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The Use of Correspondence Training to Increase Attentive and Prosocial Behaviors in a
Sports Setting for Children with a Diagnosis of
Attention-Deficit/Hyperactivity Disorder

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Abstract

Correspondence training was implemented to increase attentive and prosocial behaviors in two children diagnosed with Attention-Deficit/Hyperactivity Disorder (ADHD) in the context of a kickball game. The study also noted the occurrence of disruptive behaviors, but did not attempt to manipulate them directly. The study took place at the STAR (Summer Treatment and Research for Children with ADHD) program. Data was recorded and examined on a multiple baseline across settings design. Results showed a significant increase in attentive and prosocial behavior within the training setting. These results generalized to a group kickball game through the use of mediated correspondence. In addition, a second component of the study compared placebo versus medicated conditions and noted some effects due to medication.

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Attention-Deficit/Hyperactivity Disorder

Attention-Deficit/Hyperactivity Disorder, or ADHD, is the clinical term for those who display difficulties with attention, hyperactivity, and/or impulsiveness compared to those of the same age and sex. Many studies have shown that children with a diagnosis of ADHD are more active, restless, and fidgety than normal children (Barkley, 1998).

There are numerous proposed etiologies for ADHD. Some of these include neurological factors such as neurotransmitter dysfunction (S.E. Shaywitz, B.A. Shaywitz, Cohen, & Young, 1983), decreased physiological functioning in the prefrontal and striatal regions of the brain (Lou, Henriksen, & Bruhn, 1984), and reduced brain metabolic activity (Ernst, King, Fitzgerald, Cohen, & Zametkin, 1994). Genetics have also been considered central in the cause of ADHD. In general, researchers have noted correlations between children with ADHD and other family members with the disorder (Centwell, 1975). A final proposed etiology of ADHD is social factors such as parental management (Jacobvitz & Stroufe, 1987) and an increased cultural tempo. Despite the fact that the actual cause of ADHD is not clear, the history of the disorder shows a gradual progression of varying ideas about the nature of the disorder and its causes.

In 1902, George Still first documented a study of children who exhibited symptoms of ADHD. Still felt the degree of aggressiveness, defiance, high emotions, and lack of self-control seen in his subjects could only be attributed to biological factors rather than environment. Still noted that some causes might be heredity, central nervous

damage, or even the result of brain disease or infection (Barkley, 1998).

The issue lay mostly dormant for the next 35 years until after World War II. During this time, the phrase “minimal brain damage” came to describe children exhibiting ADHD symptoms. Over time, beliefs that hyperactivity was due to brain damage became fewer, though the idea that problems with brain function was the cause of the disorder persisted. In the 1960s the link between neurological damage and the disorder was abandoned. The term “hyperactive child syndrome” and Hyperkinetic Reaction of Childhood” became the accepted terminology. These classifications showed an increased interest on the hyperactive behavior exhibited by those who were diagnosed with the disorder. During this time emphasis was placed on abnormal brain function as the primary cause (Barkley, 1998).

Throughout the eighties, less attention was given to the hyperactive nature of the disorder, and more was given to the deficit of sustained attention. By 1980, the American Psychological Association labeled the disorder “Attention Deficit Disorder”, echoing this trend. Later, however, the disorder was renamed “Attention-Deficit/Hyperactivity Disorder”, which suggested a renewed emphasis on hyperactivity as a key component (Barkley, 1998).

Today, diagnosis of ADHD requires that the child exhibit at least six symptoms in two areas pertaining to either inattention or hyperactivity-impulsivity for a sustained period of time. It is estimated that between 3% and 5% of all school-age children are thought to have ADHD (Barkley, 1998). While researchers are generally clear on how to identify the disorder, there are several proposed methods on how to treat it.

Psychopharmacology has been widespread in the treatment of ADHD. Three classes of psychotropic drugs have been accepted as proper treatments for the symptoms of ADHD: stimulants, antidepressants, and antihypertensives. Stimulants are by far the most prescribed medication, with the most common ones being methylphenidate (Ritalin), d-amphetamine (Dexedrine), pemoline (Cylert), and Adderall. In cases where stimulant medication has not proven successful, antidepressants such as imipramine and desipramine have been prescribed. Finally, the antihypertensive clonidine (Catapres) has also been beneficial in treatment (Barkley, 1998).

Behavior therapy is also a common treatment for ADHD. The earliest methods included the use of punishment and reinforcement contingent on the child's behavior. Variations of this method include altering the stimulus properties of settings and tasks. A more recent method is the use of "correspondence training", in which a child publicly states what he or she will accomplish, then matches his or her behavior to correspond with his or her statement. In essence the goal is to create agreement between "saying" and "doing". This procedure will be examined in further detail later. Other methods include parent and teacher training to help implement behavior modification (Barkley, 1998).

Sports and Social Skills

Many of these methods of treatment have been developed to specifically improve the social skills of ADHD children; an essential area of concern since nearly 50% of children diagnosed with ADHD experience poor social relationships (Milich & Landau, 1982). However, many treatment procedures designed to improve social skills have failed to produce changes in subjects' social status. This may be because these

procedures do not focus on teaching behaviors relevant to social acceptance (Gross, Johnson, Wojnilower, & Drabman, 1985). Ascher, Oden, and Gottman (1977) noted that some of the most important factors in gaining social acceptance are accurate communication, personal and situational characteristics, and being considered an expert in some area. Thus, many ADHD children may experience poor social relationships because they exhibit deficits in the above areas, rather than simply lacking specific social skills (Gross, et al., 1985).

Evidence for this position can be seen in studies where high athletic competence was correlated with higher social status for both boys and girls (McGraw & Tolbert, 1976; Gross, et al., 1985; Weiss & Duncan, 1992). In the study conducted by McGraw and Tolbert (1976), for example, it was found that junior high boys who were rated by their peers as expert athletes were also highly rated in terms of social status. Therefore, a combined social skills and sports skills intervention may produce the most comprehensive results.

Hupp and Reitman (1999) implemented a multi-component basketball skills and behavior management program in the context of an ADHD camp. Results indicated an increase in game performance and sportsmanship. In a similar study with mentally retarded children, Gencoz (1997) noted not only improvements in game performance, but also a reduction in maladaptive behavior at home and in the classroom.

Correspondence Training

As mentioned earlier, there are many proposed treatments for ADHD. One approach, which has steadily gained popularity, is verbal-nonverbal correspondence training (or simply correspondence training). Simply stated, correspondence training

involves teaching an individual to exhibit a promised behavior by reinforcing the correspondence between saying and doing (Friedman, Greene, & Stokes, 1990). That is, the procedure focuses on increasing the likelihood that a person will actually engage in a behavior that they verbally stated (Baer, Detrich, & Weninger, 1988; Guevremont, Osnes, & Stokes, 1986).

Research has suggested there is typically a poor correspondence between a child's verbal statements of future behavior and subsequent occurrence of the stated behavior, a condition which is amplified in children diagnosed with ADHD (Stokes, Osnes, & DaVerne, 1993). Since correspondence training focuses on controlling behavior by reinforcing socially acceptable verbal-nonverbal relationships, the procedure has been viewed as an effective self-control technique to manage children with ADHD (Abikoff & Gittleman, 1985; Stokes & Baer, 1977). Despite its nontraditional approach, correspondence training has been shown effective in establishing and maintaining a variety of social behaviors such as sharing and praising (Israel & Brown, 1977; Paniagua & Baer, 1982; Risley & Hart, 1968).

Essentially, correspondence training procedures follow one of two designs: report-do (also called say-do) or do-report (also called do-say). In the former design, reinforcement is delivered contingent on the correspondence between a report about future behavior and its fulfillment. In the later design, reinforcement is delivered contingent on a correspondence between doing and accurately reporting about past (doing) behavior (Paniagua, 1992). In both methods, however, the reinforcement is delivered only after the completion of the verbal-nonverbal chain.

Risley and Hart (1968) pioneered research on correspondence training when they attempted to increase specific behavior in a preschool setting. Using the do-report method, they delivered reinforcement contingent upon a correct and accurate verbal report of previous behavior. That is, the child had to state that he/she engaged in the target activity, and he/she must have actually engaged in it. Results showed an increase in correspondence between nonverbal and verbal behavior.

In another study, Risley and Hart (1968) used the report-do method to increase a target activity. Results showed that when reinforcement was given for the completion of the verbal-nonverbal chain, the target activity was engaged in by 100% of the subjects on the following day.

Israel and Brown (1977) conducted a similar study in which a child was asked to state which toy he/she intended to play with. The child was then allowed the opportunity to play with it. First, the experimenters would reinforce the child for merely stating that he/she would play with the toy, regardless of whether or not he/she actually did. This did not create an increase in use of the promised toy. When the child was reinforced for fulfilling his/her verbal promise, however, the use of the targeted toy increased. A note to this study is that after reinforcement for correspondence was established, the researchers were then able to reinforce for only verbalizations and still achieve positive results in increased play with the target toy.

As with any behavior intervention procedure, the true utility is seen when the behavior(s) exhibited during the study is/are generalized beyond the bounds of the experiment. Traditionally, generalization has been considered a passive concept lacking any true form or design. It has been conceptualized as the natural result of failing to

practice discrimination adequately (Stokes & Baer, 1977). When generalization did not occur, it was assumed that the teaching process maintained unusually strict control over the stimuli and the responses involved. Thus, emphasis has been placed on discrimination as the active process that can limit or broaden the confines of generalization. However, for a therapeutic change to be effective, it almost always must occur across settings, behaviors, and time. The need for generalization of therapeutic behavior is a widely accepted concept, yet it is not widely realized that generalization does not automatically occur. Thus, there is often a need to systematically program generalization when the trained behaviors fail to manifest themselves in non-experimental conditions. With this in mind, one may consider generalization as the occurrence of extra-training behavior without the need for extra-training manipulations; or the occurrence of extra-training behavior with some extra-training manipulation, but the extent of which is clearly less than that of the direct intervention (Stokes & Baer, 1977).

In the light of this definition, it is necessary to incorporate procedures that study the occurrence of the target behaviors in a non-training setting, and, if necessary, could facilitate the occurrence of the target behaviors in a non-training setting. Train and Hope is a simple method of observing whether the manipulations made in the training sessions had any affect on the participants' behavior in the group kickball game. Though Train and Hope is not an example of programmed generalization, it is a sound first step in analyzing generalization.

In the absence or lack of significant "naturally occurring" generalization, mediated generalization is a means of eliciting the target behaviors in the group kickball

game without incorporating the reinforcement issued in the training sessions. Mediated generalization requires establishing a stimulus that will mediate a behavior. This mediator is then presented in a setting other than the one in which it was originally learned, in order to produce the behavior outside the confines of the training condition (Stokes & Baer, 1977). By first establishing a history of correspondence in the training setting, it is intended that the child's verbal statement about his intended behavior will become the mediator for his actual behavior in the generalized setting (Risley & Hart, 1968; Israel & O'Leary, 1973).

Summary

Correspondence training has proven to be an effective technique in producing a variety of desired behaviors. Risley and Hart (1968) and Isreal and Brown (1977) showed how correspondence training could increase a child's use of a specified toy. Rogers-Warren and Baer (1976) used correspondence training to increase prosocial behavior such as sharing. Only one article noted use of correspondence training to eliminate maladaptive behaviors associated with children diagnosed with ADHD (Paniagua, 1987). The study noted lower levels of hyperactivity and conduct disorders as a result of the procedure. Correspondence training has even been used to modify children's eating habits (Friedman, Greene, & Stokes, 1990), improve academic performance (Rocca & Gross, 1996), and implement abduction prevention programs aimed at keeping children from being kidnapped (Olsen-Woods, Miltenberger, & Foreman, 1998).

While these studies exemplify the many applications of correspondence training, none have used the procedure in a particularly pertinent area, teaching sports and social

skills for children with a diagnosis of ADHD. As mentioned earlier, ADHD-diagnosed children often experience poor social relationships because of low play skills (Gross, Johnson, Wojnilower, & Drabmen, 1985). Therefore, any procedures that target increasing a child's sports skills could theoretically increase the child's overall social skills as well. This would conform to the research noting correlations between high athletic competence and social status (Gross, et al., 1985; Weiss & Duncan, 1992; McGraw & Tolbert, 1953).

It is the purpose of this study to use correspondence training to enhance athletic competence in children diagnosed with ADHD. The study will focus on teaching the subjects the proper skills and sportsmanlike behavior for a game of kickball held at a summer camp designed for children diagnosed with ADHD. Specifically, the study will target particular prosocial, attentive, and disruptive behaviors as they apply to the sport setting. Two settings will note the child's behavior: (a) an training setting where reinforcement will be provided when the child's behavior correctly matches his prediction of behavior and (b) a group kickball setting where the training manipulations can be monitored for generalization. It is hypothesized that the procedure will produce increased occurrences of the targeted prosocial and attentive behaviors in the training setting as well as in the generalized setting and decreased occurrences of disruptive behavior.

Methods

Participants

Participants for the study included two children participating in the STAR (Summer Treatment and Research) program. The STAR program lasts for six weeks during the summer and is held on the Louisiana State University campus. The program is designed to assess pharmacological and behavioral treatments for ADHD. This year, a total of 13 children attended the program, all of whom had a psychiatrist's diagnosis of ADHD based on criterion established in the DSM-IV (APA, 1994) and are between the ages of four and six years.

Adam was a 6-year-old male entering first grade. Barry was also a 6-year-old male entering first grade. Both boys had a diagnosis of ADHD, but no other psychiatric disorders had been diagnosed. These two participants were selected for the study because prior assessment indicated both participants had significant social skills deficits. Informal observation also indicated these two participants were likely to benefit from this study.

Materials

The study required the following materials, 1 kickball, cones, 4 bases, reinforcement coupons, and reinforcers. The reinforcement coupons were the same coupons used by the STAR program as a means of rewarding appropriate behavior. There were a variety of coupons allowing the child to choose his most desired rewards from several choices. Seven different coupons, each 2 x 5 in., were made to represent each of the categories of potential reinforcers. Each coupon was colored to represent the reinforcer associated with it (e.g., yellow for edibles, red for attention, etc.). An icon that

represented the general category of reinforcer was also placed on each coupon. The amount of edible items, tangible items, and attention was provided on a 1 to 1 ratio. That is, one coupon could be exchanged for one edible item, one tangible item, or one statement of attention. Activities and escape were time based; each coupon was worth 2 minutes. After selecting a coupon, the child could later redeem it for the respective reinforcer later in the day (Northup, Fusilier, Swanson, Roane, & Borrero, 1997).

Response Definitions

The current study focused on increasing the participants' prosocial and attentive behaviors within the context of a kickball game. Child disruptive behaviors during the game were also recorded.

Prosocial behaviors were defined as any form of verbal encouragement or praise (such as cheering or compliments) or physical encouragement (such as "high fives"). It should be noted that prosocial behavior was only recorded when the child's team was on offense (i.e. the "kicking" team).

Attentive behaviors were defined as being in the "ready position". The child was considered in the ready position if he was standing within 10 feet of the base he was playing, had his hands on his knees or thighs, and was facing home plate (Pelham, Mcburnett, Harper, Milich, Clinton, Thiele, & Murphy, 1990). It should be noted that the ready position was only coded when a child's team was on defense (i.e. playing the field).

Disruptive behaviors included "negative statements (e.g. complaining, teasing), leaving one's position, noncompliance, inappropriately playing with objects, and aggression (O'Callaghan, 2002).

Correspondence was considered as an agreement between a child's verbal statement and his subsequent nonverbal behavior. That is, a child first made a verbal declaration of a behavior he intended to perform and how many times he intended to perform that behavior over the course of a set number of trials. During the trials, the child's actual behavior was recorded. If the frequency of his actual behavior (i.e. his nonverbal behavior) met or exceeded his original declaration (i.e. his verbal behavior), then correspondence was said to have occurred.

Data Collection and Measurements

The frequency of occurrence of the behaviors described above was recorded using pencil-and-paper observation forms for each of ten trials. Each trial began when the pitcher announced, "Here comes pitch number ___!" which was said prior to each pitch. The trial terminated when the call for the next pitch was made. Prosocial and disruptive behaviors were recorded if they occurred at any point during the trial. Attentive behavior (i.e., the "ready position") was recorded only if it occurred during the time between the call for the next pitch and the moment the ball crossed home plate. Ten trials were conducted during each session.

Two observers independently collected inter-observer agreement during 56% of all sessions. Overall inter-observer agreement for prosocial behavior was 90%. Overall inter-observer agreement for attentive behavior was 94%. Unfortunately, adequate reliability was not obtained for disruptive behavior, thus data on disruptive behavior is not be presented here.

General Procedures

All training procedures were conducted on the Louisiana State University campus in a vacant lot adjacent to the building where the STAR program was conducted. In the training setting, a “practice” kickball diamond was set up consisting of four bases placed 10 feet apart from one another. A “dug out” was also marked off with four cones. An experimenter (the first author) and a research assistant served as trainers for each participant. Training consisted of two general components: (a) teaching the specific behaviors as described above and (b) reinforcement for correspondence plus shaping (i.e., progressively increasing the criterion for reinforcement across sessions). All training sessions were conducted approximately two hours prior to a later kickball game (described below). Ten trials were conducted for each behavior during a training session; thus a session focusing on both attentive and prosocial behavior would consist of 20 trials.

At the end of the morning’s academic schedule, a kickball game was arranged that included all the children from the STAR program and some staff members filling in as teammates as needed. This setting served as the generalization setting and data were recorded on the child’s attentive, prosocial, and disruptive behaviors during the game. This game was located in another vacant lot on the LSU campus separate from the lot used for the training session. The same four bases were used from the training setting, but now placed approximately 20 feet apart. Similarly, the “dugout” represented by cones was increased in size to accommodate the larger amount of children. Each game consisted of two or three, 20-pitch innings (after 10 pitches, the teams switched from offense to defense and vice versa).

Medication Status. Participants were randomly alternated between receiving their usually prescribed medication and a placebo as part of another larger medication study being conducted by the STAR program. As all staff and experimenters were kept blind to the child's medication status, sessions were letter coded to reflect whether the participant received medication or placebo. Initially results were recorded separately by the letter code and actual medication status was identified at the end of the program. When medicated, Adam was prescribed 5-mg of Dexedrine in the morning. Barry was prescribed 20-mg of Adderall in the morning and an additional 5-mg of Adderall in the afternoon.

Training Procedures

Baseline. Baseline data were first collected during the group kickball game only. For five days the occurrence of prosocial, attentive, and disruptive behaviors were recorded. The participants were not aware that their behavior was being recorded and no feedback was given on their performances. On the sixth day of the study, the first training session began focusing only on attentive behavior. In order to establish a baseline for correspondence, the child was told immediately prior to the training session, "I want you to tell me that you'll be in the ready position for every pitch." The participant responded, "I'll be in the ready position for every pitch." If the participant did not respond immediately or refused to respond, he was prompted until he responded appropriately. The participant's actual behavior with respect to the ready position was recorded during the training session and correspondence was then also recorded. No feedback or rewards were given at the conclusion of the session. On the ninth day of the study, the training sessions began to include prosocial behavior as well as attentive

behavior. A correspondence baseline was recorded for prosocial behavior in a manner identical to the method used in recording the correspondence baseline for attentive behavior.

Correspondence Training. If the participant's correspondence during the baseline condition was below 100%, then correspondence training began. Similar to the baseline procedures, the participant was asked to make a statement that he would perform a target behavior a specific number of times out of a series of ten trials. After reviewing a participant's performance during baseline, a criterion was established at or slightly above the baseline level that the researchers felt the child could achieve. After the child stated that he intended to perform the behavior the prescribed number of times during the training session, he was told that if he did what he stated, then he would be allowed to choose a reinforcement coupon.

For example, a staff member (trainer) stated, " 'Bobby', I need you to tell me that you'll be in the ready position for at least 4 pitches." The participant then replied, "I will be in the ready position for at least 4 pitches." The trainer then stated, "You said you will be in the ready position for at least 4 pitches. If you do what you say you'll do, you will get to pick a coupon." As in baseline, if the participant refused or otherwise failed to make the proper statement, he was prompted until he made the appropriate statement. It should be noted, however, that the participants rarely refused to cooperate with the trainer's instructions.

The series of ten trials was then conducted and the child's performance was recorded. If the participant met or exceeded his stated performance, he was told, "You said you'd be in the ready position for at least 4 pitches. You were in the ready position

for 4 (or 5, or 6...) pitches. Because you did what you said you would do, you get to choose a coupon,” and allowed to choose a reinforcement coupon. If the child did not meet his stated criteria, he was told, “You said you’d be in the ready position for at least 4 pitches. You were in the ready position for only 3 (or 2, or 1) pitches. Because you did not do what you said you would do, you do not get to choose a coupon. Try harder next time. The purpose of the correspondence training condition was to provide the participant with a history of reinforcement for “doing what you said you would do.”

Correspondence Plus Shaping. Correspondence training plus shaping was introduced if the overall frequency of the participant’s behavior was less than 100%. Thus, if the participant did not exhibit 100% occurrence of the target behavior, shaping was used to increase his performance. In this condition, the child would again make a statement that he would perform a target behavior a specific number of times immediately prior to the training session. However, the criterion that the child had to fulfill was gradually increased (i.e. shaping) from the child’s best performance during the Correspondence Training condition. Furthermore, correspondence during a session in this condition would lead to the criteria being progressively increased on the subsequent session. Non-correspondence was not rewarded and the criterion was not raised.

Generalization Procedures

Baseline. Once a training session began to focus on a specific target behavior, data continued to be recorded on that behavior in the group kickball game. Thus, no reinforcement was provided and no other changes were made to the generalized setting, data was merely recorded to note any changes associated exclusively with the training manipulations. This type of generalization strategy has been referred to as “Train and

Hope” (Stokes & Baer, 1977).

Mediated Generalization. In the mediated generalization condition, the participant was prompted to state that he would perform a target behavior immediately prior to the group kickball game. For example, a staff member would ask the child the now-familiar phrase, “I want you to tell me that you’ll be in the ready position for every pitch.” The child would then reply, “I’ll be in the ready position for every pitch.” However, no reinforcement for correspondence or feedback was provided in the generalization setting. All target behaviors continued to be recorded as previously noted.

Design

Conditions were implemented in a single subject multiple baseline design across settings. In addition, the participants changing medication status provided a “naturally” occurring single-case alternating treatments designs. The study continued until the end of the STAR program. The length of some of the final treatment conditions was limited, due to the time constraints of the six-week summer program.

Results

Placebo Results

Adam

Training setting. Figure 1 shows the results for attentive and prosocial behavior for Adam when he received a placebo. As shown in the figure, Adam exhibited the ready position during a mean of 45% of the baseline trials. However, correspondence between his stated and actual performance did not occur during the training baseline. In the Correspondence Training phase, Adam exhibited attentive behavior during a mean of 94% of the trials and correspondence with his stated behavior occurred for four of the

five sessions. In the Correspondence plus shaping phase, the criterion for reinforcement was increased to 100%. Adam responded to this criterion increase and exhibited the ready position for 100% of the trials and correspondence occurred for all sessions.

Figure 1 shows Adam exhibited prosocial behavior during a mean of 25% of the baseline trials. However, correspondence between his stated and actual performance did not occur during the training baseline. During Correspondence Training, Adam exhibited prosocial behavior during a mean of 73% of the trials and correspondence occurred for all of the sessions. In the Correspondence plus shaping phase, the criterion for reinforcement was increased to 100%. Adam responded to this criterion increase and exhibited prosocial behavior for 100% of the trials and correspondence occurred for all sessions.

Generalization setting. In the group kickball game, Figure 1 shows Adam exhibited attentive behavior during a mean of 18% of the trials. Attentive behavior increased to a mean of 26% in the generalized setting when correspondence training was conducted in the training session. Finally, in the Mediated Correspondence phase, attentive behavior increased to a mean of 70%, though correspondence between stated and verbal behavior did not occur in this condition.

In the group kickball game, Figure 1 shows Adam exhibited prosocial behavior during a mean of 2% of the trials. Prosocial behavior increased to a mean of 14% in the generalized setting when correspondence training was conducted in the training session. In the Mediated Correspondence phase, prosocial behavior increased to a mean of 74% and correspondence occurred for 2 of the 5 sessions.

Barry

Training setting. Figure 2 shows the results for attentive and prosocial behavior for Barry when he received a placebo. The figure shows Barry exhibited the ready position during 100% of the baseline trials. Correspondence occurred during every session. Barry did not progress to Correspondence Training or Mediated Correspondence due to his perfect performance in the training baseline.

Figure 2 shows Barry exhibited prosocial behavior during 0% of the baseline training trials. Correspondence between his stated and actual performance did not occur during the training baseline. During Correspondence Training, Barry exhibited prosocial behavior during a mean of 32% of the trials and correspondence occurred for 4 of 5 sessions. In the Correspondence plus shaping phase, the criterion for reinforcement was increased to 50%, 70%, and finally 100% on three consecutive sessions. Prosocial behavior increased to a mean of 67% and correspondence occurred during 2 of 3 sessions.

Generalization setting. In the group kickball game, Figure 2 shows Barry exhibited attentive behavior during a mean of 3% of the trials during baseline. Attentive behavior increased to a mean of 14% in the generalized setting when a correspondence baseline was conducted in the training session. Finally, in the Mediated Correspondence phase, attentive behavior occurred during a mean of 16% of the trials. Correspondence did not occur during this condition.

In the group kickball game, Figure 2 shows Barry exhibited prosocial behavior during a mean of 3% of the trials. Prosocial behavior increased to a mean of 31% in the generalized setting when correspondence training was conducted in the training session.

Due to time restraints, Mediated Correspondence was not implemented in this condition.

Medication Results

Adam

Training setting. Figure 3 shows the results for attentive and prosocial behavior for Adam when he received medication and placebo. As shown in the figure, Adam exhibited the ready position during a mean of 40% of the baseline trials. However, correspondence between his stated and actual performance did not occur during the training baseline. In the Correspondence Training phase, Adam exhibited attentive behavior during a mean of 93% of the trials and correspondence with his stated behavior occurred for four out of the five sessions. In the Correspondence plus shaping phase, the criterion for reinforcement was increased to 100%. Adam responded to this criterion increase and exhibited the ready position for 100% of the trials and correspondence occurred for all sessions.

Figure 3 shows Adam exhibited prosocial behavior during a mean of 38% of the baseline trials. However, correspondence between his stated and actual performance did not occur during the training baseline. During Correspondence Training, Adam exhibited prosocial behavior during mean of 90% of the trials and correspondence occurred for all of the sessions. Due to time restraints, Correspondence plus shaping was not implemented in this condition.

Generalization setting. In the group kickball game, Figure 3 shows Adam exhibited attentive behavior during a mean of 13% of the trials. Attentive behavior increased to a mean of 23% in the generalized setting when correspondence training was conducted in the training session. Finally, in the Mediated Correspondence phase,

attentive behavior increased to a mean of 93% and correspondence occurred during 4 of 6 trials.

In the group kickball game, Figure 3 shows Adam exhibited prosocial behavior during a mean of 6% of the trials. Prosocial behavior increased to a mean of 20% in the generalized setting when correspondence training was conducted in the training session. Due to time restraints, Mediated Correspondence was not implemented in this condition.

Barry

Training setting. Figure 4 shows the results for attentive and prosocial behavior for Barry when he received medication and placebo. The figure shows Barry exhibited the ready position during 100% of the baseline trials. Correspondence occurred during every session. Barry did not progress to Correspondence Training or Mediated Correspondence due to his perfect performance in the training baseline.

Figure 4 shows Barry exhibited prosocial behavior during a mean of 3% of the baseline trials. Correspondence between his stated and actual performance did not occur during the training baseline. During Correspondence Training, Barry exhibited prosocial behavior during a mean of 37% of the trials and correspondence occurred for all of the sessions. In the Correspondence plus shaping phase, the criterion for reinforcement was increased to 50% and then 70% on two consecutive sessions. Prosocial behavior increased to a mean of 65% and correspondence occurred during both sessions. Due to time restraints, the criterion was not increased to 100% in this condition.

Generalization setting. In the group kickball game, Figure 4 shows Barry exhibited attentive behavior during mean of 27% of the trails. Attentive behavior increased to a mean of 71% in the generalized setting when a correspondence baseline

was conducted in the training session. Finally, in the Mediated Correspondence phase, attentive behavior increased to a mean of 76% and correspondence occurred during 4 of 10 trials.

In the group kickball game, Figure 4 shows Barry exhibited prosocial behavior during a mean of 9% of the trials. Prosocial behavior increased to a mean of 32% in the generalized setting when correspondence training was conducted in the training session. Due to time restraints, Mediated Correspondence was not implemented on Barry in this condition.

Discussion

Overall, both participants showed increases in both attentive and prosocial behaviors in the context of a kickball game. The treatment of correspondence training plus shaping proved to be a successful means of increasing attentive and prosocial behaviors in the training sessions. However, the results for generalization to the group kickball setting were more equivocal. Although some generalization appears to have occurred without explicit programming (“Train and Hope”), overall results were modest and inconsistent in this regard. However, the mediated generalization demonstrated a clear and substantial increase in attentive and prosocial behaviors. These results support the suggestion that establishing correspondence may lead to greater generalization. Overall, these results suggest that correspondence training may be an effective means of increasing attentive and prosocial behaviors of a child diagnosed with ADHD within a sports setting.

Comparison of the medication and placebo results suggests an increased frequency of behavior in the generalized setting associated with medication. Barry’s

attentive behavior most clearly illustrates this point. His attentive baseline during training sessions was a mean of 71% when he received medication as compared to a mean of 14% when receiving placebo. When mediated correspondence was implemented, attentive behavior occurred during a mean of 76% of the trials when receiving medication as compared to a mean of 16% when he received placebo. Barry's prosocial behavior in the generalized setting remained fairly stable in across medication conditions.

Adam's attentive behavior also reflects some evidence of a medication effect. While his attentive baselines are relatively similar, attentive behavior occurred during a mean of 93% of the trials in mediated correspondence condition when he received medication as compared to a mean of 70% when he received a placebo. Similar to Barry, Adam's prosocial baseline remains relatively stable across medication conditions. In general, the differential effects for attentive and prosocial behavior are consistent with the overall effects most often reported to be associated with stimulant medication. That is, it is well documented that stimulants may increase attention but medication effects on general social behaviors remain inconsistent. However, it is perhaps most notable that medication appears to have facilitated the generalization of attentive behaviors to another setting and in the absence of reinforcers.

To the extent that correspondence training effected an increase in prosocial behavior, the results are consistent with previous literature (Risley & Hart, 1968; Israel & Brown, 1977; Paniagua & Baer, 1982; Osnes, Guevremont, Stokes, 1986; Ralph & Birnbrauer, 1986; Lowenthal, 1995; Molina-Cobos, Luciano-Soriano, & Gomez-Becerra, 2000). Similarly, the results reflect the use of correspondence training to increase

attentive behavior seen in previous literature (Keogh, Burgio, Whitman, Johnson, 1983; Paniagua, 1987). With respects to generalization, the results are again consistent with previous literature (Israel & O'Leary, 1973; Risley & Hart 1968). However, overall results again support previous suggestion that it may be necessary to explicitly program for generalization and that correspondence training may be one effective means of doing so.

The present study extends previous literature by using correspondence training in an environment where it had yet to be tested (i.e., social skills in a sports setting) and for children with a diagnosis of ADHD. Using correspondence training in a sport setting, the study explores the practicality of implementing a proven behavioral treatment in a novel setting, a new population, and new social skills behavior that have often been quite resistant to generalization. Past studies have shown the effectiveness of correspondence training in classroom and play settings, but have not extended the treatment to an organized sport environment, such as a kickball game. Similarly, past studies have shown the effectiveness of correspondence training with a variety of populations, but have not extended the treatment to children with ADHD.

An important social implication of the study is related to the issue of social skills. As earlier noted, children diagnosed with ADHD typically suffer from poor social relationships (Milich & Landau, 1982). As several studies point out, a common trait in children who are rated highly by their peers in terms of social status is high athletic competence (McGraw & Tolbert, 1976; Gross, et al., 1985; Weiss & Duncan, 1992). Therefore, this study may also provide a method for increasing the social status of children diagnosed with ADHD by teaching proper sportsmanship and some athletic

proficiency through attending to the game.

A number of limitations to the study should be considered carefully. One limitation was the abbreviated conditions due to the time constraints of the STAR program. Mediated generalization was not conducted for prosocial behavior for Barry in either medication condition. Due to time constraints, mediated generalization for prosocial behavior was also not conducted for Adam in the medicated condition. Though this limitation did not prevent some conclusions to be drawn from these conditions, it does leave considerable room for improvement.

Another limitation to the study was the manner in which data was classified as either medication or placebo status. Because medication status was identified only after the study was completed, an unexpectedly shortened amount of time was spent in some of the baseline conditions. Future work should look to plan the conditions around medication status, so an equal amount of time will be spent in conditions regardless of medication status.

A final limitation was the insufficient reliability in recording disruptive behavior. As a result, one of the study's original targets remains unstudied. While attentive and prosocial behavior was recorded with acceptable inter-observer reliability, greater care should have been taken in training observers in recording disruptive behaviors.

Regardless of these limitations, the study strongly suggests the potential for correspondence training to facilitate the generalization of treatment gains for children with ADHD. This is critical to developing more effective behavioral treatments for ADHD and for developing addition alternatives to stimulant medication. The results for mediated generalization procedures suggest that correspondence training may in fact

make a child's verbal statement a mediator of his nonverbal behavior across settings and in the absence of direct reinforcement. Future studies may want evaluate whether mediated generalization will occur across behaviors as well as across settings. In other words, once a child has been sufficiently reinforced for correspondence for a particular behavior in a kickball game, a researcher may then want to study if the child will respond to verbal statements for a new intended behavior in a classroom setting as well. Finally, this study has suggested a positive relationship between medication and generalization. Future studies may wish to more closely examine this relationship and its implications for ADHD children and their social behavior.

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Figure Captions

Figure 1. Results for attentive and prosocial behavior for Adam when he received a placebo.

Figure 2. Results for attentive and prosocial behavior for Barry when he received a placebo.

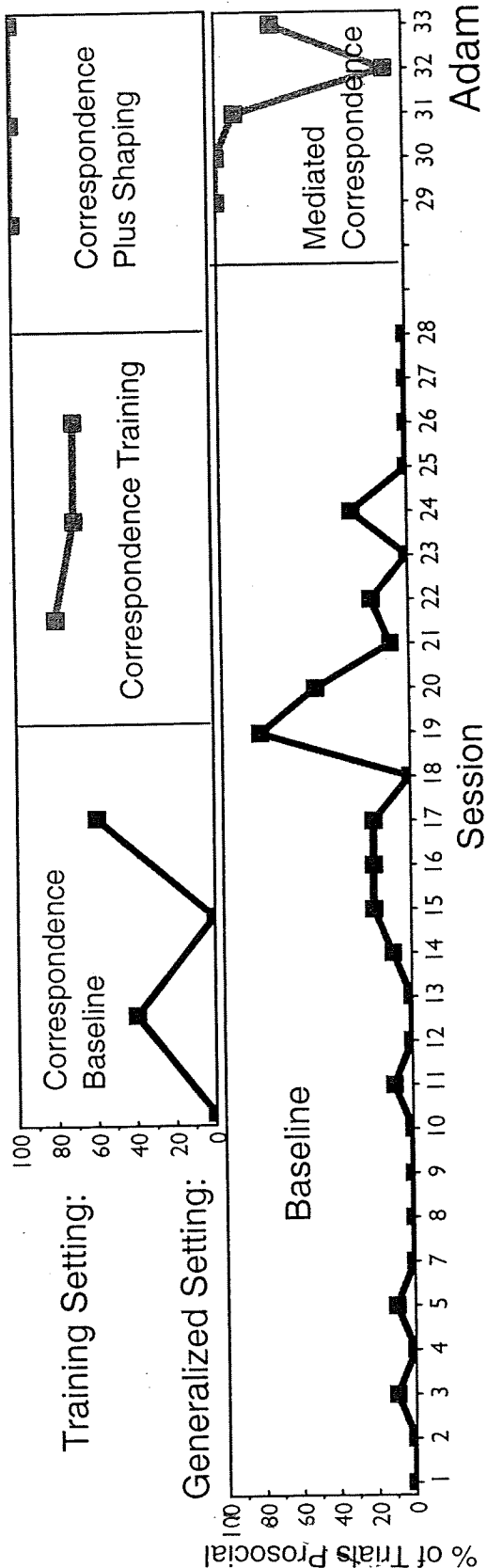
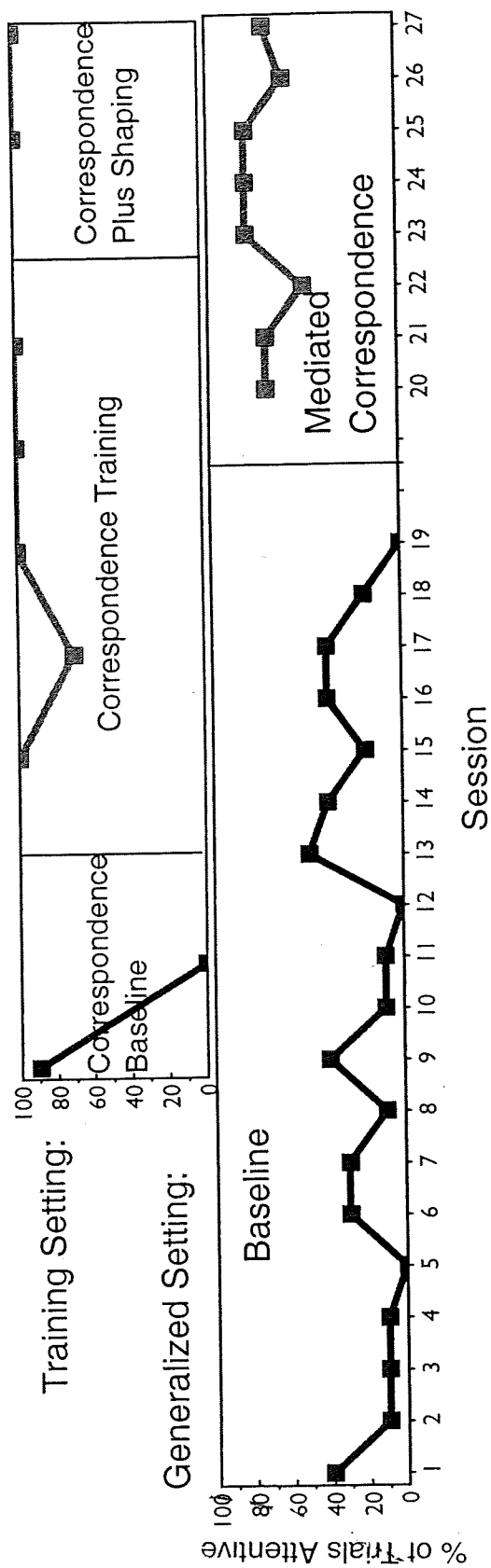
Figure 3. Results for attentive and prosocial behavior for Adam when he received medication.

Figure 4. Results for attentive and prosocial behavior for Barry when he received medication.

Figure 1

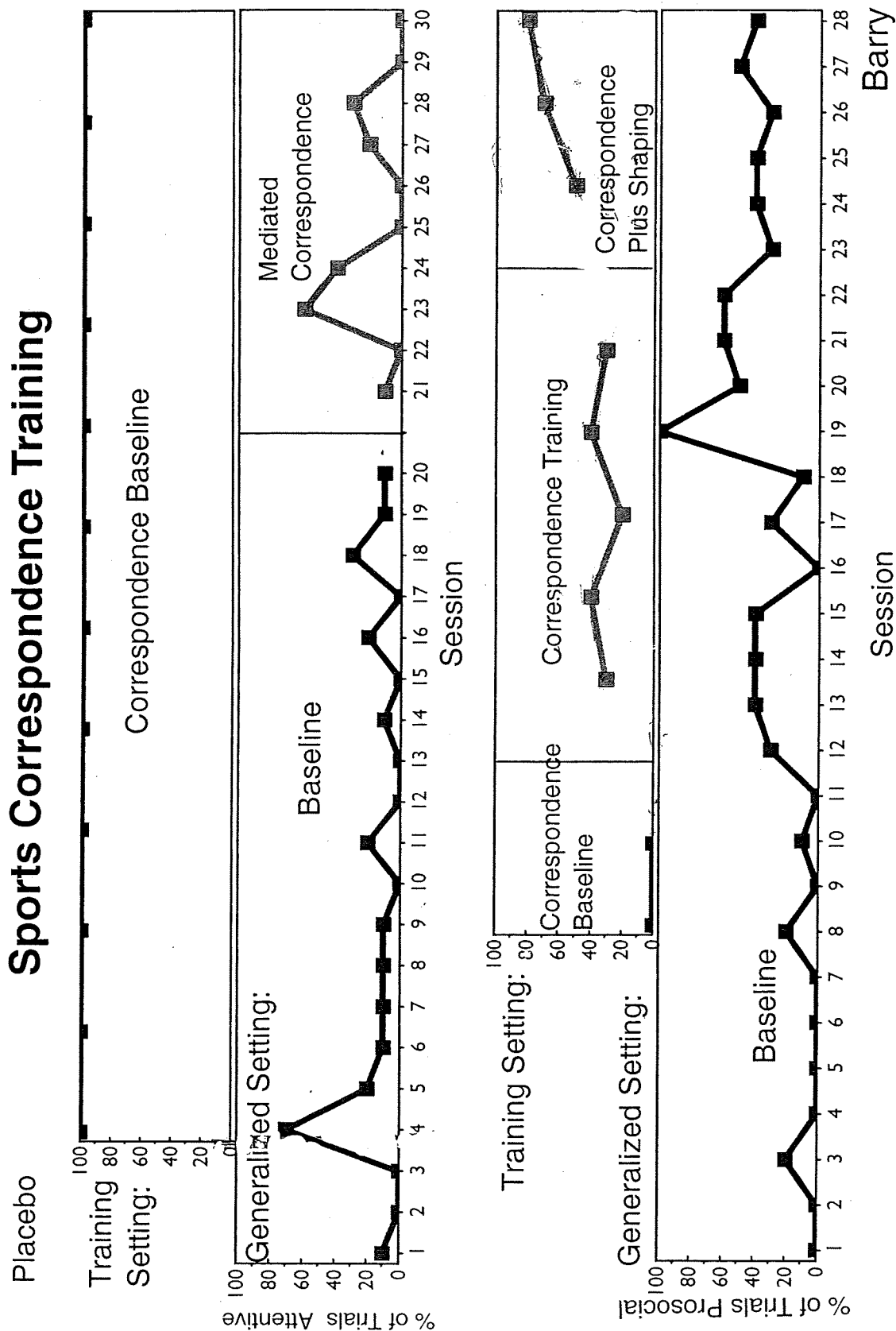
Sports Correspondence Training

Placebo



Adam

Figure 2
Sports Correspondence Training



Sports Correspondence Training

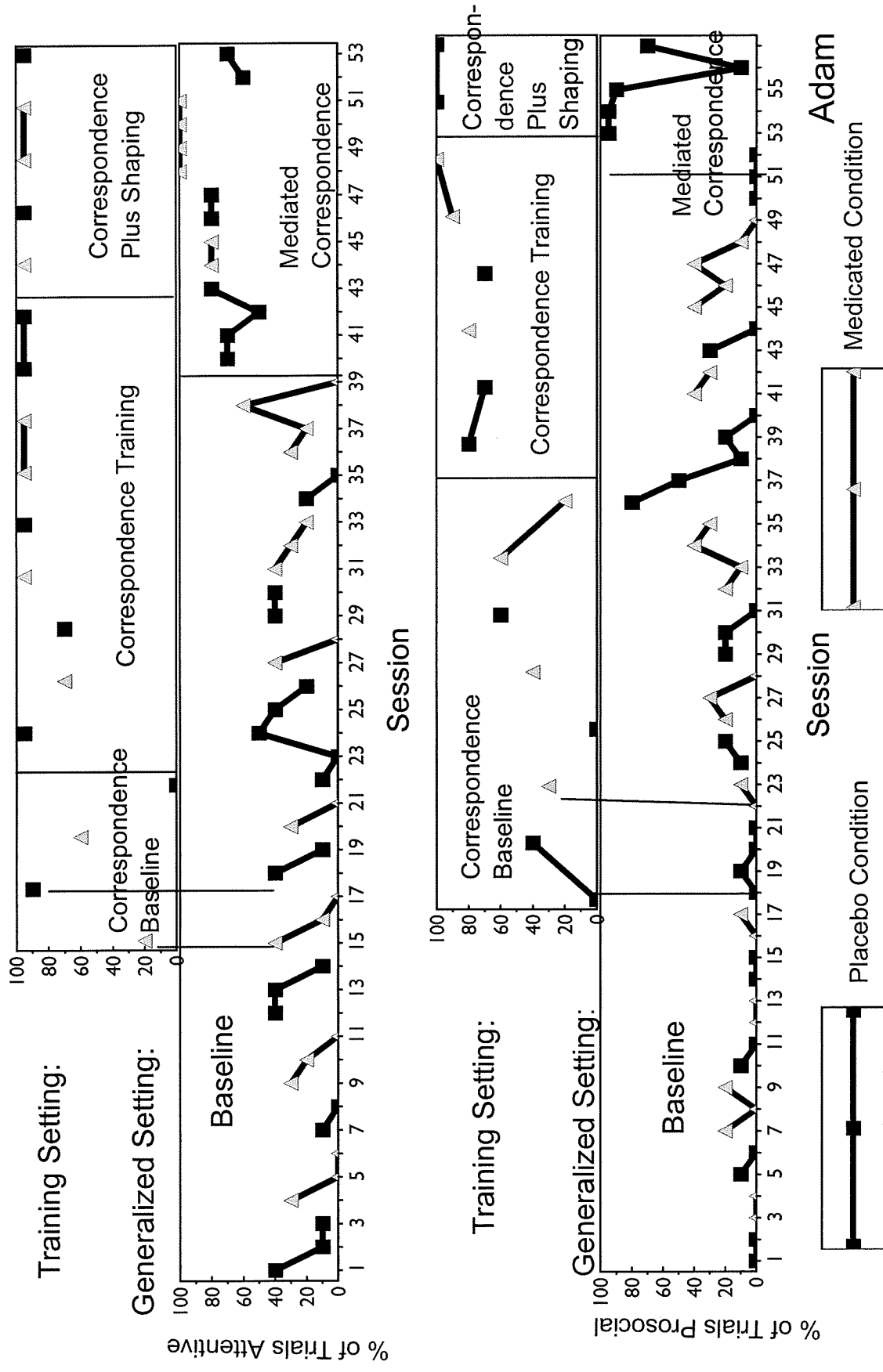
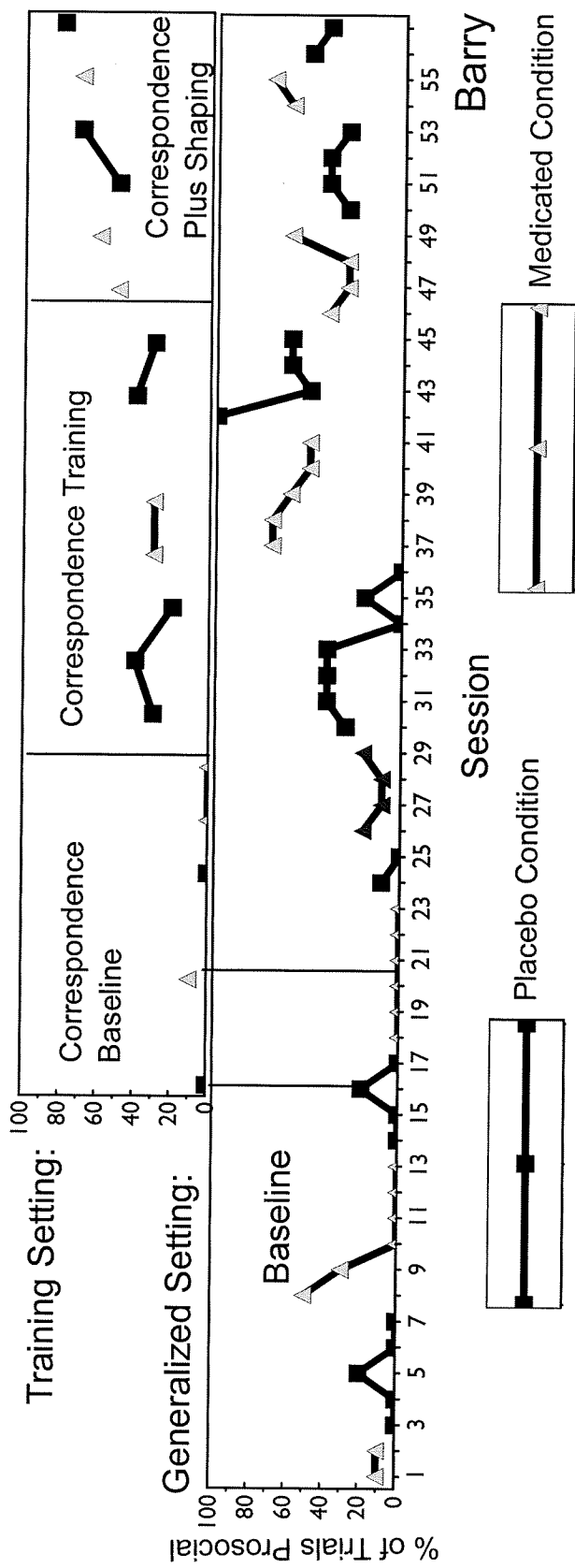
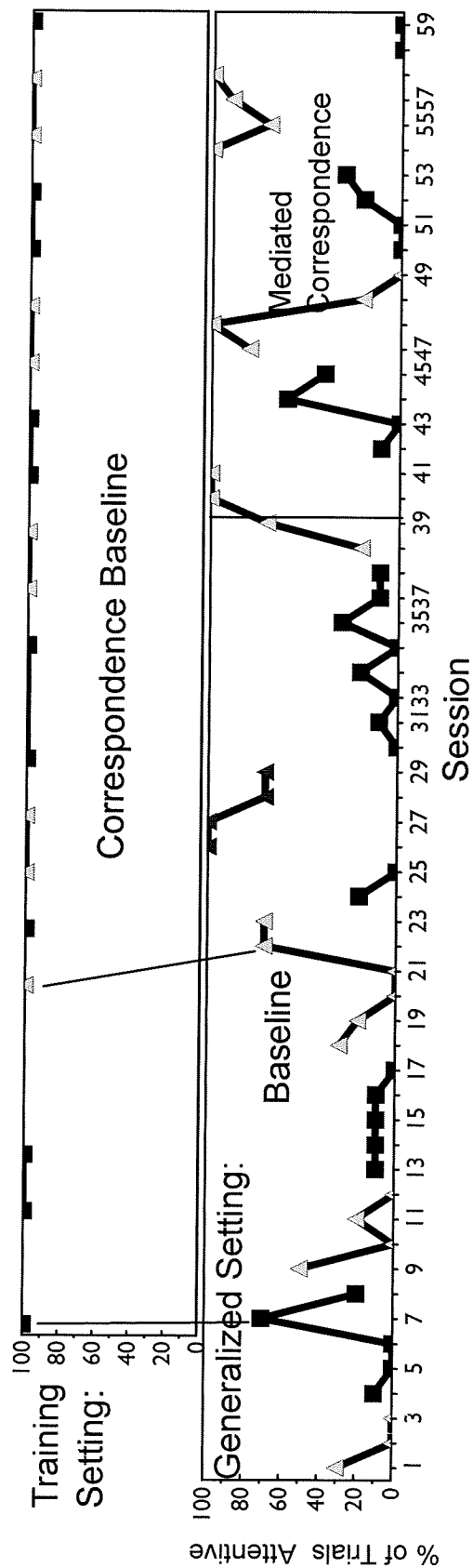


Figure 4

Sports Correspondence Training



Barry

Session

Placebo Condition

Medicated Condition