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I am submitting herewith a dissertation written by Joan Elizabeth Popkin entitled "The Effects of Interdependent Group Contingencies on the Academic Performance of Students with Serious Emotional Disturbances: Randomizing Target Behaviors, Criteria, and Reinforcers." I have examined the final paper copy of this dissertation for form and content and recommend that it be accepted in partial fulfillment of the requirements for the degree of Doctor of Philosophy, with a major in Education.

Christopher H. Skinner, Major Professor

We have read this dissertation
and recommend its acceptance:

(Inclusion of committee members' names under the lines below is optional)

Accepted for the Council:

Vice Provost and Dean of
Graduate Studies

The Effects of Interdependent Group Contingencies on the Academic Performance of Students with Serious Emotional Disturbances: Randomizing Target Behaviors, Criteria, and Reinforcers

A dissertation presented for the Doctor of Philosophy Degree

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Joan E. Popkin

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DEDICATION

This work is dedicated to my father, David Popkin, whose support has been unwavering. I cannot fully express with words my gratitude and indebtedness to him, and to my mother, Hae Yung Popkin, who will always inspire me to excel throughout my entire life and in all my endeavors.

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ABSTRACT

This investigation examined the effects of randomizing components in an interdependent group contingency program for academic assignment accuracy of five Seriously Emotionally Disturbed (SED) male students in a self-contained multi-grade classroom in southeastern United States. A multiple baseline design across target behaviors was used to evaluate the effects of the group contingency program on students' academic performance (i.e., independent seatwork assignments in spelling, mathematics, and English). The design included four phases. During baseline, no additional consequences were received for academic performance. During the randomized interdependent group contingency intervention phases in spelling, mathematics, and English, students received access to rewards contingent upon the average performance on independent seatwork assignments. For all interventions, rewards were randomly selected, as were the criteria for earning the reward. Results suggest that all three intervention phases were successful in increasing the classwide average percent correct data for all three subjects.

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CHAPTER I

INTRODUCTION

Studies have shown that interdependent group contingency programs can enhance prosocial behaviors and academic performance of students in general education classrooms. Students with Serious Emotional Disturbances (SED) are more likely to engage in inappropriate classroom behavior than general education students (Hewitt, 1974; Rosenberg, Wilson, Maheady, & Sindelar, 1997; Towns, 1981). In addition, a majority of SED students have academic skills deficits when compared to general education students. Interdependent group contingencies can be used to decrease inappropriate classroom behavior in SED students (Theodore, Bray, Kehle, & Johnson, 2001).

Interdependent group contingencies may be used to decrease inappropriate behaviors in SED classrooms. However, negative side effects are often associated with these procedures (e.g., the group does not earn access to the reinforcer, the entire group may display negative reactions). Students may believe they are being punished contingent upon the behavior of the other students (Stewart & McLaughlin, 1986). In addition, contingencies usually require a time limit in order to meet the set criteria. If students are aware that they have not or will not meet the set goal, they may stop performing the target behavior(s) (Skinner, Cashwell, & Dunn, 1996). Furthermore, a

student or group of students may be singled out as those who failed to earn the reward for their peers, thus causing feelings of frustration, anger, or aggravation, which may ultimately result in a negative classroom environment (e.g. blame and threats) for all students (Bear & Richards, 1980; Hayes, 1976).

Purpose of the Study

Researchers have posited that randomizing contingency components may allow educators to minimize these negative side effects (Skinner et al, 1996). However, there exists little research on randomized group contingencies. Further, there is no research evaluating the impact of these contingencies on the academic performance in students with SED. Therefore, the purpose of this study is to evaluate the effects of a randomized component group contingency program on the academic performance of students with SED.

Definition of Terms

1. Contingency - describes an if-then relationship between a behavior and its antecedent and consequent events. For example, if after a teacher reads a math problem (antecedent), the students accurately solve the problem (behavior), the students receive points from the teacher (consequence).
2. Individual Contingencies - consequences are delivered to each student contingent upon their own behavior meeting a specific criterion.
3. Group Contingencies - contingency management systems in which consequences for an entire group are affected by the behavior of one or more students (Jenson, 1978). The application of group contingencies allows school personnel to

implement shared operational components (e.g., criteria, target behavior, and reinforcer) to a group of students instead of one individual student.

a. Dependent Group Contingencies - consequences are delivered to all group members contingent upon the behavior of an individual child or a few selected member(s) of the group.

b. Independent Group Contingencies - each individual in a group is subjected to the same contingency, with each individual receiving the same consequence contingent upon their own behavior meeting the same criterion.

c. Interdependent Group Contingencies - the same consequence is delivered to all group members contingent upon the behavior of the group meeting a group (i.e., group's average spelling test score) criterion.

4. Seriously Emotionally Disturbed (SED) - based on the criteria described in the State Department of Education Manual for Tennessee (Tennessee Division of Special Education, 1993), in order to be diagnosed as SED, a child must exhibit to a marked degree one or more of the following:

I. inability to learn which cannot be explained by intellectual, sensory, health, or specific learning disability factors.

II. inability to build or maintain satisfactory interpersonal relationships with peers, teachers, and other significant persons.

III. inappropriate types of behavior or feelings under normal circumstances.

IV. general pervasive mood of unhappiness or depression.

V. tendency to develop physical symptoms or fears associated with personal or school problems.

5. Positive Reinforcers – are consequences, that when delivered contingent upon a behavior, increase the probability of that behavior.

CHAPTER II

REVIEW OF THE LITERATURE

Groups are an important part of functioning in everyday society. For example, it is important for individuals to collaborate with one another in order to achieve common goals and overcome common obstacles. Group cooperation and collaboration are utilized in many professional fields. Adults in a business setting must be able to work together in an effective manner to meet certain demands of the job. For example, a product group must work collaboratively to develop an effective marketing campaign. This usually requires individuals to work with one another to identify effective strategies to meet their goals.

Given the importance of groups working together to achieve common goals, school personnel should contribute to the educational environment for students to work under these conditions. Thus, children should learn how to work together and to respect one another so that they can function effectively in society. Educators can encourage group functioning, collaboration, and cohesion in the classroom environments through the implementation of behavior modification techniques, specifically with the utilization of interdependent group contingencies (Slavin, 1991).

Behavior modification techniques have been applied in educational settings for decades (Sulzer-Azaroff & Mayer, 1986). These techniques involve a collection

of procedures that have been utilized to systematically change behaviors by applying learning theories (Jenson, 1978). There are a variety of techniques that are commonly associated with behavior modification based on operant conditioning, classical conditioning, and observational learning.

Contingencies

Many school personnel have used behavior modification to describe the use of contingencies to manage behavior or academic problems (Skinner et al., 1996). In addition, contingency management techniques have been applied and utilized across settings, circumstances, and individuals, including elementary and secondary school children (Jenson, 1978). Contingencies describe a relationship between a behavior and its antecedent and consequent events (e.g., a teacher reads a math problem [antecedent], the students accurately solve the problem [response], the students receive points from the teacher [consequence]). There are two basic types of contingency management procedures: reinforcement and punishment. Both involve delivering or removing consequences contingent upon student behavior. When reinforcement is used, educators increase the probability of behaviors by delivering (i.e., positive reinforcement) or removing (i.e., negative reinforcement) an event or stimuli contingent upon behaviors. When punishment is used, educators decrease the probability of behaviors by presenting (i.e., positive punishment) or by removing a stimuli (i.e., negative punishment) contingent upon a behavior (Sulzer-Azaroff & Mayer, 1986).

Two basic contingency management programs are implemented in the classroom environment: individual and group. Individual contingency reinforcement programs target distinct behaviors, criteria levels, and reinforcers for each individual member of a group. When group contingency reinforcement programs are used, the entire group is subject to the same target behaviors, criteria, and reinforcers (Shapiro & Goldberg, 1986). Many contingency management programs have been underutilized to alter social and academic behaviors in educational settings (Forness & Kavale, 1991). The underutilization of these different contingency programs may occur because many school personnel and administrators do not have the necessary skills, education, training, and/or confidence in handling these procedures dealing with contingency management (Watson, 1994). As such, both general and special education teachers may, at times, turn to individual positive reinforcement programs rather than to group reinforcement programs (Hall, 1991).

Individual Contingencies

With individual positive reinforcement, a reinforcer is earned by a student contingent upon a particular behavior meeting a specific criterion, and the likelihood of that behavior occurring in the future increases. To reinforce an individual's behavior based on his or her performance is a common approach for modifying behavior. Individual reinforcement programs may be more commonly employed by special education teachers. Legal requirements for individualized education programs may increase the probability of special education teachers designing and implementing individual reinforcement programs (Jacob-Timm & Hartsthorne, 1994).

Finally, special education teachers may receive more training in behavioral analysis which may also increase the probability of them implementing individual reinforcement programs (Englemann, 1991).

Perhaps the primary reason why special education teachers often employ individual rather than group contingencies may be due to the idiosyncratic needs and reactions to stimuli of particular students. With individual contingencies, teachers are able to meet idiosyncratic student needs by accommodating particular reinforcers or stimuli to the individual students' particular strengths, goals, needs, interests, and/or weaknesses that they are attempting to modify or change. Another advantage includes the ability to target different behaviors displayed by students within different time frames or periods. This may allow for flexibility and specificity for each students' unique interests, needs, and psycho-educational goals (Skinner, Skinner, Skinner, & Cashwell, 1999).

Although individual reinforcement programs are extremely useful, the implementation of individual contingencies in educational environments can pose procedural, perceptual, and group cohesion problems. The management of different contingencies at different times is frequently inefficient, time consuming, and impractical (Bushnell, Wrobel, & Michaelis, 1968). Oftentimes, behavior modification techniques used to modify individual behaviors can become expensive when many individuals are involved. For example, different students may desire different reinforcers which often include tangible rewards such as candy and toys.

A substantial amount of time is often required to simultaneously evaluate, monitor, and track multiple individual contingency programs involving different target behaviors, criteria, reinforcers, and students (Gresham & Gresham, 1982). Inefficiency of a program often inhibits teachers from implementing various programs (Hall, 1991; Litow & Pumroy, 1976). Therefore, teachers may be less inclined to utilize individual contingencies because they can consume so much classroom time (Kratochwill, Elliot, & Rotto, 1995).

Implementing specific contingencies for one student and not for others may pose problems associated with "singling out" an individual student. This phenomenon may inadvertently make other students notice or detect a bias towards a specific individual and classify that individual as different or unusual (Skinner et al., 1996). Another problem occurs when one student is praised and rewarded for appropriate behaviors in order to decrease inappropriate behaviors, while other peers who are consistently displaying appropriate behaviors are never acknowledged. This differential treatment may be deemed as "unfair" to students and cause many problems such as peer taunting, ostracizing, and even fighting. Therefore, students may criticize instead of help one another, which may decrease group cohesion and cooperation among students (Cashwell, Skinner, Dunn, & Lewis, 1998).

When implementing individual reinforcement programs, educators intentionally treat some students differently from others. This can pose problems among school personnel, parents, and peers. School personnel (teachers and/or principals) may be perceived as having "favorites," thus causing both peers and

parents to view these particular educators and students in a negative light (Skinner et al., 1999).

Group Contingencies

A major goal of most educational professionals across a wide variety of settings includes shaping, altering, and managing the behaviors of students within a group or group setting (Skinner et al., 1996). Group contingencies are contingency management systems in which consequences for an entire group are affected by the behavior of one or more students (Jenson, 1978). The application of group contingencies allows school personnel to implement shared operational components (e.g., criteria, target behavior, and reinforcer) to a group of students instead of one individual student (Kelshaw-Levering, Sterling-Turner, Henry, & Skinner, 2000).

The use of a single contingency to modify the social or academic behaviors of a group of students (e.g., an entire classroom) may allow educators to avoid economic, procedural, and social limitations associated with individual reinforcement programs (Gresham & Gresham, 1982; Litow & Pumroy, 1975). Group contingencies may require fewer resources because either all or none of the students receive reinforcement. This may allow teachers to use group activity reinforcers instead of individual tangible reinforcers. For example, it would be difficult for teachers to allow some students to listen to music during independent seat-work but not others (Skinner et al., 1996). Thus, group contingencies may allow educators to use resource efficient activities that are difficult to deliver to only those who earned reinforcement.

Often reward programs may not alter student behaviors because low quality rewards are used. With group contingencies, students may encourage or provide additional social reinforcement for each other's behavior. Thus, these contingencies may encourage additional social reinforcement delivered by peers, which may enhance the impact of the program (Jenson, 1978; Litow & Pumroy, 1975; Sulzbacher & Houser, 1968).

Group reinforcement contingencies are also more time efficient than individual reinforcement in the classroom setting because it is often easier to deliver a reinforcer to the entire class than to give a one to an individual member of the class (Gresham & Gresham, 1982; Litow & Pumroy, 1975). In addition, individual contingencies may require more time to implement than group contingencies because, with group contingencies, separate records on each and every student are not needed. Furthermore, teachers do not have to acquire new behaviors or have extensive training in implementing group contingencies (Wilson & Williams, 1973).

Group contingency programs may facilitate the growth of prosocial behaviors and respect for diversity. This is an important aspect of group interaction and in helping peers help themselves. These side effects of group contingencies may also help students understand each other's academic and behavioral strengths and weaknesses, thereby making the classroom environment more conducive for students to learn and cooperate with one another (Cashwell et al., 1998).

There are economic, procedural, and social factors that encourage educators to employ group contingencies. Also, researchers have repeatedly shown that group

contingencies are effective. For example, educators have used group contingencies to reduce disruptive classroom behavior (Long & Williams, 1973), increase school attendance of pre-delinquent adolescents (Alexander, Corbett, & Smigel, 1976), reduce the overall level of noise in a classroom through the use of a mechanical device (Wilson & Hopkins, 1973), decrease the verbal interaction among high school senior girls (Dietz & Repps, 1973), increase the academic achievement of fourth and fifth-grade classrooms (Hamblin, Hathaway, & Wordarski, 1971), and control fighting and seat behavior on a school bus (Campbell, Adams, & Ryabik, 1974).

Researchers have also compared the effects of group contingencies with other types of programs. For example, Stage and Quiroz (1997) conducted a meta-analysis of research designed to decrease inappropriate classroom behavior. They found that group contingency programs resulted in larger decreases (i.e., effect size) in inappropriate classroom behaviors than all other interventions studied.

Additionally, researchers compared the effects of group and individual contingencies on student behavior. Some researchers have found that group contingencies were more effective in modifying academic performance than individual contingencies (Crouch, Gresham, & Wright, 1985; Gresham & Gresham 1982; Hamblin, et al., 1971; Litow & Pumroy, 1975; O'Leary & O'Leary, 1976). This phenomenon may occur because peers often encourage classmates to do their best (McLaughlin, 1981; Shapiro & Goldberg, 1986). Furthermore, studies have consistently demonstrated that group-oriented contingencies are more effective than no contingencies in promoting increased social acceptance among peers, appropriate

classroom behavior, and higher achievement (Nevin, Johnson, & Johnson, 1982). However, in other studies group contingencies did not result in consistently superior behavior change relative to individual contingencies (Gamble & Strain, 1979; Gresham & Gresham, 1982; Grandy, Madsen, & De Mersseman, 1973; Page & Edwards, 1978; Shapiro & Goldberg, 1986; Turco & Elliot, 1990; Axelrod, 1973).

Types of group contingencies.

Group contingencies have been classified into three main types: dependent, independent, and interdependent (Litow & Pumroy, 1975). The relative effectiveness of each group contingency varies across studies (Shapiro & Goldberg, 1986; Turco & Elliott, 1990). However there are advantages and disadvantages related to the different types of group contingencies concerning psycho-social and procedural safeguards (Crouch et al., 1985; Skinner et al., 1996; Skinner et al., 1999).

Dependent. A dependent group contingency is established when a reinforcer for the entire group is based upon an individual child or a selected member(s) of a group and is contingent upon his or her appropriate social or academic performance (Gresham & Gresham, 1982; Shapiro & Goldberg, 1986). An example of this type of contingency would be to reward (e.g., an ice cream party) the entire class contingent upon the lowest performing student obtaining 80% or higher on a spelling test. In obtaining this goal, the entire class would be allowed to participate in the ice cream party. Failure to achieve this goal would result in the loss of the ice cream party for all students. Therefore, each student is dependent on a particular peer's performance in order to obtain the reward.

Dependent group contingencies can facilitate in maintaining appropriate academic and social behaviors as well as decrease disruptive behavior with the support of peers (Cashwell et al., 1998; Gresham & Gresham, 1982; Litow & Pumroy, 1975). There are, however, disadvantages with this particular technique. When rewards include educational activities (e.g., a field trip), legal and ethical guidelines may prevent educators from withholding these opportunities from some students based upon another student's behavior (Skinner et al., 1996).

Another disadvantage is that the target student may receive inappropriate and undue pressure from his or her peers to perform and meet goals. When this occurs, the student may receive threats, social dismissal, and/or punishment from peers (Cashwell et al., 1998). Also, all students are not subject to the same criteria. Therefore, some students may deem this type of contingency system as "unfair" when they meet certain criteria or just generally perform well but do not receive recognition or rewards because of another student's behavior (Turco & Elliott, 1990).

Independent. Independent group contingencies are often used by educators because of the consistency of their applications in educational environments and the school personnel's lack of knowledge of other techniques (Watson, 1994). This particular type of reward system is based upon individuals in a group being subjected to the same response contingencies and rewards by meeting similar criteria. The reinforcement is based only upon an individual student's performance or response. An example of this type of contingency system would be the use of grades. All students are initially subject to the same criteria, target behaviors, and instruction.

Students are then able to obtain access to the same consequences based upon meeting the same goals under similar stimuli conditions (Skinner et al., 1999). When individuals are subject to the same target behaviors, criteria, and rewards, independent group contingencies are considered more fair for students and are more easily manageable for teachers than individual contingencies (Turco & Elliott, 1990).

Yet there are drawbacks to independent group contingencies that are similar to the negative effects seen with dependent contingencies. These disadvantages include a social class system, negative effects of consequences (which may be different for individual students), and ethical and legal implications (Cashwell et al., 1998; Skinner et al., 1996; Skinner et al., 1999). Social class systems may arise when one group of students consistently earns access to reinforcers while another group does not. This may discourage group cohesion among the students (Slavin, 1977). It may also cause labeling of individuals or groups of students as lazy and/or stupid. Students may become jealous of those that do earn the rewards. Also, the successful students may become ostracized by their peers as being "different," "nerdy," or trying to "kiss up" to the teacher (Cashwell et al., 1998).

With independent group contingencies, reinforcement is held constant across the group. Although some reinforcers may be high quality for some students, for others these consequences may be lower quality (e.g., a neutral stimuli) or even punishing. For example, if the reward is being able to visit a snake farm and a student is extremely afraid of snakes, this particular event could punish, as oppose to

reinforce this student's behavior (Hayes, 1976). Therefore, some students may actually misbehave in order to avoid an aversive stimulus (Skinner et al., 1996).

The quality of a reinforcer may also be diminished dependent upon who or how many receive access to the reward (Skinner et al., 1996). For example, suppose only six students earn the opportunity to play flag football out of a class of 22. Playing flag football with five classmates is a lower quality reinforcer than playing with 22 classmates. Additionally, some students may find some activities reinforcing only when other specific students are also allowed to participate (e.g., a student's best and only friend is excluded from a field trip).

Peers who do not earn rewards may also belittle the reward or reward activity. For example, students who do not earn a chance to go to a museum may belittle this opportunity (e.g., "museums are boring"), thereby decreasing the quality and effectiveness of the reinforcement.

Lastly, the same ethical and legal implications associated with dependent group contingencies apply to independent group contingencies. Again, there may be a violation of special needs students' rights according to the Individual with Disabilities Act (IDEA) if educational opportunities are denied based upon behavior related to their disability (Jacob-Timm & Hartshorne, 1994).

Interdependent. Interdependent group-oriented contingencies are established when the same reinforcer is accessible to each member of a group based upon the performance of the entire group (Shapiro & Goldberg, 1986). Therefore, with this type of group contingency each member is dependent upon the other members'

performances within the group (Litow & Pumroy, 1975). An example of this type of contingency would be 20 minutes of free time for the entire class contingent on the class averaging 80% on a spelling test. If this group criterion is achieved, all members of the class would receive the extra 20 minutes of free time. However, if this group criterion is not achieved, no members of the class would receive the extra 20 minutes of free time.

Group criteria can be set based on various levels of the group's performance. The most common one involves meeting a set or pre-established group criteria. These criteria can include averaging the grades of the group as a whole (e.g., at least 80% on math quizzes for the week), lowest performances (e.g., no one receives less than 75% on a math quiz for the week), highest performances (e.g., all students will receive no less than 3 demerits for an entire six weeks).

There are a number of applied practical advantages of interdependent group-oriented contingencies. In some instances, it may be easier to determine if the group met criteria as opposed to each individual. For example, if a minimum score is used an educator could quickly scan individual scores and stop scanning when she identified a score that did not meet the minimum.

It is also easier to deliver the same reinforcers to an entire group on an all or nothing basis. For example, it is easier to pass out a piece of candy to the entire group, as opposed to giving a piece of candy to some and not others based on their individual performance. Additionally, when all students receive tangible reinforcers,

it may reduce the probability of students stealing peers' reinforcers (Skinner et al., 1999).

When all or none of the group members receive access to reinforcement, school personnel may find it easier to use group activity reinforcers. Using these activity reinforcers may preserve resources (since tangible reinforcers, which can easily be delivered to some students and not others, may also be expensive). In addition, because all or none of these students are allowed to engage in these activities, educators do not need to plan alternative activities or engage fellow educators in monitoring those who did not earn the activity reinforcer. Finally, whereas tangible reinforcers such as candy can be easily taken by other students (i.e., stolen), activity reinforcers cannot be stolen.

In addition to the applied advantages, positive psycho-social effects may be occasioned by interdependent group contingencies. One advantage to this type of contingency is that students have to rely on one another and, therefore, may work together in order to receive the reinforcer (Slavin, 1987). Students may also be more likely to help each other perform well because it increases the probability of them earning rewards (Kelshaw-Levering et al., 2000).

Because their fates are intertwined (Slavin, 1987), peers may be more likely to assist or encourage each other to perform their best. As each student is working towards a common goal, social contact, sharing of resources, and cooperation among one another may be enhanced. This may also increase tolerance, encouragement, assistance, and understanding among diverse students who come from different

backgrounds, races, genders, and socio-economic status' (Cashwell et al., 1998; Gamble & Strain, 1979; Slavin, 1987; Skinner et al., 1996; Speltz, Shimamura, & McReynolds, 1982). Also, because the group as a whole either earns access to reinforcers or not, a class system would not be established based upon some students receiving access to the reinforcer while others do not (Cashwell et al., 1998; Skinner et al., 1996). Lastly, the group as a whole can share in the enjoyment of their goals being achieved and their reinforcer being earned. This can be particularly important when certain students are rarely reinforced for their individual behavior (Cashwell et al., 1998).

Social behavior. Studies have shown that interdependent group contingencies are effective in altering classroom behavior and academic performance. An early example was the study by Barrish, Saunders, and Wolf (1969) in which a general education fourth grade class was divided into two teams. The program was introduced as the "Good Behavior Game." The game was based upon earning the fewest number of marks for inappropriate behavior across academic periods. Reinforcement was delivered to members of the winning team or both teams when they accumulated fewer than six marks for inappropriate behavior. The game was effective in reducing the inappropriate and disruptive behaviors of the entire class.

Crouch et al., (1985) used an A-B-A-B withdrawal design to evaluate the effects of an interdependent contingency on the classroom behavior of third-grade general education students. The goal was to increase on-task behavior (e.g., working on one's own project independently of others, getting materials needed without

talking, raising one's hand before addressing a question), decrease off task behavior (e.g., using materials in an inappropriate manner, looking away from one's project longer than 5 seconds), and decrease disruptive behavior (e.g., talking so loudly one could be heard across the room, demonstrated rough or inappropriate physical contact with another student, being out of one's seat without the permission of the teacher). During baseline phases, off task, on-task, and disruptive behavior were measured under typical classroom conditions. During the interdependent group contingency phases, the entire class earned 10-minutes of free time when they met certain criteria that were specified by the teacher and communicated to the students. Specifically, points were given for students behaving appropriately (e.g., following directions and classroom rules). Results showed that the group reward program decreased inappropriate and increased appropriate behavior levels relative to baseline (Crouch et al., 1984).

Skinner, Cashwell, & Skinner (2000) used an A-B-A-B withdrawal design to investigate the effects of an interdependent group contingency program on students' reports of classmates' prosocial behaviors in a general second-grade classroom. Second-grade students were taught to identify and report peers' daily prosocial behaviors. During baseline students were taught to report, by writing on index cards, the prosocial behaviors of their peers. At the end of each day the cards were collected, read, and the experimenters tallied the number of reported incidental prosocial behaviors reported by students. During the interdependent group contingency, the class earned pre-established and pre-communicated rewards, contingent upon the

group meeting specific prosocial behavior reporting goals (e.g., the reward was delivered when a total of 200 prosocial behavior were reported, regardless of how many school days it took). It was found from the results that the interdependent group contingency increased the class' rate of reporting their peers' incidental prosocial behaviors.

Academic performance. Group contingencies often address academic performance. For example, grading systems are typically independent group contingencies. Additionally, interdependent group contingencies are a component, and perhaps a critical component of Classwide Peer Tutoring (Greenwood, Delquadri, & Carta, 1997) and cooperative learning programs (Slavin, Sharon, Kagan, Lazarowitz, Webb, & Schmuck, 1985) that have been shown to enhance academic performance.

Shapiro & Goldberg (1986) used an alternating treatment design to compare weekly spelling test accuracy across three group contingencies (i.e., independent, interdependent, and dependent) in students in a general education sixth-grade classroom. During the independent group contingency conditions, only students who scored 90% or higher received five tokens. During the interdependent group contingency conditions, the class' mean spelling test score had to be 90% or higher, for the entire class received 5 tokens. During the dependent group contingency conditions, a student was randomly chosen and if that student scored 90% or higher, then the entire class received 5 tokens. All three contingencies improved students' performance on daily spelling tests relative to baseline. However, there was no

difference in the class' spelling accuracy across the three group contingencies. Shapiro & Goldberg (1990) found similar results in a follow-up study.

Seriously Emotionally Disturbed (SED) Students

Group contingencies have been shown to be as or more effective than individual contingencies in reducing inappropriate classroom behavior and enhancing academic skills of general education students. Students with SED typically engage in higher rates of inappropriate classroom behavior than general education students (Hewitt, 1974; Rosenberg et al., 1997; Towns, 1981). Additionally, these students are more likely to experience academic skills deficits than their general education peers (Towns, 1981). Thus, group contingencies may be particularly useful for preventing and remedying social/behavioral and academic achievement problems in students with SED.

Social behavior. Salend, Reynolds, & Coyle (1989) investigated the effects of the "Good Behavior Game" on the behavior of socially emotionally disturbed students. These researchers made several modifications in the procedure. The primary difference was that different target behaviors (i.e., physical and verbal abuse to others, truancy, substance abuse, and withdrawal) were set for each student. Each incident of inappropriate behavior would receive a mark on the board for each team. The team would receive an agreed-upon reinforcement (e.g., sugarless gum, fruit, lunch with a staff member) if total marks did not go beyond the criterion level set by the teacher. Results showed that this procedure (Good Behavior Game with idiosyncratic target behaviors) was effective in decreasing the behaviors displayed by

the SED students. Additionally, teacher satisfaction was high because this kind of system was effective and easy to manage. Furthermore, students liked this idea of being rewarded for good behavior (Salend et al., 1989).

Ellery, Blampied, and Black (1975) modified the good behavior game (Barrish et al., 1969) and compared the effects of independent and interdependent group contingencies on inappropriate behavior of seven students, between the ages of eight and ten, with SED or social maladjustments. The study was conducted in a self-contained classroom for emotionally-disturbed children. During the independent contingency condition, students received reinforcement for obeying rules based on their own behavior. During the interdependent contingency condition, all students received reinforcement if all classmates obeyed the rules. Results showed that both procedures improved behavior relative to baseline, but neither was clearly more effective.

Whereas some researchers used group contingencies to decrease inappropriate behavior in students with SED, Gamble and Strain (1979) used interdependent group contingencies to increase socially appropriate behavior in two self-contained SED classrooms for elementary students. During the interdependent group contingency phases, students had to earn a specified number of smiley faces. Smiley faces were given to individual students for engaging in socially appropriate behavior (e.g., inviting another peer to join in an activity or game, saying "thank you," "please," and "your welcome" to another peer, making statements complimenting another peer's work). The entire class would earn rewards only when each student earned enough

smiley faces. Results showed that the group contingency was effective for increasing prosocial behavior across both classrooms.

Gresham and Gresham (1982) used a modified reversal design to evaluate the effectiveness of three types of group contingencies (interdependent, dependent, and independent) for reducing inappropriate behaviors in students with behavior problems and mental retardation. The interdependent group contingency was similar to the good behavior game (i.e., two teams, teams with most points wins). During the dependent group contingency, teams won or lost based on a pre-established team member's inappropriate behavior. During the independent group contingency, students received rewards based on their own behavior. Results showed that all procedures reduced disruptive behavior, however, the dependent and interdependent were more effective than the independent.

Theodore et al. (2001) found that an interdependent group contingency program developed by Skinner et al. (1996) was effective in decreasing antisocial behavior in five adolescent males with SED. In this study, both the reinforcers and contingencies were randomly selected.

Academic performance

One study was identified where researchers investigated the impact of group contingencies on SED or behavior disordered students' academic performance. Nevin et al. (1982) examined the effects of a group contingency on the completion of math problems in eleven seventh-grade students. An A-B-A-B reversal design was implemented. During baseline, students worked individually. During the

interdependent group contingency conditions, the students earned points (which could be traded in for free-time activities) for the group by correctly completing 150 math problems in 15 minutes. Results showed that group contingencies enhanced academic performance.

SED and group contingencies: Possible limitations

Researchers have shown that dependent and interdependent group contingencies can be used to reduce inappropriate behavior in SED students. Additionally, one study showed that group contingencies enhanced the academic performance of students with SED (Nevin et al., 1982). However, there are limitations associated with implementing group oriented contingencies (Skinner et al., 1996). These limitations may be of particular concern when working with students with SED.

One concern is related to perceived fairness. Students with SED may be more sensitive to contingencies and more likely to react to contingencies that they perceive as unfair (Pierce, 1998). Students have rated dependent and interdependent group contingencies as less fair than independent group contingencies (Turco & Elliott, 1990). This is not an illogical perception, as students who perform well (e.g., do not engage in inappropriate behavior) may not receive access to rewards when their peers' perform or behave poorly (Stewart & McLaughlin, 1986).

Because students with SED may be both more sensitive to being treated unfairly and more likely to engage in inappropriate behavior than their general education peers, these students may engage in disruptive behavior when they do not

receive access to rewards after they have performed or behaved well (Pierce, 1998). For example, they may complain to the teacher or engage in intense, emotional, and aggressive behavior directed toward the teacher when they learn that they will not receive access to the reward (Skinner et al., 1996).

Additionally, students with SED may also be more likely to engage in anti-social behavior directed toward their peers. Specifically, they may be more likely to threaten peers with physical or social aggression in order to "encourage" them to perform well so that the group is more likely to receive access to the reward. Also, they may punish peers for poor performance, both socially and physically when specific students are perceived as causing them to loose access to the reward (Bear & Richards, 1980; Hayes, 1976).

Another problem with group contingencies is related to criteria for earning reinforcement. For example, suppose on Monday a teacher tells her/his SED students that the entire class can earn access to a high quality reward if they do not fight for a week. If the students fight on Monday, the contingency is no longer in place for the entire week. Thus, the contingency designed to decrease fighting could actually increase fighting in SED students (Skinner et al., 1996).

A related problem is what happens when contingencies are removed. For example, because SED students may be more quickly to react to changes in contingencies than their peers (Pierce, 1998), they may be less likely to maintain behaviors when contingencies are abruptly removed.

A final problem is related to reinforcers or rewards. One reason why students with SED may engage in higher rates of inappropriate behavior and lower rates of desired behavior is related to the quality of rewards. Typically, in a classroom, all students receive access to the same consequences (e.g., rewards) contingent upon their own behavior (i.e., independent group contingencies). However, students with SED may have an idiosyncratic learning history that affects the relative quality of rewards. Thus, rewards that may be high quality reinforcers for many students, may be a) low quality reinforcers, b) neutral stimuli, or c) punishing stimuli for SED students. For example, for some students, teacher attention may serve as a reinforcing stimulus. However, students with SED may have a different learning history where this attention serves as an aversive stimuli in some contexts.

Addressing the Limitations of Interdependent Group Contingencies through Randomization of Group Contingency Components

There are many procedures that may be used to address the limitation of group contingencies that were described above. For example, research suggests that when academic behaviors are targeted, peers may be more likely to assist each other to perform well using supportive procedures such as peer-tutoring. However, when inappropriate social behaviors are targeted, peers may be more likely to threaten or coerce their peers in order to increase the probability of the group earning rewards (Pigott & Heggie, 1985). Thus, although the majority of research conducted with SED students and group contingencies has targeted inappropriate social behavior,

targeting desired academic behaviors may reduce the probability of some negative side effects.

Randomization of Contingency Components

Although there are three major types of group contingencies (i.e., independent, dependent, interdependent), each contingency is composed of similar components. These components include a) target students, b) target behaviors, c) criteria, and d) reinforcers. Skinner et al. (1996) described how randomizing these contingency components could mediate the negative side-effects associated with interdependent group contingencies.

Randomizing target students.

Researchers investigating dependent group contingencies have implemented programs which randomly selected target students (Gresham & Gresham, 1982; Shapiro & Goldberg, 1986). Because the entire group receives access to reinforcement contingent upon one student's behavior, this procedure fits the definition of a dependent group contingency. However, by randomly selecting the reinforcer, this procedure functions like an interdependent group contingency because the probability of all students receiving access to a reward is increased when their peers' perform well. These randomized dependent group contingencies have been shown to be effective in enhancing students' academic performance (Shapiro & Goldberg, 1986; Shapiro & Goldberg, 1990) and social behaviors (Drabman, Spitalnik, Spitalnik, 1974; Gresham & Gresham, 1982). Thus, in addition to the rewards delivered by the teacher, students may encourage and reinforce peers'

behavior in order to increase the probability of earning rewards. Additionally, teachers may find this procedure easy to implement (i.e., only having to check on students' performances) and students may find this procedure more acceptable because of the random drawing component (Drabman et al., 1974).

Skinner et al. (1996) indicated other advantages of randomly selecting target students when dependent group contingencies are used. By randomly selecting target students, classmates will be unable to isolate, taunt, threaten, or ostracize a target peer. Thus, a particular student may not be exposed to undue pressure from classmates. Additionally, if the student randomly selected does not meet the criteria, the teacher does not have to communicate to the students which classmate failed to meet criteria. This may reduce the probability of peers aggressing against the classmates whose performance prevented them to earn the group reward (Skinner & Watson, 1997). Furthermore, when the student who was randomly selected did meet the criterion, the teacher could announce his or her name increasing the probability of peers praising this classmate for his or her performance.

Randomizing reinforcers and criteria for interdependent group contingencies.

Randomly selecting target students may reduce or mitigate some limitations associated with dependent group-oriented contingencies. However, randomizing reinforcers, target behaviors, and criteria can reduce many limitations associated with all group contingencies (Skinner, Skinner, Sterling-Turner, in press).

Randomly selected reinforcers.

During interdependent group contingencies, all students receive access to the same reward or consequence. However, this consequence may prove to be a high quality reinforcer to some students, but a low quality reinforcer or even a punishing consequence for other students. Students who find the consequent punishing are actually negatively reinforced for failing to meet criteria. In this instance, the program will have the opposite effect on students' behavior. For example, suppose a class of SED students are told that they will go to a "water park" if they do not fight. Also suppose that one student, Joe, hates going to the water park. Joe will actually be reinforced for fighting because it allows him to avoid the water park.

One solution to this problem is to develop a pool of reinforcers and allow students to choose among the pool. This is essentially what is done with token economies. However, the problem with token economies is that educators, in addition to other duties, must manage a business in their classroom (i.e., run the store). This includes managing tokens, setting prices, keeping the store stocked, etc. Furthermore, teachers may have to address problems associated with token stealing and token forgery. Although token economies have been shown to be effective, they are rarely used within educational settings because they require large amounts of teacher time and teacher resources (Hall, 1991).

Another solution to the problem associated with idiosyncratic reinforcers is to make reinforcers unknown or randomly select reinforcers; (Jenson, 1990; Rhodes, Jenson, & Reavis, 1992; Skinner et al., 1996). Randomly selected reinforcers can be

used for any type of contingency. For example, teachers may implement an independent group contingency where students select a tangible reinforcer from a pool of reinforcers (e.g., reach into a "grab bag" and select a wrapped item; Jenson, 1990). Additionally, with group contingencies, after it is determined that the criteria is met, the group rewards can also be randomly selected.

Randomization of reinforcers in a group contingency incorporates the strengths of interdependent group contingencies, such as being time efficient and economical for teachers and facilitates prosocial behaviors in students, while helping to limit the negative side effects of group contingencies. Because some reinforcers for some students are neutral, weak, or even punishing stimuli, randomization of rewards would help to alleviate the problem of particular reinforcers having negative effects or consequences for some students. When these types of systems are utilized, not every reward has to be reinforcing for each individual student. Ultimately, there will be various rewards that are reinforcing for all students; therefore, all students will be motivated to work towards the goal (Skinner et al., 1999). In addition, this reinforcement lottery may allow students to add idiosyncratic reinforcers to the "pool" of reinforcers during the program, which could enhance their effectiveness of the program (Skinner et al., 1996).

In one study, researchers found that random or unknown group rewards were more effective in increasing students' academic performance than using known rewards. Moore, Waguespack, Wickstrom, Witt, and Gaydos (1994) implemented a mystery motivator game in two separate classrooms (classroom A and classroom B)

to investigate its efficacy in increasing the percentage of the completion and accuracy rate of homework assignments among third and fifth grade students. A key element of the mystery motivator is that students are constantly in a "state of mystery" as to the kind of reinforcer that they could earn.

In classroom A, 21 third-grade students participated in the study and the teacher identified five male students as targets for intervention. All students had to complete their homework assignments in order to have the opportunity to play mystery motivator. The teacher would collect the homework and record homework completion and accuracy rates for each student across all academic subjects. During the baseline phase, the five target students had an average homework completion rate of 64.9% and an average accuracy rate of 56.6%. During the intervention phase, students were given the opportunity to play the mystery motivator game if all their homework assignments were completed. In addition, various mystery motivator symbols were randomly placed on a chart. All five students showed an increase in their average homework completion rate (89.4%) and average homework accuracy rate (81.2%).

In classroom B, 28 fifth-grade students participated in the study and the teacher identified four male students as targets for the intervention. Similar to classroom A, all students had to complete their homework assignments to earn the opportunity to play mystery motivator. The teacher then collected the homework and recorded homework completion and accuracy rates for each student across all academic subjects. During the baseline phase, the four target students had an average

homework completion rate of 70.1% and an average accuracy rate of 52.1%. During the intervention phase, the mystery motivator game was implemented if all the students' homework assignments were completed. Like classroom A, various mystery motivator symbols were randomly placed on a chart. Three of the four students showed an increase in their average homework completion rate (80.8%) and average homework accuracy rate (65.1%). Results showed that the mystery motivator game was effective in improving academic performance relative to baseline. Furthermore, this intervention was rated as highly acceptable by the teachers who implemented the program and also by the students who participated (Moore et al., 1994).

Randomizing target behaviors and criteria.

Randomizing target behaviors and criteria alleviate other side-effects associated with using group contingencies with self-contained SED classrooms (Skinner et al., in press). In several instances, contingencies may not be effective in altering students' behavior because of the manner in which criteria are established. For example, if the criteria are too high, some students may not even attempt to meet the criteria. This may be a particular problem for students with SED who display high rates of antisocial behavior and are who more likely to have academic skills deficits than general education students.

A related problem is setting the criteria to low. For example, suppose a teacher uses an independent group contingency where each student receives access to reinforcement and they make 85% on their spelling tests. A student who consistently receives 95% could actually receive reinforcement for doing worse, as opposed to

better. However, if an interdependent group contingency is used where reinforcement is delivered based on the class' average spelling performance, then improved performance for this student is reinforced.

A solution to this problem is to randomize criteria. In fact, "the good behavior game" (Barrish et al., 1969) includes unknown criteria. Specifically, students had to perform better than their peers. However, because they did not know how many points peers were earning or going to earn, they essentially were reinforced for doing their best. Classwide peer tutoring uses a similar procedure. Students earn points for themselves and for their team for accurate academic responding. Team points are pooled to determine the winning team. However, peers have no way of knowing how many points are required to win. Thus, they are reinforced for doing there best (Greenwood et al., 1997).

In addition to using teams and competitions to randomize criteria, educators can merely develop a pool of criteria and randomly select them (see Skinner et al., 1996 for a description). If this pool includes both high and low criteria, then all students will be motivated to do their best. Additionally, students who perform poorly at some point or on some tasks, can still improve their behavior or performance and increase the probability of receiving reinforcement. For example, suppose following directions is the target behavior and a student fails to follow directions five times in the first 10-minutes of Monday. If the criterion to earn reinforcement is fewer than five failures to follow directions for the week then that student can no longer earn the reinforcement. However, if the target is randomly selected from a pool that contains

the criteria from 0-20, that student could still meet the criteria on Friday. Thus, their behavior may still be altered by the contingency.

If an interdependent group contingency is in place and the entire group loses their opportunity to earn a group reward early in the contingency interval, problems are exacerbated. Instead of having only one student whose behavior is no longer under control of the contingency, the entire class' behavior is no longer under control of the contingency. Also, when students do not meet the criteria, they may react negatively (e.g., emotional outburst and disruptive behavior). They may aggress against one another or towards a particular student in the class to whom they may place the blame for not receiving the reward.

Another issue is related to target behaviors. Group contingencies cause students to alter target behaviors. Unfortunately, these students may also exhibit an increase in undesired behaviors and/or a reduction in desired behaviors that are not targeted through group reinforcement. Therefore, teachers may have to deliver reinforcers to the group of students who improved the target behavior, but who performed poorly or behaved in an inappropriate manner across non-targeted behaviors.

Randomization of the criteria and target behaviors may facilitate in ameliorating these problems. By randomizing target behaviors and criteria, the behavior of students can be under contingency control because the students cannot continuously evaluate their behaviors and determine if they met the set criteria levels (Skinner et al., 1996). Thus, having unknown or randomly chosen target criteria and

behaviors may encourage students to continue their performance and progress across behaviors throughout the contingency program (Skinner & Watson, 1997).

Research on Randomized Group Contingency Components

There have been only two studies analyzing the effectiveness of interdependent group contingencies with the randomization of multiple components. Kelshaw-Levering et al. (2000) used a multi-phase time-series design (i.e., A-B-A-C-B-C) to evaluate the effects of an interdependent group contingency, using randomized group reinforcement procedures on the classroom behavior of second-grade general education students. Specifically, four students displaying disruptive behaviors (i.e., off task, out-of-area, inappropriate verbalizations, and noncompliance) were identified by the teacher. The purpose of the study was to determine if concurrently randomizing various contingency components (i.e., target behaviors and criteria, group contingency programs [interdependent or dependent], and reinforcers) would cause more change in target behaviors when compared to randomizing the reinforcers only. The target behaviors (e.g., "off-task") and the group criteria (e.g., a number, ranging from 0-36) were written on pieces of paper, which were randomly selected out of a jar. Two different group contingency programs (i.e., interdependent and dependent) were also randomized. The interdependent group contingency program was implemented when a slip of paper with the word "whole class" was selected. The dependent group contingency program was used when a slip of paper with the word "individual student" was selected. Lastly, if the criterion was met, a reinforcer was randomly selected from a pool of reinforcers.

During the baseline phase, observations of student target behaviors were recorded. During the interdependent group contingency with randomized reinforcers (RR+) phase, the experimenters randomly selected rewards. No other contingency components were randomly selected. These randomized reinforcers or "treats" could be earned based upon meeting specific target behavior goals (i.e., not getting out of one's area without permission from the teacher, not talking to peers without permission from the teacher, completion of seatwork, etc.) that were explained and required by the teacher. In addition, the teacher listed potential rewards (i.e., five minutes of extra recess, varying minutes of free time, snacks, and points that could be earned by the entire class for a "class party") the students could earn based upon meeting the specified criterion. A randomly selected student would then draw a reward from a jar. During the interdependent group contingency with all components randomized (R-all) phase, the students were unaware of the criteria for earning the reinforcer because target behaviors and criteria, contingency programs [interdependent or dependent], and reinforcers were randomly selected from four jars as opposed to one jar during the RR+ (randomized reinforcers) phase. One jar contained specific target behaviors and criteria with the number of times the disruptive behaviors could occur (e.g., three instances of noncompliance; five instances of off-task behavior). Additionally, some slips of paper contained the word "All," which meant that all disruptive behaviors were summed to determine if the group met the criteria. All disruptive behaviors were included with the number of times the target disruptive behavior(s) could occur in a specified interval.

A second jar was used to designate the type of group contingency program (i.e., interdependent or dependent) used. The interdependent group contingency program was labeled as "whole class" on a slip of paper. The dependent group contingency program was labeled as "individual person" on a slip of paper. In this jar, a slip of paper would be chosen in order to determine if the entire class or an individual student's behavior would be used to determine if the group earned the reward. If the "whole class" slip was selected from the jar, the teacher would evaluate the class as a whole according to the "behavior" slip from the first jar. The criteria for the interdependent group program was based upon the entire class' summed number of checks acquired during the interval. If the "individual student" slip was selected, a third jar was utilized which contained the names of each individual student in the class. The individually selected student's behavior, which was chosen from the jar, would then be evaluated according to the "behavior" slip that was chosen. If the whole class (i.e., interdependent) or individual student (i.e., dependent) met the target behavior and criterion that was randomly chosen, then the whole class earned the selected reinforcer.

The fourth jar contained various reinforcers (which were the same reinforcers used during the RR+ phase) selected by a randomly chosen student in class. At the end of each interval, pieces of paper (containing the specific target behavior and criterion, group contingency program, and /or student) were randomly chosen from the first three jars. Students were then allowed to select a reward from the reward jar if the chosen criterion was met.

The results of this experiment indicated that the RR+ and R-all phases were both effective in decreasing disruptive behavior when compared to baseline. However, the R-all (randomization of multiple components) intervention produced slightly more effective results than when the RR+ (randomization of reinforcers alone) intervention was implemented.

Theodore et al. (2001) analyzed the effects of interdependent group contingencies with randomization of multiple components on the disruptive behavior of five socially emotionally disturbed students. An A-B-A-B reversal design was used to evaluate the group contingency program. Disruptive behavior was defined as failing to comply with the requests of the teacher and/or teacher aid within 5 seconds, talking or touching other students working at their desks, verbal "putdowns" about another student, oneself, or situation, emission of crude words, and listening to one's walkman loud enough for other students and teacher(s) to hear.

During the baseline phase, the teacher implemented his typical independent group contingency classroom management program (e.g., removing 1 minute of free time for using obscenities, rewarding students with 2 minutes of free time for each instance a student showed up on time for class, etc.). During the intervention phase, the teacher discontinued the independent group contingency classroom management program and implemented a randomized group contingency program. This program was similar to the Kelshaw-Levering et al. (2000) program, in that the reinforcers, criteria, and group contingency programs were randomly selected. However, the Theodore et al. (2001) program did not randomize target behaviors.

The randomization of a criteria contingency program was employed (i.e., unknown dependent group contingency, which included the behavior of a randomly selected student in the classroom and an interdependent group contingency, which included the whole group, low, average, or high performances) along with randomized reinforcers to effectively decrease disruptive behavior. The students were informed of the new rules and the possible reinforcers that could be earned. The possible reinforcers that they could earn were mostly in the form of tangibles, such as, chips, sodas, candy bars, a detention pass, and a "late-to-class" pass, which was suggested by the teacher and presented to the class for further comments.

The intervention phase was implemented for a two-week period at the beginning of two 45-minute time frames. The classroom rules were posted in the room and also on index cards on each child's desk. The teacher would mark on the index card if the child did not follow the rules during the two specified 45-minute time frames. Two jars were placed on the teacher's desk. One jar was labeled "criteria" contained randomized criteria. The jar contained nine pieces of paper with randomized criteria (i.e., group contingency programs), including the lowest performing student, the average of all performances (randomized interdependent), one randomly chosen student from within group (randomized dependent), and the performance of the whole group. The other jar was labeled "reinforcers." All the students in the classroom would be able to earn a randomly selected reinforcer from the "reinforcers" jar if the student(s) obtained five or fewer marks for the criterion

that was chosen from the "criteria" jar. If the student(s) did not meet the criterion, the teacher would simply announce the class' failure to meet specific criterion.

The results of this study demonstrated that randomization of reinforcers and criteria for reinforcement (i.e., group contingency programs) decreased negative social behaviors in an SED classroom. In addition, both consumer satisfaction and teacher acceptability were ranked as "liked" and "strongly agree," respectively (Theodore et al., 2001). These two studies take advantage of interdependent group contingencies with randomization of multiple components (i.e., target behaviors and criteria, group contingency programs [with target students], and reinforcers). The results, in both studies, demonstrated that randomizing various components in a group contingency program was advantageous in decreasing the disruptive student behaviors in both general and special education classrooms.

Summary and Purpose

Empirical studies have supported the positive effects of interdependent group contingency programs by increasing prosocial behaviors and academic performance of students in general education classrooms. Students with SED are more likely to engage in inappropriate classroom behavior than general education students. Additionally, the majority of students with SED have academic skills deficits. Researchers have shown that interdependent group contingencies can be used to decrease inappropriate classroom behavior in SED students (Theodore et al., 2001).

Interdependent group contingencies may be used to decrease inappropriate behaviors in SED classrooms. However, there are negative side effects associated

with these procedures (e.g., the group does not earn access to the reinforcer, the entire group may display negative reactions). Students may believe they are being punished contingent upon the behavior of the other students even if they are in accordance with the rules and expectations of the class (Stewart & McLaughlin, 1986). In addition, contingencies usually require a time limit in order to earn the set criteria. If students are aware that they have not or will not meet the set goal, they may stop performing the target behavior adequately (Skinner et al., 1996). Furthermore, a student or group of students may be singled out as those who failed to earn the reward for their peers, thus causing feelings of frustration, anger, or aggravation, which may ultimately result in a negative classroom attitude (e.g. blame, threats, and verbal/physical attacks) and environment for all students (Bear & Richards, 1980; Hayes, 1976).

Researchers have posited that randomizing contingency components may allow educators to minimize these negative side effects. However, little research has been done on randomized group contingencies and no research has been done that evaluates the impact of these contingencies on the academic performance in students with SED. Thus the purpose of this study is to evaluate the effects of a randomized component group contingency program on the academic performance of students with SED.

CHAPTER III

METHODOLOGY

Participants

Students

All five male students from an intact self-contained classroom serving students with serious emotional disturbances (SED) participated in this study. The students were enrolled in a segregated school for students with SED in southeastern United States. Approximately 95% of the students at the school were eligible for free lunch, suggesting that the school was serving students from low economic families.

The participants' ages ranged from 11 to 14 years old and they were currently in either sixth, seventh, or eighth grade. Four students were Caucasian and one was African-American.

All participants had been diagnosed as SED, based on the criteria described in the State Department of Education Manual for Tennessee (Tennessee Division of Special Education, 1993). In order to be diagnosed as SED, a child must exhibit to a marked degree one or more of the following:

I. inability to learn which cannot be explained by intellectual, sensory, health, or specific learning disability factors.

II. inability to build or maintain satisfactory interpersonal relationships with

peers, teachers, and other significant persons.

III. inappropriate types of behavior or feelings under normal circumstances.

IV. general pervasive mood of unhappiness or depression.

V. tendency to develop physical symptoms or fears associated with personal or school problems.

More specific data on each student's disabilities could not be obtained due to concerns about confidentiality. Specifically, the teacher and a school administrator advised researchers that they would maximize the chance of receiving parental consent for all students enrolled in the classroom if they did not seek permission to review students' psycho-educational files. In order to conduct the current study, consent was required from each student's parent(s) or legal guardian(s).

Experimenter, Teacher, and Teaching Assistant

Additional participants included the experimenter, the teacher, and the teaching assistant. The primary experimenter was a third-year doctoral student in school psychology. She developed the program, trained the teachers, and assisted with training the students. The teacher was in her second year of teaching; both years at the current school. The teacher implemented the program daily (i.e., obtaining and recording grades and randomly selecting target behaviors, criteria, and reinforcers).

The teaching assistant was in her fifth year at the current school. She, as well as the teacher, graded daily assignments and facilitated in the implementation of the behavior management programs and daily instructional activities in the classroom. Both teachers were certified in *Therapeutic Crisis Interventions*.

Setting

All students participating in the study sat at individual desks. The desks were arranged facing the teacher's desk and the front chalkboard. However, students would sometimes move their seats around (e.g., in a circle) depending upon what activities they were engaged in. The teaching assistant's desk was placed facing the teacher's desk on the other side of the room. Instructional activities for the class included teacher-directed instruction (group and individual), group recitations, independent seatwork, and group activities.

Materials

Various materials were used in the current study. A list of rewards can be found in Appendix A. The teacher wrote names of group rewards (which were determined by the teacher and students) and group criteria-target behaviors (which were determined by the teacher and primary experimenter) on index cards. Two shoeboxes were covered with colored construction paper and used to store index cards that contained rewards and criteria-target behaviors. A third shoebox was placed on an activity table so those students could suggest rewards. These reward suggestions were also written on index cards. Additionally, daily written independent seatwork assignments were used. These assignments included worksheets from different curricula workbooks and teacher constructed assignments. Students worked on different assignments depending upon their current skill levels and IEP goals. In some instances a teacher's manual was used to grade student performance. For other

assignments, teachers scored accuracy without a key or manual (e.g., spelling, simple mathematics computation).

Design, Dependent Variables, Independent Variables

Design

A multiple baseline design across target behaviors was used to evaluate the effects of the group contingencies on student's academic performance. The three target behaviors were academic performance on independent seatwork assignments in spelling, mathematics, and English. The design included four phases. During baseline, no additional consequences were received for performance in spelling, English, and mathematics. During the intervention phases, interdependent group contingencies were implemented. Across all intervention phases, students received access to rewards contingent upon the average performance (i.e., class' average percent correct on assignments) on independent seatwork assignments. For all interventions, rewards were randomly selected as was the criteria for earning the reward.

During the first phase of intervention, rewards were delivered contingent upon the students meeting a randomly selected criteria for spelling performance. Additional target behaviors were added sequentially to the intervention. During the second intervention phase, rewards were delivered contingent upon meeting a randomly selected criteria for spelling or mathematics performance. During the final phase, English performance was included as a target behavior. Thus, rewards were randomly selected and then delivered contingent upon meeting a randomly selected criteria for

spelling, mathematics, or English performance (i.e., if the teacher selected 85% in spelling and the class' average in spelling for that day was 85% or above, then the class would have the opportunity to receive a randomly selected reward).

Dependent Variables

Each day, students were given independent seatwork assignments in spelling, mathematics, and English. Each student turned these assignments in to be graded by the teacher or teaching assistant. The teacher and/or teaching assistant scored the accuracy of each student's work. Work that was not completed was scored as incorrect. These data were converted to percentage data and used by the teacher and teaching assistant to monitor students' performance and assign grades.

The class' mean accuracy on spelling, mathematics, and English assignments served as the primary dependent variables. Mean accuracy levels were calculated by summing each student's percent correct on each assignment (i.e., spelling, mathematics, and English) and then dividing by the number of students who attended school that day. All students' scores were included unless a student had to miss a significant portion of class time for other activities (e.g., parent-teacher conference). For each subject area, individual student performance (i.e., percent correct) was also measured and analyzed.

Independent Variables

During the first baseline phase, students received no additional consequences for their performance in spelling, mathematics, and English. An interdependent group contingency program was then implemented throughout the three intervention phases.

The teacher, experimenter, and students all contributed to develop a pool of rewards. Academic criteria also were developed by the teacher and experimenter based upon baseline performance and teacher judgments. Both the criteria and rewards were randomly selected throughout the study. In addition, academic target behaviors were added sequentially (i.e., spelling, mathematics, and English) and then randomly selected during the second and third phases of the intervention.

General Procedures

Permission

Initially, an internal review board application was completed and permission letters were obtained from the teacher and the principal of the school. Applications for permission to conduct the study were then submitted to and approved by institutional review boards of the participating school district and the University that the primary researcher was attending. Next, the teacher passed out parental consent forms to all five students. All students in the class returned the form with a parent's signature, granting permission to participate. Next, the study was explained to students and all assented to participate. The institutional research application can be found in Appendix B and the parent's permission and student assent forms can be found in Appendix C.

Experimental Procedures

Baseline

During this phase, no additional contingencies were implemented for the targeted academic behaviors. Typical classroom procedures during this phase

included independent group-oriented contingencies of academic and social behaviors. Students received grades contingent upon their own academic performance on independent seatwork, tests, and homework. Additionally, independent group contingencies targeted social behaviors. For example, privileges and praise were delivered for appropriate social behavior. Students also earned "Bonus Bucks" that could be exchanged for the opportunity to engage in specific activities (e.g., playing on the computer) or tangible rewards (e.g., candy, fruit). Aversive consequences also were delivered contingent upon inappropriate and disruptive behaviors (e.g., time out or in- school suspension if student(s) engaged in physically aggressive behavior).

Teacher Preparation

The primary experimenter conducted a training session before the intervention was implemented. First, the experimenter spent about 10 minutes reviewing the program with the teacher and teaching assistant. Next, the experimenter provided the teacher and teaching assistant with a seven-step treatment protocol typed on sheets of white paper (see Appendix D). The experimenter, teacher, and teaching assistant then reviewed baseline data and selected the initial target behavior. Spelling was selected because the class's performance was low and showed a clear decreasing trend.

Next, criteria were established. Criteria were selected based on teacher judgment of students' abilities and baseline data. The teacher wrote "spelling" on 30 index cards. For each index card the teacher wrote a criteria. The 30 criteria were as follows, one 25%, three 50%, three 70%, four 80%, four 85%, five 90%, five 95%, five 100%. These index cards were then placed in a decorated shoebox.

Student Training and Reinforcer Generation

The teacher, teaching assistant, experimenter, and students met for one 30-minute group session at the beginning of the school day. The experimenter introduced herself to the class and explained that an "Academic Reward Game" would be implemented. The experimenter explained to the class that they would be able to earn a reward based upon their performance on in-class assignments. Students were told that either everyone or no one would receive rewards. The students and teacher then suggested various group rewards and the teacher wrote these rewards on the chalkboard. Students were encouraged to choose both immediate and delayed group reinforcers. The teacher gave examples for various group rewards (e.g., 15 minutes of computer time, 10 minutes of music, art activities, videos, extra bonus bucks, etc.). From this list, the teacher then selected rewards that were acceptable. For example, the teacher excluded some rewards that were resource inefficient and tangible (i.e., candy, ice cream, toy cars, toy airplanes, etc.).

Once the teacher selected rewards for inclusion in the reward pool, she wrote the rewards on index cards and placed them in a shoebox labeled "Rewards." The teacher then placed a "Suggestions" box on a table and informed students that they could write suggestions for other group rewards at anytime during the study. They were told that the teacher could choose to include these rewards in the "Rewards" box. See Appendix A for a list of rewards that were included in the pool.

Next, the experimenter told the class that they could earn these rewards if they met certain academic goal(s). The teacher told the students that their first goal would

be to improve their independent seat-work spelling grades. The teacher then told the students that she would randomly select a reward from the pool by the end of each school day if students met a specific criterion for spelling accuracy. The teacher also told the students that the entire class would earn the reward only if the class' average performance met criteria.

Next the teacher told the class that the goal or criterion would also be randomly selected. At this point, she showed the class the "Goals" shoebox and randomly selected a card and read the target behavior and criteria (e.g., 90% accuracy in spelling). She then explained that if the entire class, as a whole, met or exceeded this goal (class average of 90% or above in spelling) that she would randomly select a card from the "Rewards" box and the students would receive access to the randomly selected reward. Although students received the reward the next day, the specific time that the reward was delivered was at the teacher's discretion. The teacher told the students, that if the students did not meet the specific goal or criterion chosen, she would not select a reward from the "Rewards" box. The students also were told that they would have another opportunity to earn rewards the next school day.

The teacher selected several other examples of goals and rewards and answered any specific questions with respect to the program. The experimenter and teacher repeated that the group's average had to meet or exceed the criterion in order for all students to earn the reward. She then reminded them that they could make suggestions for other rewards by filling out an index card (kept next to the suggestion box) and placing it in the suggestions box. The box labeled goals was placed next to

the rewards box and displayed on the teacher's desk. The suggestions box was placed on an activities table.

Intervention Procedures

Immediately after training the intervention was implemented. Thus, at the end of the school day the teacher announced that it was time to determine if the group earned the reward for spelling performance. First, she randomly selected an index card from the goals box. She then checked her grade book where the teacher or the teaching assistant had calculated or estimated and recorded the group's average spelling accuracy. The teacher then announced the criterion and whether the class met this criterion. If they met the criterion, the teacher randomly selected a reward and announced to the class what reward they would receive. The teacher then returned the reward and goal index cards to their respective shoeboxes so that they could be selected again on another school day.

These procedures were continued for 9 school days. During this time, students could suggest additional rewards or the teacher or teaching assistant could add rewards to the rewards box.

Student Training and Procedures for Randomized Targets

After 9 school days of the interdependent group contingency targeting spelling accuracy, mathematics was added as a possible target behavior. Again, in the morning a training session was run where the teacher described this change in the Academic Reward Game.

The teacher told the students that the game would be changed. Specifically, she told them that the mathematics goals would be added to the goals box. Again, the teacher and the experimenter developed criteria for mathematics and wrote these criteria on index cards. The number of index cards with the specific goals were identical to those used for spelling. For example, there were four index cards with "mathematics" and "80% accurate" written on them, four index cards with "mathematics" and "85% accurate" written on them, five index cards with "mathematics" and "90% accurate" written on them, etc.

This randomized reward, criteria, and academic target behavior was then run for 9 school days using procedures that were identical to those used during the initial intervention phase. However, during this phase the teacher and teaching assistant had to calculate or estimate the class' mean accuracy on spelling and mathematics independent in-class assignments before the end of each school day.

After 6 school days a third academic target behavior was added, English independent in-class assignment accuracy. Again, the teacher and the experimenter decided to use the same number of cards with the same criteria as those used for spelling and mathematics. The teacher wrote these criteria (e.g., English, 85% accurate) on index cards. She showed and described these index cards to the students. The teacher then added these cards to the goals box and told the students that in order to increase their chance of earning the rewards, they would now have to do their best on spelling, mathematics, and English independent in-class assignments.

Procedures were identical to those described earlier, except now the teacher and the teaching assistant had to calculate or estimate the class' average accuracy levels on three assignments (spelling, mathematics, and English) before the end of each school day. This final phase of the current experiment was run until the teacher decided to halt procedures because the end of the school year was approaching and the students had many different activities planned.

Interscorer Agreement

Assignments were first scored by the teacher or teaching assistant. The primary experimenter independently scored a randomly selected sample of 20% of the in-class assignments. Interscorer agreement was then calculated for each assignment on an item-by-item basis. The number of agreements was divided by the number of agreements plus disagreements and multiplying by 100%. The mean total interscorer agreement for accuracy was 96.7%. Interscorer agreement was not 100% because there were discrepancies in scoring the English assignments which required subjective evaluation.

Treatment Integrity

The classroom teacher and teaching assistant were presented with checklists and asked to monitor the implementation of the intervention. Both the teacher and teaching assistant were given a treatment integrity checklist to review and to use as a guideline. The steps and procedures monitored to ensure consistency were (a) randomly selecting a criteria from the "Goals" box before the end of the day, (b) collection of in-class assignments, (c) accurately scoring the class' in-class

assignments, (d) explanation to the class of total percentage points for the day and whether criteria were met, (e) randomly selecting a reinforcer from the "Rewards" box (if criteria were met), and (f) distribution of the reward (activity) if criteria were met. Treatment integrity was maintained 100% of the time for all classroom administrations.

CHAPTER IV

RESULTS

Table 4.1* presents the mean data across students and each student's average percent correct data for spelling, mathematics, and English for baseline and intervention phases. Figure 4.1* graphically displays the classwide average daily assignment scores (i.e., percent correct) for all three academic subject areas during baseline and intervention. Figures 4.2-4.6 display each student's individual academic performance for all three academic subject areas.

The primary data for the current study was the class' average percent correct on daily assignments for spelling, mathematics, and English. These data were used to make decisions regarding what academic subject area to target first and when to add additional assignments to the randomized group contingency. Thus, the class' average performance will be presented first, followed by the individual student data.

Group Data

Table 4.1 shows that the class' average percent correct data during baseline phases were lowest for spelling (x = 62.2%), followed by mathematics (x = 66.6%) and English (85.7%). Across each subject area average assignment performance was

* All tables and figures can be found in the Appendix E

higher during the intervention phase. The class' average spelling assignment performance increased 34%, mathematics performance increased 19%, and English increased 7.6%.

Table 4.1 shows that the group's average spelling performance was lower than mathematics or English performance. Figure 4.1 shows that classwide average spelling performance during baseline was variable with a decreasing trend. Therefore, spelling was the first academic behavior targeted.

The first intervention phase with only spelling performance reinforced, began following 9 days of baseline. Figure 4.1 shows that the class' average daily assignment scores in spelling increased immediately after the group contingency targeting spelling only performance was implemented. During the intervention for spelling, the class' average daily percent correct on spelling assignments was more stable than during baseline. Their performance remained strong and was maintained throughout the entire intervention phase, except for days 17 and 26. As additional subject area assignments where added to the group contingency, the class' average spelling performance remained high.

During baseline, Figure 4.1 shows a decreasing trend in the class' average mathematics' assignment performance. After mathematics assignments were added to the randomized group contingency, the class showed an immediate improvement in their mathematics performance. As with spelling, intervention data were more stable than baseline data. Also, Figure 4.1 shows that students' mathematics performance tended to improve as intervention progressed (i.e., increasing trend during the

intervention). Generally, the increase in performance in mathematics was maintained throughout the intervention phase. However, Figure 4.1 shows that when English was added to the group contingency (i.e., school day 25), students' mathematics performance decreased. This decrease in mathematics performance only occurred for the first school day (i.e., day 25) that English performance was included in the group contingency.

Figure 4.1 shows that the class' average percent correct on English assignments was more variable during baseline than during the intervention phase. Furthermore, no clear trend is evident during baseline or the intervention phases. Figure 4.1 shows that after English assignment performance was added to the randomized group contingency, the class' performance was more stable and slightly higher (mean was 85.7% during the baseline phase and 93.3% during the intervention phase). Figure 4.1 shows that there was not an immediate increase in performance after English was added to the group contingency and no clear trend was evident during the intervention phase.

Individual Data

Table 4.1 and Figure 4.2-4.6 display the data on individual student performance. Decisions regarding which subject area to target first, second, and third, and when to add subject area assignments to the group contingency were based on the primary dependent variable, class' average performance each school day. Thus, phase changes were often implemented at times that hinder the ability to evaluate

immediacy of intervention effects and changes in percent correct trends for individual students.

Student One

Table 4.1 shows that student one's average percent correct spelling was 4.4% higher during the intervention phase (x = 97.7%) relative to baseline (x = 93.3%). Figure 4.2 shows that student one's average daily assignment spelling scores during baseline and intervention phases were similar with respect to level (i.e., high in both phases) and variability. During the intervention for spelling, student one's average daily percent correct on spelling assignments was slightly more stable than during baseline (Table 4.1). Furthermore, as additional subject area assignments were added to the group contingency, student one's average spelling performance remained high.

Table 4.1 shows that student one's average daily percent correct on mathematics assignments was lower during the baseline phase (x = 68.4%) than the during the intervention phase (x = 89.8%). There was an increase of 21.4%. Figure 4.2 shows that student one's average percent correct daily assignment scores during baseline in mathematics was more variable than during the intervention phase. Figure 4.2 shows that adding mathematics' assignments to the randomized group contingency program reduced the number of assignments with accuracy below 50% (i.e., no assignments were under 50% during intervention, as compared to 5 sessions under 50% during baseline).

Table 4.1 shows that student one's average percent correct English data during baseline was lower (x = 85.7%) than the English data during the intervention phase (x

= 98.0%). This was an increase of 12.3%. Figure 4.2 shows that this student's average daily percent correct on English assignments were more variable during baseline than during the intervention phase. In addition, Figure 4.2 shows that after English assignment performance was added to the randomized group contingency, student one's performance was consistently high (range between 90% and 100%).

Student Two

Table 4.1 shows that student two's average percent correct spelling data during baseline (x = 69.0%) was much lower than the spelling data during the intervention phase (x = 92.9%). There was an increase of 23.9%. During the baseline phase in spelling, student two's average percent correct on spelling assignments was less stable than during the intervention phase (refer to Figure 4.3). This student's performance remained strong and was stable throughout the entire intervention, except on school day 26.

Table 4.1 shows that student two's daily average percent correct mathematics data was lower during the baseline phase (x= 64.7%) than during the intervention phase (x = 86.6%). There was an increase of 23.9%. Figure 4.3 shows that this student's average percent daily assignment scores during baseline in mathematics was trending lower. After the intervention phase in mathematics was added into the randomized group contingency program, student two showed an immediate improvement. In addition, the average daily percent correct in mathematics performance remained between 67 and 110%. The 110% included an extra credit item on this particular assignment.

Table 4.1 shows that student two's average percent correct English data was 80.2% baseline but increased 11.8% to 92% during after English assignment performance was added to the group contingency. Figure 4.3 shows there was no immediate increase in performance after English was added to the group contingency and no clear trend was evident during the baseline or intervention phase. However, student two's English performance was consistently high and more stable after English was included in the intervention, with no assignment scores falling below 82%.

Student Three

Table 4.1 shows that student three's average percent correct spelling scores were considerably lower during the baseline phase (x = 26.2%) than during the intervention phase (x = 96.3%). There was an increase of 70.1%. Figure 4.4 shows that student three's average daily assignment spelling scores were more stable during the intervention phase than during baseline. Student three's average percent correct spelling scores during the intervention phase were all above 89% during intervention with the exception of school day 17 where the student scored 70%. Furthermore, as additional subject area assignments were added to the group contingency, student three's average spelling performance remained high.

Table 4.1 shows that student three's average daily percent correct mathematics assignments were lower and more variable during the baseline phase (x = 72.4%) than during the intervention phase (x = 86.1%). There was an increase of 13.7%. Figure 4.4 shows no immediate increase in performance after mathematics

was added to the group contingency. However, student three showed an upward trend in his average percent correct mathematics' data during the intervention phase.

Table 4.1 shows that student three's average percent correct English data during baseline was lower (x = 72.9%) than the English data during the intervention phase (x = 90.0%). This was an increase of 17.1%. Figure 4.4 shows that this student's average daily percent correct on English assignments was more variable during the baseline phase than during the intervention phase. In addition, Figure 4.4 shows that after English assignment performance was added to the randomized group contingency, student three's English performance was consistently high for the remainder of the intervention, with no daily assignment scores falling below 80%.

Student Four

Table 4.1 shows that student four's average percent correct spelling data during baseline (x = 90.7%) was lower than during the intervention phase (x = 98.5%). There was an increase of 7.8%. Figure 4.5 shows that student four's average daily assignment spelling scores during baseline and intervention phases were similar with respect to variability. Furthermore, although the student showed a relatively small increase in level of performance, this increased performance was evident throughout the intervention phase (i.e., all scores were above 94%, with the exception of school day 17 where he scored 81%).

Table 4.1 shows that student four's average daily percent correct mathematics' assignments were lower during the baseline phase (x = 58.0%) than during the intervention phase (x = 80.4%). There was an increase of 22.4%. Figure

4.5 shows variable mathematics performance during baseline. After mathematics assignment performance was included in the intervention, student four showed an immediate increase in mathematics performance that was consistently above 74%, with the exception of one school day, when the student did not attempt to complete this assignment.

Table 4.1 shows that student four's average percent correct English data during baseline was lower (x = 86.9%) than the English data during the intervention phase (x = 100.0%). This was an increase of 13.1%. Figure 4.5 shows that this student's average daily percent correct on English assignments was more variable during baseline than during the intervention phase. In addition, Figure 4.5 shows that after English assignment performance was added to the randomized group contingency, student four's performance was consistently strong with all three assignments being completed with 100% accuracy.

Student Five

Table 4.1 shows that student five's average percent correct spelling scores were lower during the baseline phase (x = 0%) than during the intervention phase (x = 89.5%). There was an increase of 89.5%. Figure 4.6 shows that student five's average daily assignment spelling scores during baseline were all at 0%. During baseline, student five did not attempt to complete his spelling assignments and instead would engage in inappropriate disruptive behaviors (e.g., throwing his spelling books). Figure 4.6 shows that following the implementation of the group contingency target, spelling, student five's average percent correct spelling scores immediately increased

and remained above 86% with the exception of school day 26 where the student refused to do his spelling assignment.

Table 4.1 shows that student five's average daily percent correct on mathematics assignments were lower during the baseline phase (x = 63.7%) than the during the intervention phase (x = 84.0%). There was an increase of 20.3%. Figure 4.6 shows that student five's average percent correct daily assignment scores during baseline in mathematics was more variable than during the intervention phase. Figure 4.6 shows that adding mathematics assignments to the randomized group contingency program reduced the number of assignments where student five performed poorly. During baseline, student five scored lower than 50% on three mathematics assignments compared with no assignments completed below 68% during the intervention phase.

Table 4.1 shows that student five's average percent correct English data during baseline was higher (x = 87.7%) than the English data during the intervention phase (x = 79.0%). This was decrease of 8.7%. Figure 4.2 shows that student five only completed two English assignments during the intervention phase. Therefore, it is difficult to compare performance across phases for this student.

CHAPTER V

DISCUSSION

Summary

The current study was designed to extend earlier findings that focused on reducing inappropriate behaviors with interdependent group contingency programs in both general and special education classrooms. Specifically, the current study investigated the effects of randomizing interdependent group contingency components on SED students' academic performance in a self-contained SED classroom. During the randomized interdependent group contingency program, criteria and rewards were randomly selected throughout the experiment. Target behaviors (i.e., spelling, mathematics, and English) were added sequentially to the program, and a selection of target behaviors was randomized as new target behaviors were added. This staggering of target behaviors allowed researchers to use a multiple baseline design to evaluate the effects of the intervention.

Results of the current study showed that the randomized criteria and reward program resulted in dramatic, immediate, and stable increases in the class' daily spelling assignment performance. When the mathematics target behavior and criteria were added to the contingency program, similar increases were found in the class' mathematics performance. The final target behavior was English assignment

performance. The class' baseline performance in English was much stronger than either spelling or mathematics (i.e., baseline was 62% for spelling and 67% for mathematics, while English was 86%). Thus, when English was added to the target behavior pool, assignment performance increases were not as dramatic. Regardless, mean English performance increased from 86% during baseline to 93% after the English performance was added to the target behavior pool. Thus, the current study showed that the interdependent group contingency program with randomized components caused significant improvements in the class' average academic performance across subject areas.

In the first phase of the study, students could earn rewards by merely focusing on enhancing their spelling assignment performance. As additional target behaviors were added, students could not determine which assignments would result in reinforcement. Thus, as the study progressed, in order to increase the probability of earning rewards, students were required to perform well across two content area assignments (i.e., spelling and mathematics) and then three content area assignments (i.e., spelling, mathematics, and English). Thus, as each target behavior was added reinforcement opportunities remained stable, but students were required to enhance performance across academic assignments in order to consistently earn the same rewards. One concern with such procedures is that as target behaviors are added, student performance across non-target assignments may decrease. Results of the current study showed that this did not occur.

Analysis of each student's data shows that when students were performing poorly in content areas, the intervention tended to cause immediate and large increases in assignment performance. When students were typically performing well in content areas, but occasionally having school days when they performed very poorly, the intervention tended to increase the stability of their performance by reducing days when they performed poorly. Finally, when students were consistently performing very well in certain content areas, the current study showed that the intervention and the addition of target behaviors did not reduce this strong performance. Thus, the current study showed that this intervention enhanced performance of students across content areas where they were performing poorly and had no impact on performance across areas where they were performing well.

Implications

Results of the current study showed that in content areas where either the class' average performance (e.g., the class' average in mathematics and spelling) or individual student performance was low, both the class as a whole and individual students (e.g., student two in mathematics and student five in spelling) showed a considerable increase in academic performance. These immediate and high level changes have clear applied implications. Often students with behavior disorders perform poorly on academic assignments. The current study suggests that educators working with students who often perform poorly or fail to even attempt to complete assignments may be able to enhance student daily academic performance and their learning rates by implementing randomized interdependent group contingencies.

While group contingencies are often used because they are easy to implement, the additional use of randomizing target behaviors also has applied implications. First, by starting with one target behavior, the students may have been more likely to earn their rewards, thus allowing them to experience success. Thus, starting with one academic target behavior may have enhanced the success of this program. Second, by adding target behaviors, the program amounts to a natural fading procedure because students are required to perform across more content areas (complete more assignments with high levels of accuracy) in order to maintain the same chance of earning equivalent reinforcement. This natural fading procedure is efficient because it does not require teachers to strengthen reinforcement procedures as they add target behaviors. Furthermore, this fading procedure may enhance maintenance of behaviors (Stokes & Baer, 1977).

Limitations

The results of this study suggest that randomizing components within an interdependent group contingency management program may be an effective strategy for enhancing academic achievement exhibited by students in an SED classroom. However, future research is needed before any strong applied recommendations are provided.

Future researchers should address several limitations of the current study. First, in the current study, changes in performance were immediate and large across spelling and mathematics. However, changes in performance when English was added to the pool of target behaviors were less impressive. Thus, future research

should run similar studies in order to provide more demonstrations of experimental control, thereby enhancing the internal validity of the study.

During the current study, there was some unaccounted variability across student performance during baseline and intervention phases. This variability may have been caused by many variables including changes in assignment demands, teacher and/or teaching assistant absences, student absences, and many other variables that may impact students' day-to-day academic performance. Future researchers should consider attempting to control for some of these extraneous variables that may have influenced students' performance.

In the current study, student preference assessment was not conducted, thus researchers could not ensure that each group reward was desirable to each student. In fact, in some instances it is possible that some rewards were aversive. Although researchers have suggested that this study's use of randomized reinforcers should have mitigated the impact of different rewards on student performance, the effects of specific rewards being added to the program were never evaluated. Additionally, the impact of satiation of reinforcers and attenuation of novelty may have contributed to variance during the intervention phase.

Enhancing students' daily academic performance may improve learning rates and decrease achievement deficits. However, in the current study, only students' daily assignment grades were measured.

Previous researchers have suggested that group contingencies can both decrease and increase anti-social and prosocial peer interactions. For example,

students may have threatened each other in order to attempt to influence peers to complete their work. However, peers may also have encouraged or helped (e.g., incidental peer-tutoring) one another in order to help each other complete the assignments. Additionally, peers may have become angry with students who failed to perform well and engaged in social aggression toward these students (e.g., called them idiots). However, students may also have provided social praise to other students who did well (e.g., high fives for a student completing an assignment at 100% accuracy). In the current study, these issues could not be addressed because no data was collected on these students' social behaviors.

There are also external validity limitations associated with the current study. The current study was conducted with only five male students, in one classroom, with one teacher, and one teaching assistant. Thus, it is not known if treatment effects may be generalized to other educational settings, races, gender (females), regional areas, ratio of students (teacher/student ratio), and larger groups (classes containing six or more individuals).

Future Research

Only two studies (Theodore et al., 2001; Kelshaw-Levering et al., 2000) have been conducted that investigated the effects of interdependent group contingencies with randomization of multiple components (i.e., target behaviors and criteria, group contingency programs [with target students], and reinforcers). Both of these studies showed that the contingency programs were effective in decreasing inappropriate behaviors. The current study showed that a similar program could be used to enhance

academic performance in students with SED. Future research is needed to establish the external validity of randomized interdependent group contingency procedures. Specifically, researchers should determine if such procedures would be effective across students (e.g., age, gender, disability, culture), settings (e.g., general education settings, large classes, urban settings), teachers, and target behaviors (e.g., prosocial behaviors).

Research extending the investigation of interdependent group contingencies with randomization of multiple components to students without a history of behavioral difficulties is also needed. The results of this study indicated that behavior disordered students responded well initially to the program. It is unclear if the findings of this study are characteristic of all behavior disordered classrooms. Conducting a similar study with a different SED classroom and also with a general education classroom in similar grade levels would facilitate in answering this question.

In addition to extending the investigation of interdependent group contingencies with randomization of multiple components within a general education classroom, it may be worthwhile to investigate the effects of this procedure on the academic achievement among other populations. An intriguing and valuable study might evaluate the effects of randomized interdependent group contingencies and its implementation in a residential treatment facility. Investigating the effects of interdependent group contingencies with randomizing multiple components for

residential students who have both academic and behavioral difficulties may prove to be advantageous.

Oftentimes children and adolescents referred to these treatment facilities display negative and disruptive behaviors similar to characteristics displayed by SED students. Children and adolescents in these residential treatment facilities may benefit from the structured yet random "game-like" program. Another interesting investigation would be to implement the program with a larger population in a classroom or group setting. This would address possible sample size limitations. Furthermore, a longitudinal study could be implemented to determine the effects of grades over a substantial amount of time (i.e. a minimum of six months or whole calendar school year) instead of a few weeks.

Future researchers should also extend the current study by collecting data on several other behaviors. Researchers should determine if randomized interdependent group contingencies enhance students' learning rates and achievement, as well as improve their grades over extended periods of time. If randomized interdependent group contingencies enhance students' achievement and learning rates, research should determine if such a procedure could be used to prevent students from being placed in self-contained classrooms and enhance their performance during mainstreaming.

One reason why students with SED are placed in self-contained classrooms is that their behavior disrupts their classmates, preventing everyone from completing their academic assignments and perhaps causing students to fail to meet academic

achievement goals. With randomized interdependent group contingencies, any behavior that disrupts peers from completing their work at high levels would decrease the probability of the group members earning their reward. Therefore, future researchers should determine if this program which targets academic behaviors also decreases disruptive classroom behaviors. Additionally, researchers should collect direct observational data on students' classroom behavior to determine if randomized interdependent group contingency programs increase bullying, threatening, cheating, and name calling behaviors. Researchers should also determine if such procedures enhance a variety of prosocial behaviors including classmates tutoring, encouraging, or supporting each other.

In the current study the researchers randomized three contingency components (target behaviors, criteria, and rewards). Future researchers should compare the impact of interventions with randomized components and non-randomized components across students, settings, and target behaviors in order to develop the most effective and efficient interventions.

Finally, in the current study, target behaviors were added sequentially. It may have been more efficient and more beneficial to students if all three target behaviors were included in the first phase. Therefore, future researchers should consider conducting a similar study where additional target behaviors are not gradually introduced. Researchers should also evaluate the impact of this gradual increase in target behaviors on maintenance.

Conclusion

The current study showed how randomizing various components in an interdependent group contingency program could cause improvements in students' daily academic performance. The intervention is easy to implement, economical, time efficient, and both the teacher and students reported that they liked the program. Although it is evident that this program has many potential applications, many questions remain unanswered regarding effects of interdependent group contingencies with randomization of multiple components. Thus, future research should be directed at evaluating the effects of interdependent group contingencies with randomized components on students' academic achievement and their prosocial behavior, anti-social behavior, and escape-avoidant behavior in both special education and general education classrooms.

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APPENDICES

APPENDIX A

LIST OF REWARDS

REWARDS

30 minutes on "Carmen Sandiego" (a word and math detective game)

30 minutes on the "flight simulator"

30 minutes on "Gizmos and Gadgets" (building science chemicals, airplanes, and math problems)

30 minutes of free game time

15 minutes of "Silent Ball" in the room

15 minutes of a math computer game

100 Bonus Bucks (that could be traded into the store for drinks, fruit, water, novelty toys)

150 Bonus Bucks (that could be traded into the store for drinks, fruit, water, novelty toys)

One game of "Fruit-Basket Turnover"

Play a card game with a staff member

A movie

APPENDIX B

INSTITUTIONAL REVIEW BOARD APPROVAL

FORM B

IRB # _____
Date Received in OR _____

THE UNIVERSITY OF TENNESSEE, KNOXVILLE

Application for Review of Research Involving Human Subjects

I. IDENTIFICATION OF PROJECT

A. Principal Investigator
Joan Popkin
425 Claxton Addition
College of Education
jpopkin@utk.edu
974-8145

Faculty Advisor
Christopher Skinner, Ph.D.
425 Claxton Addition
College of Education
cskinne1@utk.edu
974-8145

Department/Unit: College of Education – Educational Psychology

B. Project Status: Educational Research

C. Title of Project: The Effects of Randomized Interdependent Contingencies on the Academic Achievement of Emotionally Disturbed Students

D. Starting Date: "Upon IRB Approval"

E. Estimated Completion Date: January 31, 2001

F. External Funding: None

II. PROJECT OBJECTIVES

The purpose of this project is to determine if randomizing group contingency components (i.e., rewards, criteria, target academic subjects) can be used to increase student achievement and performance in various academic subject areas.

III. DESCRIPTION AND SOURCE OF RESEARCH SUBJECTS

Source and Description: The participants for this research will include students in a middle school classroom currently enrolled and attending the Knoxville Adaptive Education Center (KAEC). These students have emotional/social or behavior problems. Many also have attention problems. These are higher functioning students who are not severely impaired. In addition, many of these students have the potential to be mainstreamed to the general education classroom. Participation will be requested from approximately six to eight middle school students (ranging in age from 12-14 years in grade levels 6th-8th) and their parents or guardians.

IV. METHODS AND PROCEDURES

The principal investigator, a doctoral student in the School Psychology program, will gather grades on in-class assignments in various subject areas, in a classroom at the Knoxville Adaptive Education Center, during the school semester from the teacher. These assignments will be used to determine the effectiveness of the randomized interdependent group contingency program. The participants in this study

have experienced group contingencies and rewards implemented by their teacher based upon prosocial behaviors. The students will be given rewards contingent upon their group performance in certain academic subject areas determined by the teacher (i.e., spelling, English, and math). Rewards will be given to the entire classroom of students based upon meeting the criteria randomly chosen by the teacher. The teacher will select rewards with input from the students. A few examples of these rewards may include 10 minutes of extra free time, 15 minutes of computer time, posters, sports cards, movies, pens, and pencils. The names of the rewards will be written on cards placed in a box labeled "Rewards." The teacher will determine the final rewards placed in the box. The teacher will also determine the criteria. These criteria will be based upon meeting specified accuracy/completion rates of the various academic subjects (i.e., 90% accuracy on in-class English assignments, 88% completion on in-class math assignments, 92% accuracy on in-class assignments in spelling, etc.). These various criteria will be written on cards and placed in a box labeled "Goals." The teacher at various times throughout the week (based upon his/her discretion and preference) will randomly choose a criterion card from the "Goals" box. A student will then be allowed to randomly choose a card from the "Rewards" box based upon meeting the specified criterion. If the specified criterion randomly chosen was not met by the entire class, it will be placed back in the box and no reward will be chosen. The teacher will then allow the students a chance to have a random drawing of rewards and criteria at a later date.

A multiple baseline design will be employed to evaluate the effectiveness of the program across all three academic subject areas. The design will include a Baseline Phase in which students will receive no consequences for their performance in spelling, English, and math. Intervention Phase I includes an interdependent group contingency with randomized rewards, criteria, and the one academic subject area (e.g., spelling). Intervention Phase II includes an interdependent group contingency with randomized rewards, criteria, and two academic subject areas (e.g., spelling and English) randomly chosen. Intervention Phase III includes interdependent group contingency with randomized rewards, criteria, and all three academic subject areas (e.g., spelling, English, and math) randomly chosen. Additionally researchers will compare student's academic performance (percent correct/completed on in-class assignments) across subject areas. Finally, it will be determined if students improved their academic performance when randomized group contingency components were implemented compared to baseline data.

Data will be collected from the teacher at the end of each week for approximately eight to sixteen weeks. These data will be an average of the entire class's grades for each week; therefore, there will be no individual identifiers and confidentiality can be maintained. In addition, nothing will leave the school with the name of a student. Furthermore, consent forms will be mailed to the parents and/or hand delivered by a liaison from the school. Teacher and students may also stop the program at anytime. Another classroom of students will be found if a student does not obtain parent permission or does not want to participate in the study.

V. SPECIFIC RISKS AND PROTECTION MEASURES

Confidentiality will be maintained with respect to the data collected on individuals and the procedures will not be disturbing or harmful. The teacher will be the only one who has or knows identifiers. Each participant will be assigned a number that is the only identifier for all materials. There are no foreseen risks and procedures will be halted if unforeseen risks were to occur. In addition, group or numbered data may be presented in future papers or conference presentations. All materials containing names of subjects will be stored in a locked file cabinet in the Department of Educational Psychology, Claxton Addition Building, Room 438 for a minimum of three years.

VI. BENEFITS

The benefits of this study described within this form will be a contribution to the understanding of how randomized rewards effect students' academic improvement. The physical or psychological risks are minimal to none. However, through this study, one can learn how to construct ways in which students will increase the accuracy and completion rates of in-class assignments and improve students' grades. This, in effect, may also enhance students' classroom behavior, without reducing assignment demand. The similar procedures described in this form have been used in previous studies, and posed no risk to the participants.

VII. METHODS FOR OBTAINING "INFORMED CONSENT" FROM SUBJECTS

The attached informed consent form will be given to the children to take home and return. The study will be explained to the students. After the parents and students have signed the informed consent form, the student's assent form will be read to the student, and the student again will have an opportunity to ask questions. Signatures will be obtained from both the parent and the student before implementation of the program begins. The parent and child will be given a copy of the informed consent/assent form.

VIII. QUALIFICATIONS OF THE INVESTIGATOR(S) TO CONDUCT RESEARCH

Joan Popkin is currently a doctoral student in the School Psychology program in the Educational Psychology Department at the University of Tennessee, Knoxville and is completing her third year as a Ph.D. student. She received a Master of Science degree in Educational Psychology with an emphasis in Individual and Collaborative Learning and received her Bachelor of Science degree in Psychology. Ms. Popkin has also completed the psychoeducational assessment and practicum sequence of twelve hours at the University of Tennessee and has worked with educational interventions for children in a classroom setting during her professional practice practicum in the school psychology program. Dr. Skinner was a master teacher in a self-contained

school for students with behavior disorders and has conducted and published studies using procedures similar to those used in this study.

IX. FACILITIES AND EQUIPMENT TO BE USED IN THE RESEARCH

Data (group scores) will be collected on in-class assignments given to students by the teacher. The data will be collected and obtained on worksheets and the paper, pencil, photocopier will be used at the University of Tennessee, Educational Psychology Department. Procedures will be run at the Knoxville Adaptive Education Center.

RESPONSIBILITY OF THE PRINCIPAL/CO-PRINCIPAL INVESTIGATOR(S)

By compliance with the policies established by the Institutional Review Board of The University of Tennessee, Knoxville, the principal investigator(s) subscribe to the principles stated in "The Belmont Report" and standards of professional ethics in all research, development, and related activities involving human subjects under the auspices of The University of Tennessee, Knoxville. The principal investigator(s) further agree that:

1. Approval will be obtained from the Institutional Review Board prior to instituting any change in this research project.
2. Development of any unexpected risks will be immediately reported to the Compliances Section.

3. An annual review and progress report (Form R) will be completed and submitted when requested by the Institutional Review Board.

4. Signed informed consent documents will be kept for the duration of the project and for at least three years thereafter at a location approved by the Institutional Review Board.

XI. SIGNATURES

ALL SIGNATURES MUST BE ORIGINAL. The Principal Investigator should keep the original copy of the Form B and submit a copy with original signatures for review. Type the name of each individual above the appropriate signature line. Add signature lines for all Co-Principal Investigators, collaborating and student investigators, faculty advisor(s), department head of the Principal Investigator, and the Chair of the Departmental Review Committee. The following information should be typed verbatim, with added categories where needed:

Principal Investigator _____Joan Popkin, M.S_____

Signature _____ Date _____

Co-Principal Investigator _____N/A_____

Signature _____ Date _____

Faculty Advisor_____Christopher Skinner, Ph.D._____

Signature_____ Date _____

II. DEPARTMENT REVIEW AND APPROVAL

The application described above has been reviewed by the IRB departmental review committee and has been approved. The DRC further recommends that this application be reviewed as:

[ ] Expedited Review -- Category(ies): _____

OR

[ ] Full IRB Review

Chair, DRC _____ Robert Williams, Ph.D. _____

Signature _____ Date _____

Department Head _____ Steve McCallum, Ph.D. _____

Signature_____ Date _____

Protocol sent to Compliance Section for final approval on (Date)

_____

Approved: Compliance Section

Office of Research

404 Andy Holt Tower

Signature_____ Date _____

For additional information on Form B, contact Brenda Lawson by email at blawson@utk.edu or by phone at 974-7697.

APPENDIX C

PARENT INFORMED CONSENT AND CHILD ASSENT FORMS

VGR # _____

Informed Consent

The Academic Reward Game

I,_____, as the parent/ legal guardian of_____, agree to the participation of my child in a research project, entitled "The Academic Reward Game."

I understand that participation in this study is voluntary, and I may withdraw my child at any time with no penalty. I have been informed that the total time involved in participating in the study is approximately 12 weeks and that participation in this study involves no foreseen risks to my child. Although there are no direct benefits of participation in this study, the intent of the study is to find ways to promote academic improvement. I understand that this study will not interfere with my child's engagement in his/her regular classroom activities.

The information collected in this study will remain confidential. The data gathered during this research project may potentially be shared professionally, but will include numerical coding to ensure the privacy of the participants. The information gained may be used as part of data collection for these and/or future educational studies. The data gathered will include the scores on regularly assigned classwork and will not affect the student's daily academic activities. The group scores will be collected at the end of each week from the teacher. The entire classroom will then have the opportunity to receive rewards based upon their academic achievement

in the classroom. The students and teacher will determine these rewards at the beginning of the program. Examples of these rewards may include 10 extra minutes of recess time, 15 minutes of computer time, gel pencils, and sports cards. I will be given detailed information concerning the evaluation procedures that will be used during this study. I have been given the opportunity to ask questions about this research study. My child's participation is voluntary and not forced in any way.

This consent form will be stored for three years past the completion of the study at a University of Tennessee location. If I have any questions about this study, I may contact the following:

Joan Popkin, College of Education, Educational Psychology,
University of Tennessee, Knoxville, (865) 974-8145

Dr. Christopher Skinner, College of Education, Educational Psychology,
University of Tennessee, Knoxville, (865) 974-8145

I have read the above information. I understand that participation is voluntary. I agree to have my child participate in this study. I will receive a copy of this form.

Child's name (print) _____

Signature _____ Date _____

Legal guardian's name (print) _____

Signature _____ Date _____

Children's Assent Form

The Academic Reward Game

To be read to the participant and signed by the participant prior to study, and after the Signed Consent has been signed by the participant's parents/legal guardians.

DATE _____

Your parents signed permission for you to be a part of this research study involving various classroom activities. This information will be used as part of a research study. If you have any questions as I explain the study, please feel free to ask them.

This study will involve an "Academic Reward Game" based upon the participation of the entire class. The class as a whole will have different opportunities to earn rewards. The members of the class and your classroom teacher will make up these rewards. The rewards in class will be given based on how well the class performs in certain academic subject areas. The class as a whole may or may not receive the reward. There will be two boxes displayed in your classroom. One box will be marked "Rewards" and another box marked "Goals." The rewards box will have different prizes chosen by the class and teacher. The academics box will contain different academic subject area(s) and different goals (for example: the whole class must make an 85% on all class assignments in math in order to earn the reward). The teacher will then average your class grades based on the regular classroom work that is given to see if the class can earn a reward from the "Rewards" box. If the class

meets the goal chosen from the academics box, then the entire class will earn the reward. A different student will choose the reward from the box without looking. If the class does not meet the academic goal chosen from the academics box then the class will not win the game. The class will have a chance to earn another reward the next time the game is played. Do you have any questions?

At this time I want to know if you want to be a part of this study. Your participation is voluntary, and that means that you do not have to be a part of it if you don't want to. If you decide at any time that you do not want to continue in the study, then you may stop without any penalty and no one will get mad at you.

There is no risk of being harmed by this study, and there may be no direct benefits of participation in this study.

If you have any questions about this study, please contact the following:

Joan Popkin, College of Education, Educational Psychology,
University of Tennessee, Knoxville, (865) 974-8145

Dr. Christopher Skinner, College of Education, Educational Psychology,
University of Tennessee, Knoxville, (865) 974-8145

If you would like to be in this study, please sign here. You will receive a copy of this form.

Child's name (print) _____

Signature _____

Date_____

APPENDIX D

TREATMENT INTEGRITY CHECKLIST

Treatment Integrity Checklist

Date:_____

____ 1. Teacher will collect all data (in-class assignments) from the day.

____ 2. Teacher will randomly select criteria from the "Goals" box before the end of the day.

____ 3. If criteria is met, teacher will randomly select a reinforcer from the "Rewards" box.

____ 4. Teacher/Teaching assistant will grade and record the class' in-class assignments in spelling, mathematics, and English.

____ 5. Feedback will be given to students regarding their total percentage points for the day.

____ a. If the class as a whole meets the chosen criteria, they will earn the reinforcer.

____ b. If the class as a whole does not meet the chosen criteria, they will not earn the reinforcer and will be told that another drawing will occur the next day.

_____ 6. If 5a. was done, the class will earn the reward (activity) if enough time is allowed (the teacher will determine the time that the activity will take place).

_____ 7. A "rain check" will be given to the class for the reward (activity) to occur the next day, if the allotted amount of time ran out in the afternoon.

APPENDIX E

TABLES AND FIGURES

Table 4.1 Mean Percentages and Standard Deviations for Individual Students and Group

	Spelling		Math		English	
Student	Baseline Mean(sd)	Intervention Mean(sd)	Baseline Mean(sd)	Intervention Mean(sd)	Baseline Mean(sd)	Intervention Mean(sd)
One	93.33 (7.07)	97.67 (5.63)	68.41 (32.90)	89.80 (16.78)	85.65 (21.50)	98.00 (4.47)
Two	69.00 (37.83)	92.87 (25.73)	64.67 (40.91)	86.58 (15.16)	80.21 (34.53)	92.00 (6.93)
Three	26.22 (41.78)	96.33 (8.57)	72.36 (33.42)	86.13 (12.78)	72.92 (35.22)	90.00 (7.07)
Four	90.71 (6.07)	98.50 (4.77)	58.00 (29.25)	80.40 (29.70)	86.85 (12.13)	100.00 (0.00)
Five	0.00 (0.00)	89.53 (25.16)	63.67 (34.11)	84.00 (12.94)	87.73 (14.83)	79.00 (22.63)
Group	62.22 (17.71)	96.24 (8.12)	66.56 (14.55)	86.58 (9.20)	85.67 (11.29)	93.33 (6.25)

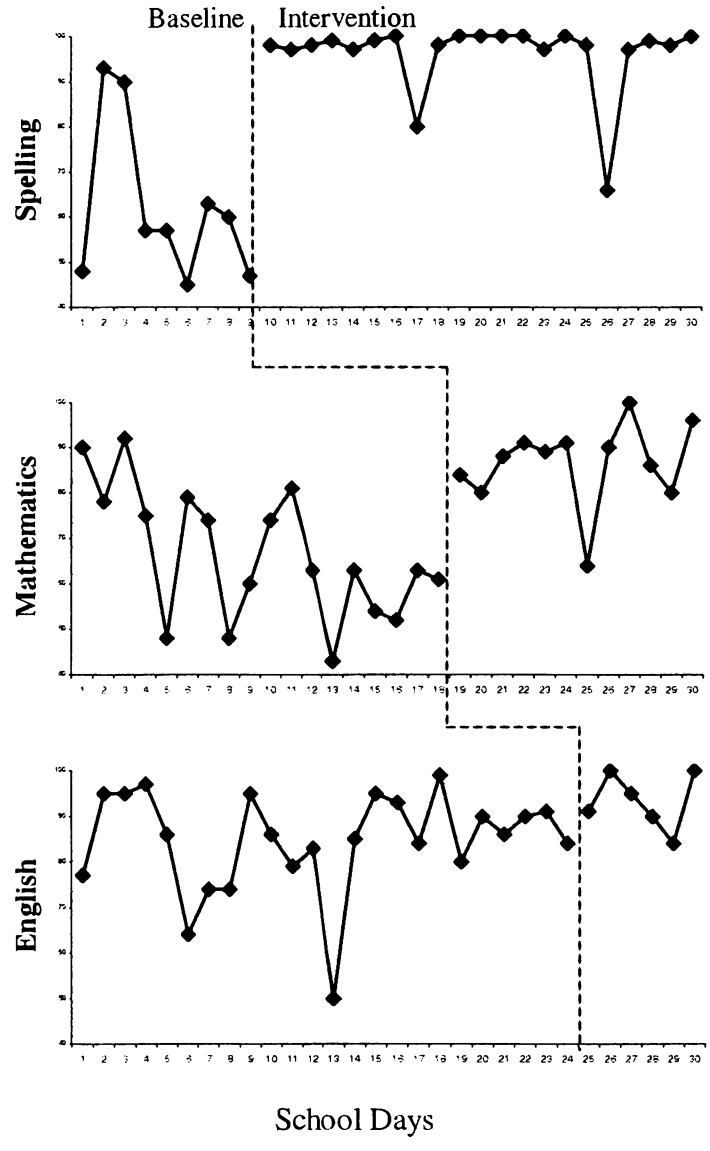

Figure 4.1 Classwide Daily Assignment Scores in Spelling, Mathematics, and English

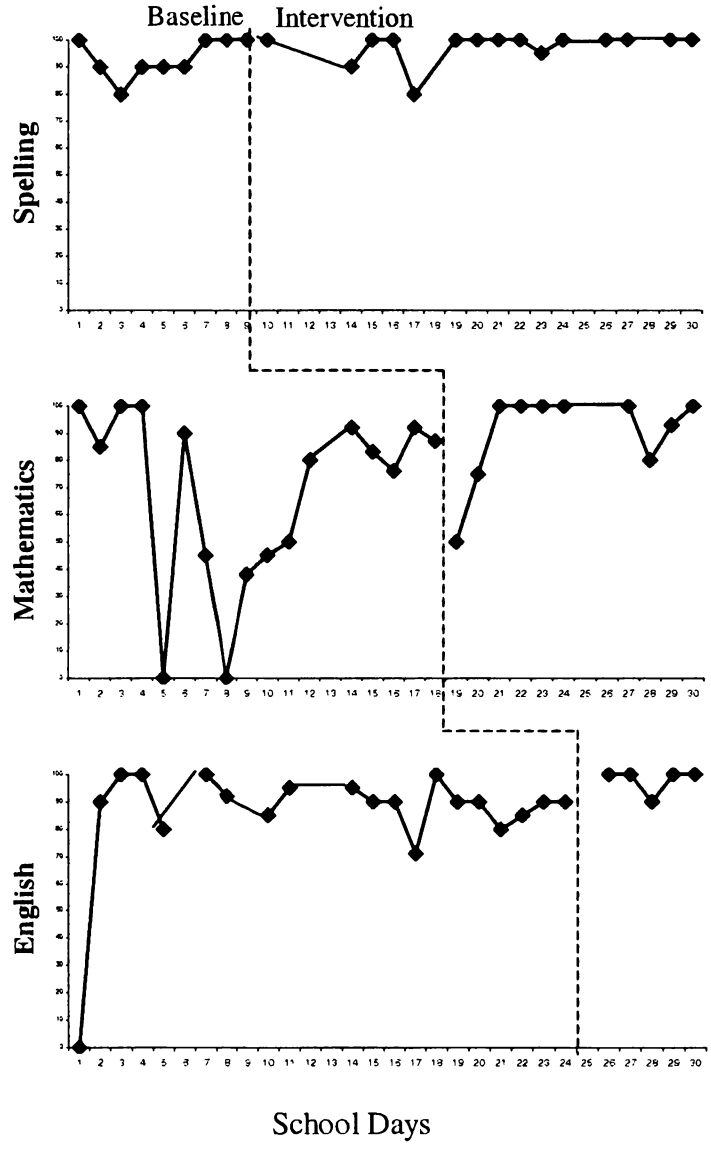

Figure 4.2 Student One's Daily Assignment Scores in Spelling, Mathematics, and English

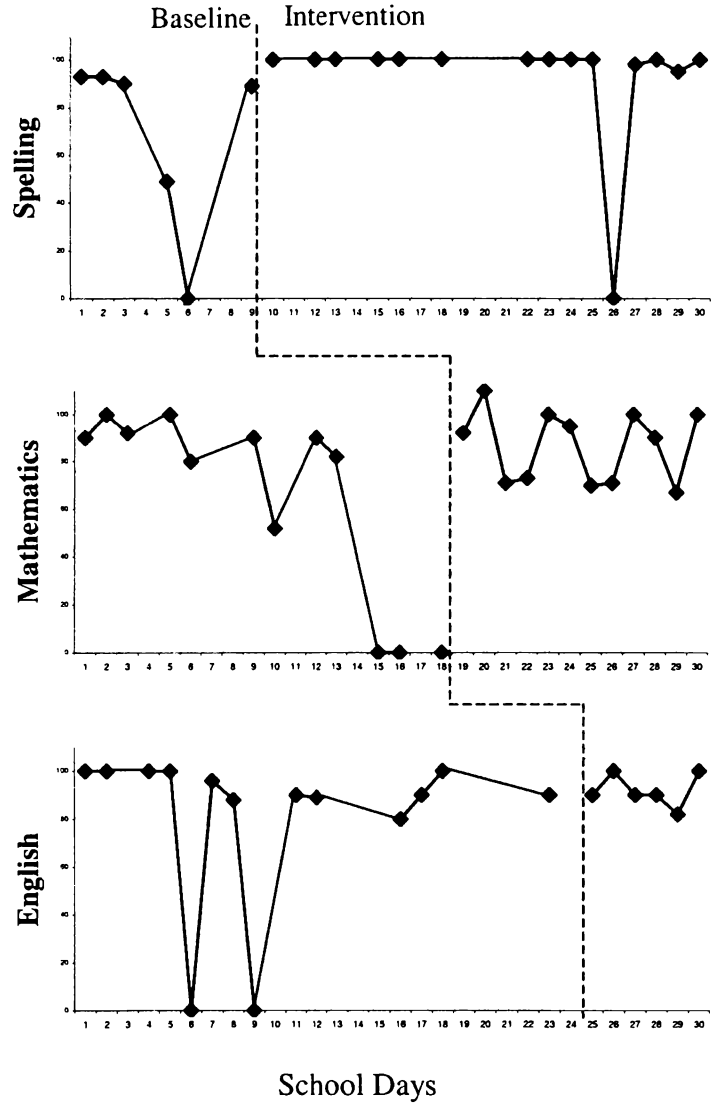

Figure 4.3 Student Two's Daily Assignment Scores in Spelling, Mathematics, and English

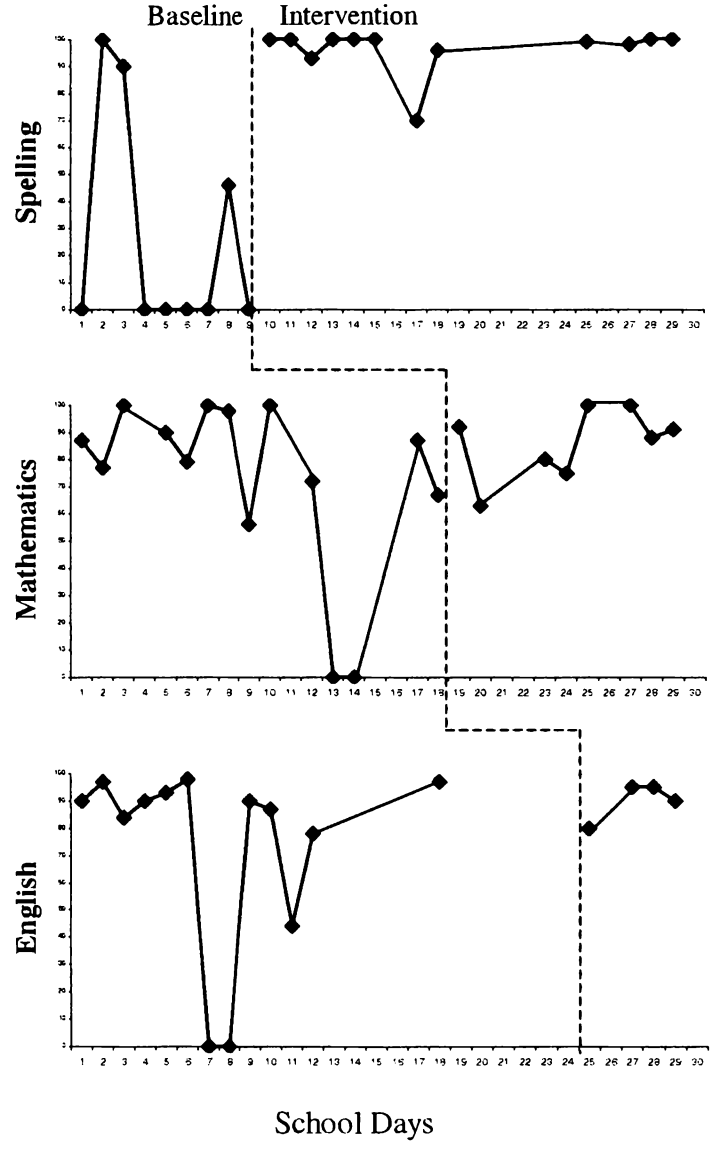

Figure 4.4 Student Three's Daily Assignment Scores in Spelling, Mathematics, and English

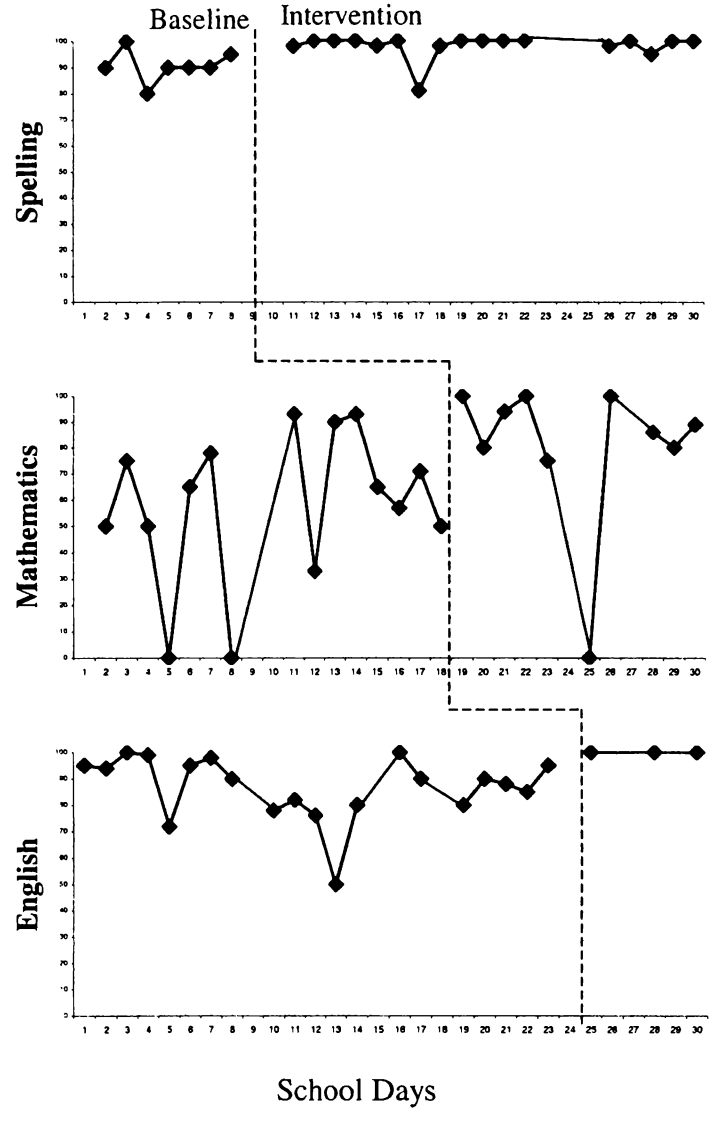

Figure 4.5 Student Four's Daily Assignment Scores in Spelling, Mathematics, and English

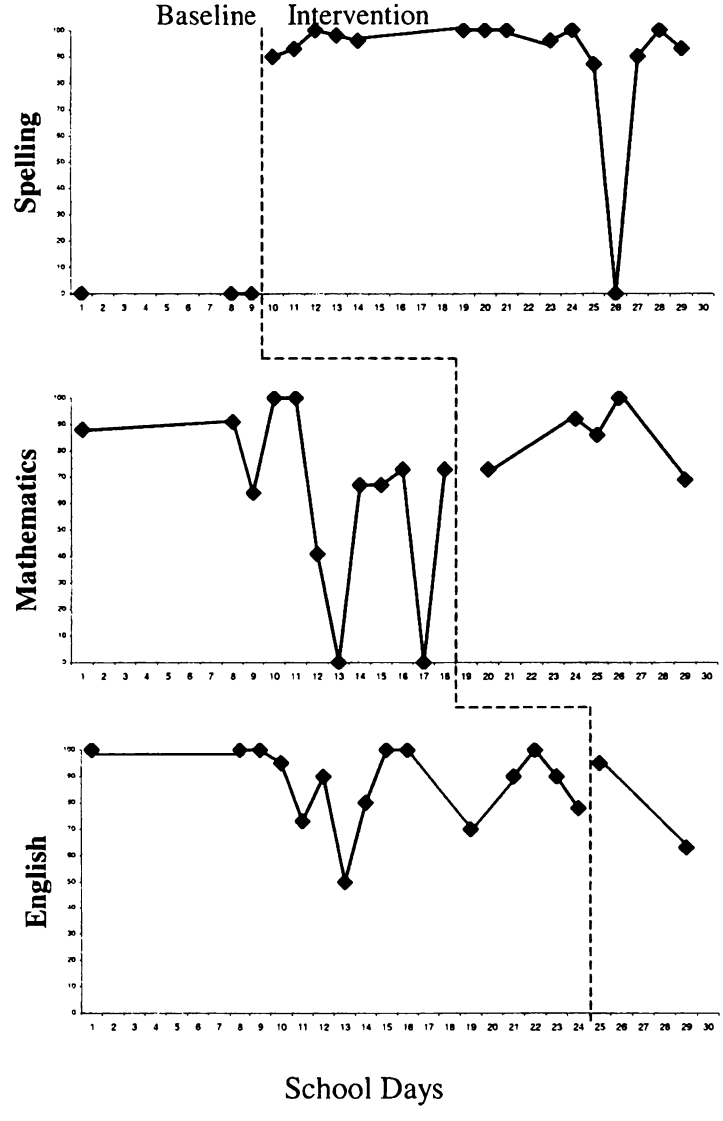

Figure 4.6 Student Five's Daily Assignment Scores in Spelling, Mathematics, and English

VITA

Joan Elizabeth Popkin was born in Nashville, TN, on January 10, 1973. She graduated from Hillsboro High School in 1991 and attended Emory University from 1991-1993. She earned a Bachelor of Arts in Psychology in 1995 from the University of Tennessee, Knoxville. In 1999, she earned a Master of Science degree in Education from the University of Tennessee, Knoxville where she majored in Educational Psychology with an emphasis in Individual and Collaborative Learning. Ms. Popkin has been involved in various aspects of the educational system in Tennessee and Texas. In 2001, she obtained an APA-approved internship working with the Houston Independent School District (HISD) in Houston, TX, as a psychology intern from 2001-2002. She is currently in the doctoral program in School Psychology at the University of Tennessee, Knoxville.