

Athletic Performance and Social Behavior as Predictors of Peer Acceptance in Children Diagnosed With Attention-Deficit/Hyperactivity Disorder

ANDY LOPEZ-WILLIAMS, ANIL CHACKO, BRIAN T. WYMBS,
GREGORY A. FABIANO, KAREN E. SEYMOUR, ELIZABETH M. GNAGY,
ANDREA M. CHRONIS, LISA BURROWS-MACLEAN,
WILLIAM E. PELHAM, JR., AND TRACY L. MORRIS

Sixty-three children between ages 6 and 12 who were enrolled in a summer treatment program for children with attention-deficit/hyperactivity disorder (ADHD) participated in a study designed to measure the relationship between social behaviors, athletic performance, and peer acceptance. Children were assessed on sport-specific skills of three major sports (basketball, soccer, and softball), general fitness tests (i.e., 50-yard dash and sit-ups), and social behavioral measures. Predictors were standardized and separated into three broad domains: athletic performance, negative social behavior, and positive social behavior. Both negative behavior and athletic performance significantly predicted children's sociometric status regardless of outcome measure. Positive behavior was a significant predictor only when considering positive peer nominations. The direction and magnitude of the predictor varied by type of outcome measured. Clinical implications and future directions are discussed.

Children's interactions with peers are crucial for the optimal development of social and emotional competency (Berndt & Ladd, 1989; Hartup, 1979). Peer rejection in childhood is a predictor of negative outcomes and externalizing behavior problems in adolescence, particularly delinquency, school dropout, and psychopathology (Coie & Cillessen, 1993; Coie, Terry, Lenox, Lochman, & Hyman, 1995; Hoza, Molina, Bukowski, & Sippola, 1995).

Significant deficits in relationships with peers have been reported among children with ADHD (Bagwell, Molina, Pelham, & Hoza, 2001; Frederick & Olmi, 1994; Hodgens, Cole, & Boldizar, 2000; Stormont, 2001). Given that children with ADHD are likely to suffer impaired peer relations, they are at heightened risk for long-term deficits in social functioning. Thus, research on the social behaviors of children with ADHD directed toward understanding factors involved in peer rejection is of particular importance.

In comparison with children without ADHD, children with ADHD engage in higher rates of active behavior, are more aggressive, are more negative, and are perceived as more annoying (Pelham & Bender, 1982); have more talkative, commanding, and aggressive actions (Madan-Swain & Zentall, 1990; Maedgen & Carlson, 2000), are more socially awkward (Landau & Moore, 1991); and communicate less effectively (Whalen, Henker, Collins, McAuliffe, & Vaux, 1979). These behaviors are theorized to lead to difficulties in social relationships in general, and peer relationships in particular. In addition to being at risk for peer rejection due to their negative social behaviors, children with ADHD are thought to be at risk for rejection due to poor basic motor-skill development, poor coordination, and low levels of athletic skill. Researchers have indicated that children with ADHD do not perform as well as their

same-age peers on basic motor skills tasks (Beyer, 1994; Piek, Pitcher, & Hay, 1999), are less physically fit and coordinated than a normative group of children (Harvey & Reid, 1997), and may be more accident prone than same-age peers (Lahey et al., 1998). This latter finding is notable in light of research indicating that clumsy children are more disliked by peers and have lower self-esteem (Schoemaker & Kalverboer, 1994).

Several researchers (Bunker, 1991; Chambers, 1991; Coop & Rotella, 1991) have noted the importance of athletic participation, finding that improvements in self-esteem, self-confidence, and social skills are demonstrated as a result of successful experiences with such activities. Researchers have also indicated that poor athletic performance is related to lowered levels of self-confidence and decreased popularity and respect from peers (Gross & Johnson, 1984; Gross, Johnson, Wojniower, & Drabman, 1985). Indeed, play behaviors are a central component of a child's social world. The nature of play of boys in elementary and middle school (the primary population of ADHD children) is largely focused on sports games (Blatchford, Baines, & Pellegrini, 2003). Athletic activities such as baseball, soccer, and basketball play an important role in social relations and adjustment (Pellegrini & Blatchford, 2002). Such activities allow children to practice a range of developmentally appropriate social skills in ecologically relevant peer contexts.

The aim of this study was to understand the unique role of athletic performance and social behavior in peer relationships of children with ADHD. A key question is whether the negative behaviors of children with ADHD are so salient in predicting peer relationships that athletic performance would add little or no predictive value. If this is indeed the case, treatments that primarily target social behaviors may be considered sufficient. However, if athletic performance does have important predictive association with peer relations above and beyond that of social behavior, then compelling arguments for the inclusion of treatment components targeting athletic skills could be made.

METHOD

Participants

Participants were 63 children diagnosed with either ADHD Combined, Predominantly Inattentive, or Predominantly Hyperactive/Impulsive subtype who were enrolled in an intensive summer-time behavioral treatment program (Pelham & Hoza, 1996) for children with ADHD. Parental consent and child assent were obtained for each child. Diagnoses were made on the basis of parent and teacher reports on the *Disruptive Behavior Disorders Rating Scale* (Pelham, Gnagy, Greenslade, & Milich, 1992) and the *Diagnostic Interview Schedule for Children Version IV* (DISC-IV). The DISC-IV has demonstrated acceptable reliability and validity for both child and parent versions (Shaffer, Fisher, Lucas, Dulcan, & Schwab-Stone, 2000). DISC-IV interviews were conducted by trained senior graduate students in a clinical child psychology doctoral program. A licensed clinical psychologist reviewed and confirmed each child's diagno-

sis. The mean age of the sample was 9.08 years ($SD = 1.67$), 92% were male (58 children), and 92% were reported as Caucasian by their parent(s)/guardian(s). Thirty-eight children (60%) met criteria for comorbid diagnosis of Oppositional Defiant Disorder, and 13 children (21%) met criteria for a comorbid diagnosis of Conduct Disorder. These rates are commensurate with those of studies that have reported that approximately one half to two thirds of ADHD children also receive a diagnosis of ODD or CD or exhibit aggression (e.g., Barkley, 1998; Pelham et al., 1992).

The summer treatment program was conducted for 8 hr per day, 5 days per week, for an 8-week period. Groups of 12 children each were formed according to age. Each group spent 3 hr per day in classroom academic work and the remainder in social skills training and recreationally based activities. A major component of the recreational activities included sports skills training (basketball, soccer, baseball, and swimming). Referrals to the program were made by local care providers (physicians and psychologists), and participants were also enlisted through advertisements. A subset of children ($n = 33$) maintained their medication status as usual per direction of their care providers (i.e., children on methylphenidate or other stimulant medication were not required to alter their medication status to participate in the program), 11 were not medicated during the study, and 29 underwent randomized medication assessments of various medication types and doses during the course of the study. Given the variety of medication conditions, we did not include medication status in the analyses.

Athletic Performance Measures

Athletic performance, as measured in this study, was composed of two types of skills: general athletic performance and performance related to a specific sport. Key skills from the three major sports played in the treatment program were selected for assessment along with two general fitness tests that measure strength/endurance and running speed (Morrow, Jackson, Disch, & Mood, 1995). All athletic performance measures were collected in the sixth and seventh weeks of the 8-week summer program. Each athletic performance measure was standardized by computing z scores within group to control for developmental level and to make possible the combination of measures with different metrics (e.g., time, distance) as well as permit interpretation between measurements. If necessary, scores were transformed so that positive scores reflected better performance. Measurements were collected and supervised by several of the authors, each of whom was involved in the development of the study methodology (e.g., instructions for measurements). For each of the distance (softball throw, soccer punt) and count (sit-ups) measurements, a second rater confirmed the accuracy of the measurement (e.g., distance of softball throw). This method was not intended nor collected as a separate reliability measure but rather as a method of increasing accuracy of measurement by securing agreement between raters before recording the measurement.

Basketball Dribble. Children were instructed to start running from a designated point in a designated pattern around cones that were placed on an area of the basketball court. Arrows were drawn in chalk on the outdoor court to indicate the proper running direction. Children completed the course once without a ball and another time while dribbling a basketball; both scores were timed in seconds (to the hundredth). They were instructed to complete the course as fast as they could without any dribbling violations (i.e., carrying, traveling, double dribbling). One of the authors observed each child to ensure that the child completed the course as instructed. If a child made an error, the child was instructed to begin again. This was done to ensure that the sport-specific skill of dribbling was measured, not simply speed through the course. The amount of time through the course while dribbling the ball was divided by time through the course without the ball to compute a performance ratio, a more valid measure of dribbling efficiency (Morrow et al., 1995).

Softball Throw. Children were instructed to throw a standard softball (overhand) as far and as straight as they could along a line that was marked on a large, open field. Distance was measured in feet from the designated start spot to where the softball initially landed. Error was measured in feet as the distance that the ball landed from the line. Error was subtracted from distance to get a total score. Thus, both strength and accuracy were reflected in children's total scores.

Soccer Punt. Children were instructed to punt a soccer ball as far and as straight as they could along a line that was marked on a large, open field. The same method used to calculate total scores for the softball throw was used for the soccer punt.

Sit-ups. Participants were grouped into dyads, within age group, according to size. Children were told to lie on their backs, hands behind their heads, and with the soles of their feet on the ground while their partners held their feet. The participants were instructed that they had to elevate their upper bodies to a level at which both elbows touched their knees. The total number of repetitions in which the participant touched both elbows to his or her knees within a 1-min time span were counted and recorded.

Fifty-Yard Dash. Children were instructed to start at the beginning of a 50-yard line marked off on a large open field. Children's times from start to finish of the 50 yards were recorded to the nearest hundredth second.

Average Skill Scores. After the results of each test were standardized within age group, the standardized scores of the five test scores for each child were averaged to reflect a composite athletic performance measure ($\alpha = .73$). As a check on the reliability of the athletic performance measures, Pearson correlations were computed for the 12 children who participated

in the study both years but for whom only the first year of data were used in the analyses. The average Pearson correlation between the first and second year on the five athletic performance measures ($r = .62$) demonstrated adequate reliability over a 1-year period of measurement.

Social Behavior Measures

Several measures of social behavior were collected daily as a standard component of the treatment program. During activities, children were given immediate feedback by staff upon exhibition of any behavior—negative or positive—included in the behavioral point system. All staff members were required to memorize verbatim operational definitions of behavior categories and received comprehensive training prior to the beginning of the program (Pelham, Greiner, & Gnagy, 1998; the operational definitions of each behavior category are too lengthy to include here, but copies can be obtained from Pelham via <http://ctadd.net/ctadd/index.html>). In addition, all staff members were tested weekly on operational definitions and coding behaviors. Furthermore, daily integrity and fidelity observations were made with detailed feedback given to staff members regarding their adherence to manualized procedures. Six categories representative of a range of social behavior were selected (see descriptions later in this section). Each of the social behavior category totals were calculated daily and then averaged across the 8-week duration of the program. Each social behavior measure was standardized by computing z scores within group to control for developmental level and to make interpretation between measurements possible. All negative behavior categories were transformed after they were standardized so that positive scores reflected better behavior.

The behavioral observation and feedback system utilized in the summer treatment program has been developed over the past 25 years and has been demonstrated to exhibit adequate reliability in several studies (e.g., Chronis et al., 2004; Pelham et al., 1999). Reliability estimates during the second year of this study were gathered via independent observations collected on 25% of the children in a group for an entire day, sampled across groups and days, independently classifying and recording point system behaviors for those children. Reliability for each of the behavioral categories was determined by computing Pearson correlations between the group counselors and the independent observer across children; average Pearson r s were 0.88. These measures have been shown to be reliable and sensitive to treatment effects in our previous studies.

Total Rule Violations. Total rule violations were the number of incidents in which the child violated rules specific to a particular activity, game, or drill (e.g., not participating in a game, failing to stay in line during a transition). Rule violations were summed daily, and a daily average was calculated across the 8-week duration of the program. Pearson correlation between the group counselors and the independent observer across children was .89.

Total Negative Verbalizations. Total negative verbalizations included the number of incidents of three particular behaviors: teasing peers, verbal abuse directed at adults, and cursing/swearing. Pearson correlation between the group counselors and the independent observer across children was .89.

Total Conduct Behavior. Total conduct behavior included the number of incidents of four particular behaviors: intentional aggression, intentional destruction of property, stealing, and lying. Pearson correlation between the group counselors and the independent observer across children was .85.

Sharing With a Peer. Behaviors were coded *sharing* when a child shared a possession or a privilege with another child. Pearson correlation between the group counselors and the independent observer across children was .68.

Helping a Peer. Behaviors were coded as *helping* when a child offered aid or assistance to another child. Pearson correlation between the group counselors and the independent observer across children was .89.

Ignoring a Negative Stimulus. When a child was confronted with a negative stimulus (e.g., teasing by another child), behavior was coded as *ignoring* if the target child exhibited no negative response to the negative behavior. Pearson correlation between the group counselors and the independent observer across children was .78.

Rule violations, negative verbalizations, and conduct behaviors were averaged together to form a global negative social behavior category. Sharing, helping, and ignoring were averaged together to form a global positive social behavior category.

Assessment of Peer Relationships

Sociometric measures provide information regarding the extent to which a child is liked or disliked by his or her peer group. Two primary methods of obtaining sociometric information have been used in the literature: Likert-type ratings (Asher, Singleton, Tinsley, & Hymel, 1979) and nominations (Coie, Dodge, & Coppotelli, 1982). Although tapping overlapping constructs, the two methods are not equivalent in their assessment of peer relationships (Asher, Parker, & Walker, 1996). The Likert-type ratings collected in this study reflect how each child is viewed by every other child in the peer group and relate more to a quality of overall group acceptance. Peer nominations reflect who a child specifically likes or dislikes out of the peer group and relate more to qualities of friendship or active rejection. As such, both methods were used in this investigation in an effort to assess the association of athletic performance and social behavior to distinctive aspects of children's peer relationships.

Sociometric Rating Procedure. A research assistant individually interviewed each child during the last week of the summer program and informed each child that his or her re-

sponses would not be shared with any other children in the program. Each child was shown a picture of each of the children in his or her group and asked to report how much he or she liked or disliked each child. Children were instructed to respond with 1 = *Really like him/her*; 2 = *Like him/her but is not one my favorites*; 3 = *Do not like or dislike him/her*; 4 = *Do not like him/her very much*; 5 = *Really do not like him/her*. Ratings for each child were summed and then standardized by computing *z* scores within group.

Peer Nomination Procedure. Following provision of sociometric ratings, each child was asked to name his or her three best friends in the group (*positive peer nominations*) and three children that he or she did not like at all (*negative peer nominations*). Positive and negative nominations were standardized by computing *z* scores within group.

RESULTS

Data Analysis

Standard multiple regressions were performed with main effects added in the first block and interaction terms entered into the subsequent block. Each dependent variable was evaluated in separate regression analyses to assess the predictive value of social (positive and negative) behavior and athletic performance in overall peer group acceptance (Model 1), positive friendship nominations (Model 2), and peer rejection (Model 3). Standardized overall likability ratings (Model 1), standardized positive peer nominations (Model 2), and standardized negative peer nominations (Model 3) served as dependent variables. Standardized scores of negative behavior (*ZNEGBEHAVE*), positive behavior (*ZPOSBEHAVE*), and athletic performance (*ZATHLETE*) served as independent variables in each of the regression analyses. Although all three-way and two-way interaction terms were entered into each multiple regression analysis, consistent non-significant effects were found. Thus, only the main effects of negative behavior, positive behavior, and athletic performance were considered.

Overall Group Acceptance

Model 1 accounted for a significant proportion of variance in predicting overall group acceptance ($r^2 = .426$; $F[3, 59] = 14.56$; $p < .001$). As shown in Table 1, both negative behavior and athletic performance were uniquely related to overall group acceptance such that better athletic performance and lower rates of negative behavior were associated with greater group acceptance; positive behavior was not a significant predictor of overall group acceptance. The squared semipartial correlations equal the amount of unique variance accounted for by each predictor variable in the dependent variable (Tabachnick & Fidell, 2001). Thus, athletic performance and negative behavior accounted for approximately equal proportions of unique variance in overall peer acceptance.

TABLE I
Summary of Regression Analyses for Athletic Performance and Social Behavior in Predicting Peer Relationship Status in Children With ADHD (N = 63)

Independent variable	r^2	β	Squared semipartial correlation (sr_i^2)
Model 1 (group acceptance)	.426***	—	—
ZATHLETE		.436***	.16
ZNEGBEHAVE		.429***	.16
ZPOSBEHAVE		.098	
Model 2 (positive peer nominations)	.328***	—	—
ZATHLETE		.366**	.11
ZNEGBEHAVE		.249*	.05
ZPOSBEHAVE		.295*	.07
Model 3 (negative peer nominations)	.432***	—	—
ZATHLETE		.334**	.09
ZNEGBEHAVE		.530***	.24
ZPOSBEHAVE		.115	

* $p < .05$. ** $p < .005$. *** $p < .001$. Note. Dashes indicate no value for the entire model.

Positive Peer Nominations

Model 2 accounted for a significant proportion of variance in predicting positive peer nominations ($r^2 = .328$; $F[3, 59] = 9.59$; $p < .001$). Positive behavior, negative behavior, and athletic performance were all uniquely related to positive peer nominations. Positive behavior and negative behavior were significant predictors of the number of positive peer nominations received, with approximately equal beta coefficients indicating that higher rates of positive behavior and lower rates of negative behavior were associated with greater positive peer nominations. Better athletic performance was associated with a greater number of positive peer nominations. Athletic performance accounted for a portion of unique variance in the number of positive peer nominations approximately equal to negative and positive behavior combined (see Table 1).

Negative Peer Nominations

Model 3 accounted for a significant proportion of variance in predicting negative peer nominations ($r^2 = .432$; $F[3, 59] = 14.92$; $p < .001$). Both athletic performance and negative behavior were significantly related to the number of negative peer nominations received. More specifically, better athletic performance and lower rates of negative behavior were associated with fewer negative peer nominations. Whereas athletic performance was the strongest predictor in the number of positive peer nominations received, negative behavior was more strongly related to negative peer nominations than either athletic performance or positive behavior (see Table 1). Positive behavior was not significantly related to the number of negative peer nominations received.

DISCUSSION

The purpose of this study was to examine the relationship between athletic performance and social behavior and peer acceptance in children with ADHD. The results indicate that both athletic performance and social behavior were significant predictors in the social acceptance of children with ADHD. Results support the proposition that athletic performance and negative behavior of a child are significant predictors of peer acceptance as measured by sociometric ratings and positive peer nominations. Positive behavior was related only to positive peer nominations.

In considering athletic performance, we found that the better the child performed athletically (as measured in this study), the more likely the child was to be liked by the group and to be nominated as a best friend, and the less likely to be rejected by peers. Thus, athletic performance may be considered an important facet of children's social worlds and a relevant determinant of how children with ADHD are accepted or rejected by their peers. Similarly to athletic performance, negative behavior was also a significant predictor of each measure of social acceptance, with its strongest predictive association with peer rejection. That is, as a child's negative behavior increased, the likelihood that the child would receive negative nominations from peers also increased. This finding is consistent with previous research demonstrating that children who exhibit annoying, disruptive behaviors are more likely to be rejected by their peers (Dodge, 1993). Positive social behaviors appeared to be important only in predicting positive peer nominations. Perhaps this finding can be explained by considering the nature of the measurement. Positive peer nominations are a reflection of whom children consider a friend, and the positive behavior cat-

egory is a collection of behaviors (e.g., sharing, helping) that should logically contribute to being more liked by peers; children who share and help may be viewed as more friendly and, thus, more desirable as friends.

Taken together, these results provide a glimpse into how these factors may influence social relationships in children with ADHD. A child who is athletic and exhibits few negative behaviors and more positive behaviors may be likely to be accepted by the group and desired as a best friend. Conversely, children who exhibit many negative behaviors and few positive behaviors and are not athletic are less likely to be considered a friend and are at risk for being unaccepted by the peer group. The notion that negative and positive behaviors are important in children's social relationships is not a novel one. In fact, interventions aimed at improving children's peer relationships have often specifically targeted reducing negative behaviors and increasing prosocial behaviors (Pelham, & Hoza, 1996). What is novel about these data is the role of athletic performance as an important and unique factor in the social relationships of children with ADHD.

The results from this study highlight the importance of using multiple measures of peer relationships (e.g., nominations of best friends vs. group ratings of acceptance vs. negative peer nominations). Had these three important areas not been measured, the current pattern of results would not have been possible to ferret out. Peer relationships are multifaceted, and research aimed at understanding and treating deficits in these social relationships must incorporate measures of these related but distinct constructs.

Limitations

Although the results indicate a relationship between athletic ability and social behavior and social acceptance, the use of a correlational design warrants caution in interpreting these results. Additional research using a true experimental design is necessary to eliminate alternative explanations of the apparent relations between these variables.

It is possible that the relatively few athletic and sociometric measures in the study did not fully assess the respective constructs. The athletic performance measures used were not intended to fully represent the universe of athletic skills. Rather, they were representative of the more commonly played sports games among school-age boys (and girls to a lesser, though growing, extent). Thus, the conclusions and the results from which they are drawn may be limited to these specific arenas. Replication of the present findings with more varied measures of general athletic performance and sport-specific skills would enrich support for the role of athletic performance in the peer relationships of children with ADHD.

This study was conducted within the framework of a treatment setting wherein all children suffered from at least one diagnosable behavioral disorder. Thus, these findings relate solely to how athletic performance and social behavior of children with ADHD relate to peer relationships *among* a group of children

with ADHD. In contrast, most children are exposed to social environments composed of a majority of children without behavioral and mental health disorders. It is possible that children with ADHD evaluate other children differently in terms of social acceptance. Certainly, children with ADHD exhibit biases in self-perceptions (Hoza, Pelham, Dobbs, Owens, & Pillow, 2002). Although it is not clear whether these biases in self-perception extend to the behavior of peers, it is possible that children with ADHD may have similar biases in their perceptions of others. For example, it is possible that children with ADHD may place more importance on evaluating peers in areas in which they themselves are impaired (e.g., athletic performance), and thus the results of this study cannot be generalized to a typical social environment. Given the empirical evidence supporting the relations of athletic performance and social acceptability in typical social environments, however, it is also plausible that a similar pattern of findings would be found if these relations were tested in a typical social environment consisting of a majority of children without ADHD. These questions require empirical testing, and the present findings cannot be generalized to typical social environments until such a time.

Questions regarding the potential impact of children's medication status on the outcome of this study may be raised. Although medication certainly has been shown to have a positive effect on behavior in children with ADHD and could potentially have a positive effect on athletic performance, it was not considered in the present study owing to the variety of different medication conditions that children underwent during the course of this study. In addition, the goal of this study was not to elucidate the factors that affect athletic performance and behavior; rather, this study was designed to determine if athletic performance and behavior were important factors in peer relationships of children with ADHD. Furthermore, research has indicated that although methylphenidate improves attention in children with ADHD, it does not affect their performance on measures of athletic skills similar to those employed in this investigation (Pelham et al., 1990). Relatedly, in contrast to performance on academic tasks, methylphenidate has not been found to affect social task performance or persistence in a group of boys with ADHD (Pelham, Waschbusch, Hoza, Pillow, & Gnagy, 2001).

Because the sample was composed predominantly of Caucasian males, the relations between race, gender, athletic ability, and disruptive behavior and social acceptance could not be properly investigated with standard statistical procedures. However, as an exploratory check, statistical analyses were performed with only Caucasian males, and the results remained unchanged. Unfortunately, because of gender ratio disparities in the presenting population, the majority of research on children with ADHD has not included girls. A growing literature regarding girls and relational aggression demonstrates that there may be nonphysically aggressive pathways (e.g., spreading rumors about others) that factor into peer relationships in girls (Crick et al., 1999). How this issue relates to athletic performance, if at all, is yet to be determined but is certainly worth

examination. Attention to this question in a population of girls with ADHD is warranted before including them in peer relationship training within the athletic domain.

Clinical Implications

Treatment outcome research focusing on peer relationship difficulties for children with ADHD has shown that this domain of impairment is not easily amenable to existing evidence-based treatments for ADHD. Although several treatment approaches have attempted to remedy these difficulties, few changes in the quality of peer relationships have resulted (Pelham & Bender, 1982; Stormont, 2001). Pelham et al. (1990) reported that although stimulant medication had a beneficial effect on *attention* in children with ADHD in sports activities, sports *skills* were not affected by stimulant medication. Consequently, children with poor athletic ability who are treated with psychostimulant medication alone may remain at risk for impaired peer relationships. Furthermore, the fact that many psychosocial treatment approaches that focus on traditional social skills (e.g., initiating interactions, maintaining eye contact) have also produced minimal effects speaks to the complexity of impairment and the associated difficulty in intervening.

The social world of children is complex. The centrality of sports and athletic games in children's recreational activities suggests that this may be an ideal mechanism through which to effect positive change. A child who has sufficient athletic skill may find it easier to integrate and achieve acceptance within the peer group. Given that athletic performance and social behavior both contributed independently to peer acceptance in the present study suggests that comprehensive treatments for children with ADHD should include both components to have maximum benefit in the area of peer relationships. The present findings suggest that interventions that combine sports skills training with evidence-based behavioral interventions for children with ADHD may have a greater effect in treating the peer problems of such children than interventions that do not incorporate sports skills training. Thus, it is recommended that providers of treatment for children with ADHD strive to integrate sports skills training into treatment plans and assess the impact on outcomes. Currently, there are interventions that have demonstrated the ability to increase children's athletic performance, and these can serve as models for achieving this goal (Hupp & Reitman, 1999; Pelham & Hoza, 1996).

About the Authors

ANDY LOPEZ-WILLIAMS, PhD, is an assistant professor of clinical child psychology and psychiatry at West Virginia University. **ANIL CHACKO**, MA, is a clinical psychology doctoral student at the University of Buffalo. **BRIANT WYMBS**, MA, is a clinical psychology doctoral student at the University of Buffalo. **GREGORY A. FABIANO**, MA, is a clinical psychology doctoral student at the University of Buffalo. **KAREN E. SEYMOUR**, BA, is a clinical psychology doctoral student at the University of Maryland. **ELIZABETH M. GNAGY**, BS, is a research support specialist at the

University of Buffalo. **ANDREA M. CHRONIS**, PhD, is an assistant professor of clinical psychology at the University of Maryland. **LISA BURROWS-MACLEAN**, PhD, is a research assistant professor at the Center for Children and Families at the University of Buffalo. **WILLIAM E. PELHAM, Jr.**, PhD, is Distinguished Professor of Psychology, Pediatrics, and Psychiatry at the University of Buffalo. **TRACY L. MORRIS**, PhD, is a professor of clinical child psychology at West Virginia University. Address: Andy Lopez-Williams, Department of Psychology, 1124 Life Sciences Building, West Virginia University, Morgantown, WV 26506-6040; e-mail: andy.lopez-williams@mail.wvu.edu

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References

- Asher, S. R., Parker, J. G., & Walker, D. L. (1996). Distinguishing friendship from acceptance: Implications for intervention and assessment. In W. M. Bukowski, A. F. Newcomb, & W. W. Hartup (Eds.), *The company they keep: Friendships in childhood and adolescence* (pp. 366-405). New York: Cambridge University Press.
- Asher, S. R., Singleton, L. C., Tinsley, B. R., & Hymel, S. (1979). The reliability of a rating scale sociometric method with preschool children. *Developmental Psychology, 15*, 443-444.
- Bagwell, C. L., Molina, S. G., Pelham, W. E., & Hoza, B. (2001). Attention-deficit hyperactivity disorder and problems in peer relations: Predictions from childhood to adolescence. *Journal of the American Academy of Child and Adolescent Psychiatry, 40*, 1285-1292.
- Barkley, R. A. (1998). *Attention-deficit hyperactivity disorder: A handbook for diagnosis and treatment* (2nd ed.). New York: Guilford Press.
- Berndt, T., & Ladd, G. (Eds.). (1989). *Peer relationships in child development*. New York: Wiley.
- Beyer, R. (1994). Differences in motor proficiencies: Males with ADHD and males with LD. *Palaestra, 10*, 725-733.
- Blatchford, P., Baines, E., & Pellegrini, A. (2003). The social context of school playground games: Sex and ethnic differences, and changes over time after entry to junior school. *British Journal of Developmental Psychology, 21*, 481-505.
- Bunker, L. K. (1991). The role of play and motor skill development in children's self-confidence and self-esteem. *The Elementary School Journal, 91*, 467-471.
- Chambers, S. T. (1991). Factors affecting elementary school students' participation in sports. *The Elementary School Journal, 91*, 413-419.

- Chronis, A. M., Fabiano, G. A., Gnagy, E. M., Onyango, A. N., Pelham, W. E., Lopez-Williams, A., et al. (2004). An evaluation of the summer treatment program for children with attention-deficit/hyperactivity disorder using a treatment withdrawal design. *Behavior Therapy, 35*, 561–585.
- Coie, J. D., & Cillessen, A. H. (1993). Peer rejection: Origins and effects on children's development. *Current Directions in Psychological Science, 2*, 89–92.
- Coie, J. D., Dodge, K. A., & Coppotelli, H. (1982). Dimensions and types of social status: A cross-age perspective. *Developmental Psychology, 18*, 557–570.
- Coie, J., Terry, R., Lenox, K., Lochman, J., & Hyman, C. (1995). Childhood peer rejection and aggression as predictors of stable patterns of adolescent disorder. *Development and Psychopathology, 7*, 697–713.
- Coop, R. H., & Rotella, R. J. (1991). Sport and physical skill development in elementary school: An overview. *The Elementary School Journal, 91*, 409–412.
- Dodge, K. A. (1993). Social-cognitive mechanisms in the development of conduct disorder and depression. *Annual Review of Psychology, 44*, 559–584.
- Frederick, B. P., & Olmi, D. J. (1994). Children with attention-deficit/hyperactivity disorder: A review of the literature on social skills deficits. *Psychology in the Schools, 31*, 288–296.
- Gross, A. M., & Johnson, T. C. (1984). Athletic skill and social status in children. *Journal of Social and Clinical Psychology, 2*, 86–89.
- Hartup, W. W. (1979). Peer relations and the growth of social competence. In M. W. Kent & J. E. Rolf (Eds.), *Primary prevention of psychopathology* (pp. 150–170). Hanover, NH: University Press of New England.
- Harvey, W. J., & Reid, G. (1997). Motor performance of children with attention-deficit hyperactivity disorder: A preliminary investigation. *Adapted Physical Activity Quarterly, 14*, 189–202.
- Hodgens, J. B., Cole, J., & Boldizar, J. (2000). Peer-based differences among boys with ADHD. *Journal of Clinical Child Psychology, 29*, 443–452.
- Hoza, B., Molina, B. S., Bukowski, W. M., & Sippola, L. K. (1995). Peer variables as predictors of later childhood adjustment. *Development and Psychopathology, 7*, 787–802.
- Hoza, B., Pelham, W. E., Dobbs, J., Owens, J. S., & Pillow, D. R. (2002). Do boys with attention-deficit/hyperactivity disorder have positive illusory self-concepts? *Journal of Abnormal Psychology, 111*, 268–278.
- Hupp, S. D., & Reitman, D. (1999). Improving sports skills and sportsmanship in children diagnosed with attention-deficit/hyperactivity. *Child & Family Behavior Therapy, 21*, 35–51.
- Lahey, B. B., Pelham, W. E., Stein, M. A., Loney, J., Trapani, C., Nugent, K., et al. (1998). Validity of DSM-IV attention-deficit/hyperactivity disorder for younger children. *Journal of the American Academy of Child and Adolescent Psychiatry, 37*, 695–702.
- Landau, S., & Moore, L. A. (1991). Social skills deficits in children with attention deficit hyperactivity disorder. *School Psychology Review, 20*, 235–251.
- Madan-Swain, A. J., & Zentall, S. S. (1990). Behavioral comparisons of liked and disliked hyperactive children and behavioral accommodations for their classmates. *Journal of Clinical Child Psychology, 58*, 197–209.
- Maedgen, J. W., & Carlson, C. L. (2000). Social functioning and emotional regulation in the attention deficit hyperactivity disorder subtypes. *Journal of Clinical Child Psychology, 29*, 30–42.
- Morrow, J. R., Jackson, A. W., Disch, J. G., & Mood, D. P. (1995). *Measurement and evaluation in human performance*. Champaign, IL: Human Kinetics.
- Pelham, W. E., & Bender, M. E. (1982). Peer relationships in hyperactive children: Description and treatment. In K. Gadow & I. Bialer (Eds.), *Advances in learning and behavioral disabilities*, (Vol. 1, pp. 366–436). Greenwich, CT: JAI Press.
- Pelham, W. E., Gnagy, E. M., Chronis, A. M., Burrows-MacLean, L., Fabiano, G. A., Onyango, A. N., et al. (1999). A comparison of morning-only and morning/late afternoon Adderall to morning-only, twice-daily, and three times-daily methylphenidate in children with attention-deficit/hyperactivity disorder. *Pediatrics, 104*.
- Pelham, W. E., Gnagy, E. M., Greenslade, K. E., & Milich, R. (1992). Teacher ratings of DSM-III-R symptoms for the disruptive behavior disorders. *Journal of the American Academy of Child and Adolescent Psychiatry, 31*, 210–218.
- Pelham, W. E., Greiner, A. R., & Gnagy, E. M. (1998). *Summer treatment program manual*. Buffalo, NY: Comprehensive Treatment for Attention Deficit Disorders, Inc.
- Pelham, W. E., & Hoza, B. (1996). Intensive treatment: A summer treatment program for children with ADHD. In E. Hibbs & P. Jensen (Eds.), *Psychosocial treatments for child and adolescent disorders: Empirically based strategies for clinical practice* (pp. 311–340). New York: APA Press.
- Pelham, W. E., McBurnett, K., Harper, G. W., Milich, R., Murphy, D. A., Clinton, J., et al. (1990). Methylphenidate and baseball playing in ADHD children: Who's on first? *Journal of Consulting and Clinical Psychology, 58*, 130–133.
- Pelham, W. E., Waschbusch, D. A., Hoza, B., Pillow, D. R., & Gnagy, E. M. (2001). Effects of methylphenidate and expectancy on performance, self-evaluations, persistence, and attributions on a social task in boys with ADHD. *Experimental and Clinical Psychopharmacology, 9*, 425–437.
- Pellegrini, A. D., & Blatchford, P. (2002). Time for a break: The developmental and educational significance of breaktime in school. *The Psychologist, 15*, 60–62.
- Piek, J. P., Pitcher, T. M., & Hay, D. A. (1999). Motor coordination and kinaesthesia in boys with attention deficit-hyperactivity disorder. *Developmental Medicine and Child Neurology, 41*, 159–165.
- Shaffer, D., Fisher, P., Lucas, C. P., Dulcan, M. K., & Schwab-Stone, M. E. (2000). NIMH Diagnostic Interview Schedule for Children Version IV (NIMH DISC-IV): Description, differences from previous versions, and reliability of some common diagnoses. *Journal of the American Academy of Child and Adolescent Psychiatry, 39*, 28–39.
- Schoemaker, M. M., & Kalverboer, A. F. (1994). Social and affective problems of children who are clumsy: How early do they begin? *Adapted Physical Quarterly, 11*, 130–140.
- Stormont, M. (2001). Social outcomes of children with AD/HD: Contributing factors and implications for practice. *Psychology in the Schools, 38*, 521–531.
- Tabachnick, B. G., & Fidell, L. S. (2001). *Using multivariate statistics*. New York: HarperCollins.
- Whalen, C. K., Henker, B., Collins, B., McAuliffe, S., & Vaux, A. (1979). Peer interaction in a structured communication task: Comparison of normal and hyperactive boys and of methylphenidate (Ritalin) and placebo effects. *Child Development, 50*, 388–401.

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