases during baseline.

After CW-FIT was introduced in the classrooms, the conditional probability that teachers praised on-task behavior went up, and the conditional probability that teachers reprimanded disruptive behavior went down. Given the results from this study, significant links can be identified between the introduction of CW-FIT as a classroom management system and the changes in conditional probabilities that teachers used praise given on-task behavior, and reprimands given student disruption. The introduction of teacher praise, through CW-FIT, as a consistent consequence for on-task behavior resulted in the outcomes depicted in the CSA (see Figure 10). The CSA graphs (Figures 9 & 10) depict the effects CW-FIT had on how teachers used consequences (i.e., reprimands and praise) given student behavior (i.e., disruption and on-task behavior), going from baseline phase to CW-FIT phase. In other words, compared to baseline phase where teachers used reprimands given student disruption more than they used praise given student on-task behavior, during CW-FIT, teachers used praise as a consequence given student on-task behavior more often than they used reprimands given student disruption.

Another important finding in the current study that is also indicative of change is that, at baseline, the conditional probabilities that reprimands followed student disruption had the highest mean, median, and the largest range of scores. In contrast, during CW-FIT, the conditional probabilities that praise followed on-task behavior had the highest mean, median, and lowest number of zeros. Further, the conditional probabilities that reprimands followed student disruption had the highest number of zeros, with less than 20% of cases being on any schedule. Thus, CW-FIT changed the environment of the classroom for students identified as being at-risk for behavior disorders by making it more likely for teachers to notice the students' on-task behavior and provide praise to the student in response, and less likely to provide reprimands in response to the students' disruptive behavior.

Teacher consequences and student behavior. Research has shown that the recommended praise to reprimand ratio in the classroom is 3:1 or 4:1 (Kalis et al., 2007; Shores et al., 1993). Although a teacher cannot spend their entire instruction time praising students who are on task, the teacher can make a conscious effort to 'catch the students being good' rather than focusing on the disruptive behavior the students display (Wills et al., 2010). CW-FIT is designed to help teachers make that conscious effort to attend to on-task behavior, and thus increase the likelihood that the praise to reprimand ratio in the classroom favors praise. On average, going from baseline phase to CW-FIT phase, the conditional probabilities that praise was used given on-task behavior increased, and the conditional probabilities that reprimands were used given disruptive behavior decreased.

Acker and O'Leary (1987) found that praise alone did not increase on-task behavior for students with problem behaviors. The results from the current study reinforce these findings in that although praise given on-task behavior was more likely, there was still some use of reprimands given disruptive behavior. The recommended 4:1 praise to reprimand indicates the need for four praise statements for every one reprimand statement. When using conditional probabilities to describe reprimands and praise, the focus is how likely disruptive or on-task behaviors precede the teacher's use of these consequences in the classroom. During baseline, the praise to reprimand ratio favored reprimands, with there being a 6% higher likelihood that reprimands were used given disruptive behavior, versus a 1% likelihood that praise was used given on-task behavior. During CW-FIT, there was a 7% likelihood that praise was used given on-task behavior, and a 3% likelihood that reprimands were used given disruptive behavior. These outcomes highlight the importance of monitoring the events that precede praise and reprimand ratio as they affect the ratio balance.

Observed versus expected schedule. Teacher and student interactions in the classroom affect the learning environment. Positive relationships reduce teacher stress, and improve student performance (Roache & Lewis, 2011).

There was a notable effect from the observed use of CW-FIT, given that the observed schedule (i.e., range of 0 to .26) presented a wider range of values than the expected schedule (i.e., range of .06 to .17) for the use of praise at the individual student level, given on-task behavior. Moreover, a majority of the conditional probabilities that praise followed on-task behavior (i.e., 62%) fell within the expected schedule range. Overall, the decrease in student disruption, increase in the likelihood that teachers used praise given on-task behavior, and decrease in the likelihood that teachers used reprimands given student disruption (Figure 11) show that CW-FIT has practical utility as a classroom management system. Ultimately, the CW-FIT has been shown to improve and have a positive effect on the classroom environment within which teachers and students interact. The treatment integrity analysis did not result in the anticipated numbers perfectly. Nevertheless, in spite of the slightly unexpected numbers, research shows that, mistakes in reinforcement (i.e., accidental reinforcement of problem behavior) did not have a detrimental effect as long as there was a richer schedule being used for appropriate behavior (Vollmer, Ringdahl, Roane, & Marcus, 1997; Worsdell, Iwata, Hanley, Thompson, & Kahng, 2000). Further, the expected schedule in this study was a rough approximation. A more detailed expected schedule should be crafted in future research before the study is conducted. The purpose of the analysis in this study was to show the potential of using conditional probabilities to evaluate treatment integrity, not necessarily to evaluate CW-FIT.

Last, the changes that occurred in the conditional probabilities of teacher consequence

following student behavior from baseline to CW-FIT help researchers to quantify what percentage of students at-risk for behavioral disorders teachers are praising when they display on-task behavior. In other words, researchers can determine from the results whether the behavioral intervention is helping teachers use praise more with this class of students when they display on-task behavior than they would use reprimands given student disruption.

Limitations

Although this study adds to the literature in a variety of ways, there were some limitations. The generalizability of the study is limited because the teachers volunteered to participate in the study and were already invested in participating. The students that were part of the study were identified as being at-risk for behavioral disorders. Therefore, the results cannot be compared to a population of typical students. Another limitation is that the reprimands and praise recorded may not be representative of all teacher behavior which limits how far the results generalize beyond the current context where the praises were controlled by the timer prompt.

Although Hammond's (1980) three descriptive levels of conditional probability of reinforcement were acquired through studying operant conditioning in mice in a lab setting, similar studies involving animals have been associated with human behavior (e.g., Skinner, 1950, 1953). The current study attempted to make the connection between animal and human behavioral probabilities. However, extrapolating these findings to the real world is not an exact science due to the use of animals in a lab versus humans in their natural environment of the classroom. Additionally, unlike the lab where experimental conditions make it more difficult for extraneous variables to interfere, the real world setting of a classroom is a constantly changing environment where researchers can only restrict participants' interaction with extraneous

variables during designated observation and training sessions. However, the presence of similar studies and results provided research evidence of the applicability of animal research to human behavior (e.g., Martens et al., 2008; McKerchar & Thompson, 2004; Skinner, 1953).

Although CSA provides information about the relative "payoff" for engaging or not engaging in a particular behavior, it had limited utility with the large sample size of the current study. The increased sample size, as well as the small size of the conditional probabilities (i.e., closer to zero) resulted in an overlap of data points that made it difficult to interpret directly from the graph. One undesired outcome of using the 10-s interval overlay on the CW-FIT data was that some of the reprimands and praises were captured where they preceded on-task behavior and student disruption, respectively. The sample that was used for this study was not collected specifically for conducting a CSA. The total number of teacher praises given during a typical lesson was not always captured within the observations given that the reinforcement schedule ranged from 1min to 5min, and the observations were only 15-min long. Another limitation was the use of a 10-s interval partial-interval layout to convert the raw data into conditional probabilities. The unconventional findings (e.g., reprimands occurred given on-task behavior) were likely a result of cases in which reprimands being used for disruptive behavior, but being recorded in a 10-s intervals that had on-task behavior. In addition, going from baseline to CW-FIT, teachers were less likely to use reprimands, making it less likely for reprimands to be recorded in the intervals even when given disruptive behavior.

Implications

The results from previous CW-FIT studies indicate that the contingencies between reprimands and disruptive behavior, and praise and on-task behavior had not been previously

investigated in the detail presented here. The increase in the likelihood that praise followed on-task behavior over the likelihood that reprimands followed disruptive behavior, going from baseline phase to CW-FIT phase, provided evidence of the contingent relationships that played a part in improving the classroom environments where CW-FIT was used as a classroom management system.

Functional behavior assessments and behavior intervention plans (FBAs; BIPs; O'Neill, Horner, Albin, Sprague, Storey, & Newton, 1997) are a fundamental part of the process used for behavior modification in the school setting (Iwata, 1994; Kamps et al., 2006). Data for the FBAs and BIPs are usually collected through direct observations and interviews to determine the triggers, setting events, antecedents, and consequences associated with the target behavior. Conditional probabilities identify environment-behavior correlations that can be used for further analysis within an FBA (Camp, Iwata, Hammond, & Bloom, 2009).

In order to be effective, BIPs need to be implemented with fidelity (Cohen et al., 2007; Gable et al., 2002). Identifying the contingencies between reprimands and student disruption, and praise and on-task behavior increases the likelihood that the BIP will include parameters that prevent haphazard or inappropriate use of consequences following student disruption or on-task behavior. Thus, when there is question about a BIP's effectiveness, it needs to be reviewed. As an extension of the descriptive analysis, a functional analysis can be conducted on the individual student's level. These data help, either to increase program efficiency and effectiveness by omitting any unnecessary steps (e.g., addressing every disruption), or adding missing steps (e.g., providing only behavior-specific praise to student) to the BIP.

Finally, behavior consultants in the school setting can use CSA data to present their

evaluation of a class's behavior support system to help teachers critique or improve their use of attention to individual student behavior in their classroom management system (Reinke et al., 2008). The teachers' discussion would address whether they need to change how often they give praise following on-task behavior for at-risk students in contrast to how often they use reprimands given student disruption within their classroom management system (Connell & Kubisch, 1996; Martens et al., 2008; Reinke et al., 2008).

Future Directions

Although there were several interesting findings, there were some unanswered questions that can help guide future research. It would be beneficial to analyze the conditional probabilities of teacher consequences following student behaviors to determine the effectiveness of a classroom management systems being implemented in a classroom for typical students, i.e., those not at-risk for behavioral disorders.

Despite recording reprimand and praise ratios that may not be representative of all teacher behavior, replication of the study using partial interval recording, along with standard timer intervals for every teacher rather than a range (i.e., 1-3min), can help address some of the concerns with low conditional probabilities, and anomalies (e.g., reprimands following on-task behavior). Many of the concerns were related to the post hoc nature of the study.

Extending the use of CSA in a classroom setting with a small group of at-risk students may provide useful information on the contingencies of teacher consequences (i.e., reprimands and praise) following student behaviors, (i.e., disruptive and on-task behavior). Finally, this is the first study to use CSA in an applied setting and it is hoped that the investigation of its use continues and expands beyond its current presentation, e.g., in a clinical setting, or even juvenile

settings to determine the best combination of consequences following desired and undesired behaviors. Finally, the use of specific software to calculate the conditional probabilities may help with increasing data accuracy.

Conclusion

Disapproval or approval of students' disruptive or on-task behavior are the most common social meanings of reprimands and praise (Swinson & Harrop, 2001). After CW-FIT was implemented, the conditional probabilities that teachers used reprimands given student disruptive behavior, and praise given student on-task behavior favored the contingency of praise given on-task behavior. This conclusion is similar to the numerous studies on the use of praise contingent on on-task behavior (e.g., Kamps et al., 2011; Sherman & Cormier, 1974; Wills et al., 2010). Kamps and her colleagues (2011) reported that during CW-FIT, group on-task data improved. Additionally, results in Kamps' study indicated decreased disruptive behaviors and increased on-task behavior for individual students during CW-FIT. In the study by Sherman and Cormier (1974) the disruptive behavior of two students was modified without the teacher's knowledge. The teacher's reactions toward the students were observed. Results indicated that the change in student behavior influenced the teacher's behavior; in the current study, the change in teacher behavior via CW-FIT was hypothesized to influence student behavior. Finally, the Wills et al. (2010) article presented evidence supporting how CW-FIT increased teacher attention (i.e., praise) to appropriate behavior at the class level, which is similar to the current results that depict the increase of the conditional probabilities of praise given on-task behavior, but different in that the groups were the focus of the Wills et al. study where the individual student was the focus of the current study. To honor the group contingency component in CW-FIT in the current study,

any praise and reprimands directed to the individual student, or to a group that the individual student was a part of were recorded in the miniMOOSES data.

Finally, the decrease in the frequency of the conditional probabilities of reprimands given disruptive behavior was evident in this study going from baseline to CW-FIT, and this research differs from previous CW-FIT research. Whereas previous studies focused on the effects of CW-FIT on group on-task behavior for the entire classroom (Wills et al., 2010), group contingency programs (Kamps et al., 2011), self-management (Kamps, Conklin, & Wills, in preparation), and the effect of CW-FIT on prosocial classroom behavior (Conklin, 2010), this study focused on the relationship between teacher consequences given student behavior when CW-FIT is used as the classroom management system. The author's hypothesis that the rates of teacher reprimands given student disruptive behavior would decrease, and the rates of teacher praise given student on-task behavior would increase was supported by the data results.

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Appendix A

Rank Ordering on Internalizing Dimension

(modified from Walker and Stevenson, 1991)

Internalizing refers to all behavior problems that are directed inwardly (i.e., away from the external social environment) and that represent problems with self. Internalizing behavior problems are often self-imposed and frequently involve behavioral deficits and patterns of social avoidance. Non-examples of internalizing behavior problems would be all forms of social behavior that demonstrate social involvement with peers and that facilitate normal or expected social development.

Examples include:

- having low or restricted activity levels
- not talking with other children
- being shy, timid, and/or unassertive
- avoiding or withdrawing from social situations
- preferring to play or spend time alone
- acting in a fearful manner
- not participating in games and activities
- being unresponsive to social initiations by others

Non-Examples include:

- initiating social interactions with peers
- having conversations
- playing with others, having normal rates or levels of social contact with peers
- displaying positive social behavior toward others
- participating in games and activities
- resolving peer conflicts in an appropriate manner and
- joining in with others

- not standing up for one's self

List Internalizers

Student Name	Rank

Instructions:

1. Review the definition of internalizing behavior and the list of all students in your class.

2. Enter the names of the students whose characteristic behavior patterns most closely match the internalizing behavioral definition.

3. Rank order the students listed according to the degree or extent to which each exhibits internalizing behavior. The student who exhibits internalizing behavior to the greatest degree is ranked first and so on until all students are rank ordered.

Rank Ordering on Externalizing Dimension

(modified from Walker and Stevenson, 1991)

Externalizing refers to all behavior problems that are directed outwardly, by the child, toward the external social environment. Externalizing behavior problems usually involve behavioral excesses, (i.e., too much behavior) and are considered inappropriate by teachers and other school personnel. **Non-examples** of externalizing behavior problems would include all forms of adaptive child behavior that are considered appropriate to the school setting.

Examples include:

- displaying aggression toward objects or persons
- arguing
- forcing the submission of others
- defying the teacher
- being out of seat
- not complying with teacher instructions or directives
- having tantrums
- being hyperactive
- disturbing others
- stealing
- not following teacher or school imposed

Non-Examples include:

- cooperating, sharing
- working on assigned tasks
- making assistance needs known in an appropriate manner
- listening to the teacher
- interacting in an appropriate manner with peers
- following directions
- attending to task
- complying with teacher requests

rules

List Externalizers	Rank

Instructions:

1. Review the definition of externalizing behavior and then review a list of all students in your class.

2. Enter the names of the **externalizing students** (3-6), those whose characteristic behavior patterns most closely match the externalizing behavioral definition.

3. Rank order the students listed according to the degree or extent to which each exhibits externalizing behavior--to the greatest degree is ranked first and so on until all students are rank ordered (modified from Walker and Severson, 1991)

4. Enter the name of **peer models**, 3-6 students who show appropriate and cooperative behaviors.

Appendix B

Definitions for Observation Codes for Mini-MOOSES

STUDENT BEHAVIOR

bd **CHILD GENERAL DISRUPTIVE : Always keep in mind that these behaviors are only coded when they reach a threshold where they occur in such a way as to disrupt other students or draw the attention of the teacher.** A general category of inappropriate behaviors including the inappropriate use of any materials as noted below. Code as one occurrence unless topography (what it looks like) changes or behavior ceased for **5s** or longer.

EXAMPLES:

A child is rocking in his/her chair, begins tapping pencil, and falls out of the chair. (bd, bd, bd)

Throwing or tossing material. (bd)

Making non-verbal noises (tapping an object, drumming on desk or stomping a foot). (bd)

Destroying property, such as a worksheet, or snapping a pencil. (bd)

Coloring desk, chair, clothes, etc. instead of paper (bd)

During floor time when child is expected to be in a criss-cross seated position, the following are coded as "bd": turning somersaults behind a table, (bd) crawling across the floor on his/her hands and knees (bd), standing up bent over with bottom up in the air (bd).

NON-EXAMPLES:

Kneeling on chair.

Making verbal noises (grunts, humming, etc.) Code this as “bva.”

During floor time when child is expected to be in a criss-cross seated position, the child is laying over on the floor. Code as “outofp.”

During floor time when child is expected to be in a criss-cross seated position, the child stands up without bending over with bottom up in the air. Code as “outofp.”

bvp - CHILD TO PEER NEUTRAL VERBAL BEHAVIORS (talking, laughing)

Verbal statements towards peers that are inappropriate for the situation such as chatting during work time if it is not task related. This code also includes laughing that is not teasing. Code bvp separately if at least 3 sec have passed between the end of one incident and the beginning of the next or if another students responds to separate the event).

EXAMPLES:

Instructional setting is math table time in small groups. Target child initiates with other child about a show he/she watched last night. Other child responds with a sentence that lasts 3 sec. Target child continues talking about show. Other child responds. Teacher redirects group back to math and the children comply.

NON-EXAMPLES:

After class, teacher allows students to talk to one another, target student talks to a friend. Student asks peer for a pencil or something related to assignment and gets started on work right away.

negvp - CHILD TO PEER AGGRESSIVE BEHAVIORS (teasing, cussing, arguing)

Verbal statements towards peers that are argumentative, taunting, name-calling, put downs, and provocative in nature. Tone and volume of voice may be an indicator of a negative verbal statement, but must include content as described to be counted. This code

also includes laughing at a peer when in trouble. Code negvp separately if at least 3 sec have passed between the end of one incident and the beginning of the next or if another students responds to separate the event).

EXAMPLES:

Bothering or making fun of someone. (negvp)

"I'm going to cut you!" (negvp)

NON-EXAMPLES:

"Hey, do you want to come to my house to play after school?" (bvp)

"Let's play hop scotch at recess… (bvp)

bva - CHILD TO TEACHER NEUTRAL VERBAL BEHAVIORS (talk outs, mouth noises)

Verbal statements towards teachers that are inappropriate for the situation such as talking when not called upon or making noises during instruction. This code also includes making noises such as excessive sighing, clicking the tongue, blowing air out through the lips, or other audible distractions. Code bva separately if at least 3 sec have passed between the end of one incident and the beginning of the next or if the teacher responds to separate the event).

EXAMPLES:

Target student answers a question without raising his or her hand. (bva)

During an assignment, target student sighs when he or she does not know how to answer a question without getting teachers' attention appropriately.

If specifically forbidden by teacher instructions

NON-EXAMPLES:

"This assignment sucks, you are a bad teacher!" (negva)

Teacher welcomes a whole class choral response and the student talks without raising his hand.

Student mumbles to self about instruction, whispers to self

negva - CHILD TO TEACHER AGGRESSIVE VERBAL BEHAVIORS (argue, cussing or verbal aggression)

Verbal statements towards teachers that are argumentative, taunting, and provocative in nature. Also includes refusals to comply to directions with arguing statements. Tone and volume of voice may be an indicator of a negative verbal statement, but must include content as described to be counted. Code negva separately if at least 3 sec have passed between the end of one incident and the beginning of the next or if the teacher responds to separate the event).

EXAMPLES:

"No!" (negva)

"I don't have to!" (negva)

"Make me!" (negva)

"I'm not going to do it!" (negva)

"This is stupid!" (negva)

NON-EXAMPLES:

Answering questions without hand raising if permitted by the teacher. (no code)

Making obscene hand gestures at another person. (bd)

Whispering to self, working problem barely out-loud (no code)

Engagement/Disengagement

****Note: The general rule is: Is the student doing what they are supposed to be doing?**

eng - Student is appropriately working on the assigned/approved activity. Signs of this on-task behavior include (a) attending to the material and the task, (b) making appropriate motor responses (writing, following rules of a game, looking at the teacher or student speaking), (c) asking for assistance (where appropriate) in an acceptable manner (e.g., raising hand), and (d) waiting appropriately for the teacher to begin or continue with instruction (staying quiet and staying in seat).

EXAMPLES: Target Child (TC)

TC is writing on an assigned workbook page.

TC is reading out loud with the class when directed to do so.

TC puts her head down on her desk for 4 seconds and then continues her work.

TC is not engaging in choral reading with the class, but is looking at the page and following along with his finger.

TC gets up to sharpen her pencil and returns to her work within 5 sec (or is on the way back to her desk without dawdling).

TC gets up to get a Kleenex and immediately returns to his seat.

TC goes to the teacher's desk to ask a question and then returns to her seat.

TC looks out the window for less than 5 sec and then returns to the task.

deng - Student is not participating in an approved/assigned activity. They are not attending to the material or task, making appropriate motor responses, asking for assistance in an acceptable manner, or waiting appropriately for the teacher to begin or continue with instruction. Only score after the student has not been attending for 3 sec.

EXAMPLES: Target child (TC)

TC has been asked by the teaching assistant to leave a teacher-led activity and come talk to her; this takes more than 3 sec. (noncomp,deng)

TC is writing on an assigned workbook page. (eng)

TC gets up from seat and washes hands for 7 seconds (up without permission). (OutofP, deng)

TC is reading out loud with the class when directed to do so. (eng)

TC stares away from the teacher, student talking, or instructional materials for more than 3 sec. (deng)

TC puts her head down on her desk for 3 sec and then continues her work. (eng)

The teacher asks the students to stand up to stretch before an activity and the TC remains seated for more than 3 sec. (noncomp,deng)

TC is currently disengaged. The teacher asks the class to follow along in the book and engage in choral responding. The TC is not engaging in choral reading with the class, but begins looking at the page and following along with his finger. (noncomp, eng)

TC has been out of the classroom, comes back into the classroom and takes 8 seconds to return to her desk (up without permission or is dawdling). (trans,deng, OutofP)

TC gets up to sharpen her pencil and returns to her work within 3 sec (or is on the way back to her desk without dawdling). (OutofP, eng)

TC gets up to get a Kleenex and immediately returns to his seat. (Out ofP, eng)

TC goes to the teacher's desk to ask a question and then returns to her seat. (OutofP, eng)

TC looks out the window for less than 3 sec and then returns to the task. (eng)

Sequence for engaged vs. disengaged: The class is working on Math. Some of the students (including the target child) are standing up at their desks. The teacher gives a general behavioral request to "Sit down" but the child does not comply. Then the child is no longer working on the math sheet (looking out the window). The teacher tells the class to sit down. The child does not sit down but begins to work on the math problems. The correct coding sequence would be: noncomp, diseng, rep_gr, noncomp, eng.

TEACHER BEHAVIOR

pr_in/pr_gr- TEACHER PRAISE (individual/to group)- *Individual* praise is to the target only. *Group* is inclusive of the target student, may be large or small groups and is praise **not** directed toward an individual.

Individual praises are to the target student only. Score praise for a verbal statement or physical gesture of intended reinforcement (hugs, pats) or tangibles (tokens, points) that indicate **approval of behavior over and above an evaluation of adequacy or acknowledgement of a correct response to a question**. This includes requests for children to give themselves a pat, high five, etc. Tone of voice may also be indicative of praise *provided that the content can be clearly heard.* Long and detailed praise statements count as one episode, unless at least 3 sec have passed between the end of one statement and the beginning of the next, *or the content changes*.

EXAMPLES: (can be combined with expressive gestures)

Thumbs up, High five, pat on the back! (pr_gr)

"Good work, Yvonne!" (pr_in)

"Billy, I like the way you did that!" (pr_in)

"Your handwriting is improving!" (pr_in)

"Everyone is sitting quietly, great!" (pr_gr)

"David, since you are sitting quietly you may read first." (pr_in)

"Thank you for raising your hand first!" (pr_in)

Good! (either pr_gr/pr_in) – MUST be context specific.

NON-EXAMPLES:

Thank you. – ignore **do not code.**

That's correct. – ignore **do not code.**

I've got Johnny's paper. – ignore **do not code.**

Right.– ignore **do not code.**

Everyone is sitting quietly. – ignore **do not code.**

Teacher looks at the target child and smiles. – ignore **do not code.**

rep_in/rep_gr- TEACHER REPRIMAND (to individual/group)-

Indicators: Reprimands occur ***after*** the behavior is occurring and is to correct or stop the behavior.

Group reprimands include those to groups in the class that target student is part of.

Verbal comments such as scolding, negative statements about behavior with the intent to stop the student from misbehaving or gestures, used with the same intent as verbal only with gestures are considered reprimands. Verbal content must be able to be clearly distinguished. Otherwise, code as "tatt" (teacher attention). Tone will likely be stern or punitive, although reprimands can be delivered in a pleasant tone ***and sometimes sound like precorrects*** (**SEE INDICATORS)**. Threats should also be counted as reprimands. Statements of negative consequences by the teacher are also included in this category.

Code reprimand at the end of the first reprimand statement, and code them separately if at least 3 sec have passed between the end of one reprimand and the beginning of the next. Statements are coded as reprimands when they are intended to correct behavior as it is occurring or after it has occurred.

EXAMPLES:

"Johnny, quit wasting time and get back to work." (rep_in)

"Start paying attention or your name is going on the board." (rep_in)

"Stop bothering Kim." (rep_in)

"I told you to sit down." (rep_gr/rep_in) –context specific

Teacher raises her finger to her mouth to gesture to students to keep quiet. (rep_gr)

Teacher asks Jane to "have a seat" when Jane gets out of her seat during independent seatwork. (rep_in)

"People are going to have to start bringing their pencils to school instead of taking them from me." (rep_gr)

"Are you awake?" (Student has eyes closed during lesson) (rep_in)

Teacher takes pencil away from student who is playing with it and not following instructions. (rep_in)

"Your behavior at recess was inexcusable." (rep_gr/rep_in) – context specific

"That's 10 minutes off recess." (rep_gr/rep_in) – context specific

"Go flip a card" (colored card system) (rep_in)

"If you keep talking, you are going to lose your recess!" (rep_gr/rep_in) – context specific

NON-EXAMPLES:

“Try harder on your math worksheet; I know you can do better.” – ignore **do not code.**

Students come back from lunch and the teacher asks them to “have a seat”. – ignore **do not code.**

“This is incorrect.” – ignore **do not code.**

“We’re getting ready for math. I want eyes and ears on me.” (look for compliance)

Teacher looks at the target child and raises his/her eyebrows. – ignore **do not code.**

Teacher looks at the target child and frowns. – ignore **do not code.**

Teacher brings finger to mouth in silent gesture**-ignore do not code.**

Teacher uses hand as a “stop/no more” gesture-ignore **do not code.**

Appendix C

Teaching Lessons

We are going to review the skill: ***"How to Get the Teacher's Attention"*** (*refer to poster*)

Definition

The steps are (*teacher reads aloud*):

1. Look at the teacher
2. Raise your hand
3. Wait for the teacher to call on you
4. Ask your question or give an answer

Now everyone read with me (*students read chorally*).

Which "School Rule" does this match? (*Answer: Ex: Be Peaceful or Be Respectful, etc*).

What other ways can you Be Peaceful or Respectful? (*Answer: Quiet, calm voice; Work quietly; Have quiet transitions, etc).*

Rationale

Why is it important to use these steps for getting the teacher's attention? (*Ex: so we can all hear the person, the classroom is quieter so people can work, so people are not talking all at once, so students aren't shouting out, etc).*

Role Play

Let's practice getting the teacher's attention.

Use volunteers (2-3 students). After each example, ask students if the volunteers got the teacher's attention the right (or wrong) way & to state the steps they saw (or didn't see).

Example: Pretend to be explaining a math problem on board. Have students raise hands. Call on one to ask/answer question.

Non-example: Pretend to be reading a story. Have volunteer shout out a question about the passage (what happened, who said it?).

Example: Pretend to be asking questions from the story. Have volunteers raise hands to answer.

Example: Have students writing in their journals. Have a volunteer raise hand and ask to get an eraser or dictionary.

Review

You did great with the role plays for practice.

Again, let's read together the steps in how to get the teacher's attention (*choral read*).

Let's work hard to practice this behavior today.

Appendix D

Human Subjects Committee <hscl@ku.edu> Wed, Jan 16, 2013 at 11:11 AM
To: "Nsubuga (Kathurima), Belinda Namugenyi" <belindak@ku.edu>
Cc: "Wills, Howard P" <hpwills@ku.edu>

Belinda,

Thank you for forwarding this information. As your tutorial certification is current and you are named as an investigator on HSCL#16385, you are permitted to use the research data that was collected during that study. Please let me know if you have additional questions.

Best regards,

Chris

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Appendix E

Ideas for Reinforcers:

- Treasure box with small prizes
- Balloons
- Bouncy balls
- Bookmarks
- Bubbles
- Play dough
- School supplies (pencils, erasers, small notebooks)
- Marbles
- Puzzles
- Stickers (younger kids)
- Grab bags (surprise inside)
- Raffle tickets (drawings can be held as often as necessary)
- Good Student certificates
- Positive note home

<u>Ideas for Fun Activities (non-tangible, inexpensive rewards)</u>

- Eat Lunch in classroom instead of cafeteria.
- Use of markers or art supplies
- Draw a team picture on the chalkboard
- Play a game (i.e. hangman)
- Bad Hair Day- Students get to brush their hair funny
- Opportunity to sing a fun song/ do a fun dance
- Take shoes off in class for (___) minutes
- Extra recess time (5 min)
- 5 minutes of free time

How to Get the Teacher's Attention

1. Look at the teacher

2. Raise your hand

3. Wait for the teacher to call on you

4. Ask your question or give an answer

Follow Directions the 1st Time

1. Look at the person (teacher) & listen

2. Say OK in your head

3. Do it now

4. Check back (if needed)

Ignore Inappropriate Behavior

1. Keep a nice face
2. Look away from the person

3. Keep a quiet mouth

4. Follow directions-
   Do your work

"CW-FIT" GAME POINTS						
DATE:		**REWARD:**		**GOAL:**		
TEAMS:	**1**	**2**	**3**	**4**	**5**	**6**
POINTS:						

1. **How to gain teacher attention**
2. **Following directions**
3. **Ignoring inappropriate behaviors**