Impact of an After-School Physical Activity Program on Youth's Physical Activity Correlates and Behavior

by Chaoqun Huang, Wayland Baptist University; Zan Gao, The University of Minnesota; James C. Hannon, University of Utah; Barry Schultz, University of Utah; Maria Newton, University of Utah; William Jenson, University of Utah

Abstract

The purpose of this investigation was to examine the effect of a sports-based, after-school physical activity (PA) program on youth's physical activity PA levels and PA correlates. After the pretest, 130 youth were assigned to the intervention group (i.e., after-school PA group) or the comparison (i.e., no after-school PA group) group. Participants also completed a posttest after the 8-week intervention. Based on the results of the MANCOVA, a main effect of intervention was yielded (Wilk's Lambda = .88, $F(6,90) = 2.14$, $p = .05$, $\eta^2 = .13$). Follow-up tests indicated that the intervention group reported greater increases in self-efficacy ($F(1,95) = 3.98$, $p < .05$, $\eta^2 = .04$) and peer support ($F(1,95) = 6.93$, $p < .05$, $\eta^2 = .07$). The multiple regression analysis revealed that self-efficacy and social support were positive predictors of PA. It was concluded, that the intervention raised children's PA self-efficacy and peer support for PA, and self-efficacy and social support were positive predictors of PA behaviors.

Key words: intervention; sports-based; self-efficacy; social support

It has been well-documented that regular participation in physical activity (PA) has a positive influence on youth's health and well-being (Roberts & Barnard, 2005). It has been recommended that youth should engage in PA of moderate to vigorous intensity for at least 60 minutes daily (Biddle, Gorely, & Stensel, 2004; Cavill, Biddle, & Sallis, 2001; Strong et al., 2005). However, it has been reported that a substantial number of youth are not sufficiently active (Biddle et al., Sallis, 2000). More specifically, increasing evidence shows that school children do not engage in the recommended levels of PA, which has lead to an increased prevalence in overweight and obesity in this population (Centers for Disease Control and Prevention [CDCP], 2003). Given the fact that regular participation in PA may lead to improved mental and physical well-being, encouraging youth to initiate and maintain a positive participation behavior in PA is increasingly important. Behavioral change, however, is not an easy task. It involves an array of factors and is a dynamic process (Nahas, Goldfine, & Collins, 2003).

A number of theories provide possible explanations for PA behavioral change. Among them, the Social Cognitive Theory (Bandura, 1986, 1997) represents a viable theory to examine individuals' behavioral changes related to PA participation. According to this theory, behavior change is affected by environmental influences, personal factors, and attributes of the behavior itself. Each may affect or be affected by either of the other two (Bandura, 1986, 1997). Self-efficacy and outcome expectancy are considered as major personal correlates of behavior. Self-efficacy refers to a person's belief about his or her ability to learn or perform a specific task/activity, whereas outcome expectancy refers to a person's beliefs concerning the likely consequences of a behavior and perceived value of the behavior to the individual (Bandura, 1986, 1997). Researchers who have conducted empirical studies have posited that self-efficacy is considered to be the most powerful and proximal cognitive predictor of behavior, including PA (McAuley & Blissmer, 2000; Reynolds et al., 1990; Sallis et al., 2000). Self-efficacy has been highly correlated with PA (Sallis, Hovell, & Hofstetter, 1992). Outcome expectancy is defined as the expectation of positive and negative outcomes that flow from performance attainments (self-efficacy) (Bandura, 1997). In self-efficacy theory, outcome expectancy impacts behavior directly, with positive outcome expectancy increasing behavior and negative outcome expectancy decreasing behavior (Williams, Anderson, & Winett, 2005). Empirical studies have also reported that outcome expectancies influence PA levels (Rogers et al., 2007; Steinhardt & Dishman, 1989) and behavioral intention to be active (Gao, Xiang, Lee, & Harrison, 2008).

Social support is a major social environmental determinant of behavior and has been defined in numerous ways. Generally social support refers to any behavior that assists a person in achieving desired goals or outcomes (Taylor, Baranowski, & Sallis, 1994). Social support can come from significant others such as parents, peers, and teachers. The social support and PA link has been consistently supported in PA research (Beets et al., 2007; Gao, 2012). Beets et al. reported that peer social support was a direct predictor of PA. They also suggested that social support should be examined from a multidimensional perspective to account for support offered by parents, siblings, and friends. Hoefer, McKenzie, Sallis, Marshall, and Conway (2001) reported that if parents transported their children to PA locations, their children were more active. Other researchers have reported similar positive relationships among forms of social support and PA (Biddle & Goudas, 1996; Davison, 2004; Sallis et al., 2000; Stucky-Ropp & DiLorenzo, 1993).

In the triadic reciprocal determinism of social cognitive theory the bidirectional influences of the environment, person, and behavior on one another are presumed (Bandura, 1986, 1997). This suggests that behavior depends on the independent and mediated influences of environmental and personal variables and behavior can, in turn, influence environmental and personal variables. However, there is no empirical research that could be located on the influence behavior (i.e., PA behavior) might have on environmental and personal variables.

Previous researchers have shown that gender is a significant factor in PA. Generally, findings about PA in children have revealed that boys are more active than girls (CDC 2001; CDC 2003; Grunbaum et al., 2002). Gender differences in self-efficacy have also been observed with boys reporting higher self-efficacy levels than girls (Sallis, Pate, Saunders, Ward, Dowda, & Felton, 1997). Some researchers have reported gender differences in perceived

social support. For example, the study of adolescents aged 12 to 24 showed that girls perceived significantly more support from friends than boys did, although both groups reported an equal amount of parental support (Helsen, Vollebergh, & Meeus, 2000). In addition, Harter (1985) showed that girls reported higher levels of support from close friends compared to boys. Based on these results, gender was the obvious confounding variable in the study. So, a controlled effect during data analysis for a gender effect is not the major research focus in the present study.

Schools are an ideal setting for the promotion of PA because 95% of children can be reached in academic settings (McKenzie et al., 2000). However, physical education classes typically do not provide sufficient PA levels for children (Biddle et al., 2004; McKenzie et al.,). Only 8% of elementary schools and 6.4% of middle schools provide daily physical education during the school year and the guideline of engaging in moderate to vigorous PA during at least 50% of class time is rarely achieved (Cardon, Verstraete, Clercq, & Bourdeaudhuij, 2004; Stratton, 1997; US Department of Health and Human Services, 2000).

Because physical education cannot provide all the recommended amounts of moderate to vigorous PA, other sources of youth PA should be identified and evaluated (CDC, 1997). Morgan and colleagues (2003) reported that the majority of PA children and adolescents engage in occurs outside of physical education classes. One opportunity is after-school PA. Although after-school PA programs cannot single-handedly resolve all of the problems associated with physical inactivity, it could be an ideal venue for contributing to the improved health and PA of children. As to the mode and structure of after-school PA, Liu and Chepyator-Thomson (2004) reported that organized sports participants reported significantly larger amount of PA minutes and Metabolic Equivalents (METs) than those who did not participate in any organized sports during the after-school period. Liu, Wand, and Xu (2008) stated that competitive sports were the primary contributor to children's after-school PA, and that youth in structured after-school PA demonstrated significantly greater PA than youth in unstructured after-school PA.

The purpose of the present study was to examine the effect of structured sports (e.g., basketball, soccer, football, etc.) on youth's PA correlates in an after-school PA program. The predictive utility of the exercise correlates (i.e., self-efficacy, outcome expectancy, and social support) to youth's PA levels were also investigated. Based on the literature review, it was hypothesized that the youth participating in after-school PA would exhibit greater increases in self-efficacy, outcome expectancy, social support, and daily PA levels than those exhibited by the students not participating in an after-school PA program. In addition, it was hypothesized that youth's level of self-efficacy, outcome expectancy, and social support would be positive predictors of their PA levels.

Method

Participants and Research Design

The participants were 130 seventh and eighth grade urban youth enrolled at two public schools selected with convenient sampling in the Mountain West Region of the United States. They agreed to participate in the present research voluntarily and were individually randomly assigned to an after-school PA group (intervention group) or the no school-based after-school PA group (comparison group). After deleting the incomplete data for those youth who transferred or were absent during the data collection period, the final sample comprised 98 children, 48% female (n = 47) and 52% male (n = 51). They ranged in age from 12 to 15 years old (M = 13, SD =.72). The racial and ethnic distribution consisted of 82% White (non-Hispanic), 10% Hispanic, 4% Asian or Pacific Islander, 2% Black, 2% American Indian or Native of Alaska. There were 48 participants in the after-school PA group and 50 participants in the no after-school PA group. The children in the intervention group participated in a 50-minute after-school sport-based PA session (e.g., basketball, football, or soccer) 5 times per week for 8 weeks. The children in the comparison group did not participate in any school-based after-school PA programs.

Permission to conduct the study was obtained from the University Institutional Review Board, the school district, and the school administration prior to the start of this study. The students provided written informed assent and parents provided the written informed consent prior to participation in this study.

The pretest was administered prior to the initiation of the after-school PA program. All participants spent about 10 minutes completing questionnaires related to youth's self-efficacy, outcome expectancy, social support, and daily PA levels. The posttest with the questionnaires was conducted in the 9th week after the 8-week intervention.

Intervention

According to previous research, organized sport is viewed as a viable medium for promoting more PA among youth (Liu & Chepyator-Thomson, 2004; Liu et al., 2008). In the present study, the intervention was structured by using various sports-based physical activities. Based on the National Federation for State High School Associations (NFSHS, 2005), the 10 most popular sports for boys are football, basketball, outdoor track and field, baseball, soccer, wrestling, cross-country, golf, tennis, and swimming and diving; whereas the 10 most popular sports for girls are basketball, outdoor track and field, volleyball, fast pitch softball, soccer, cross-country, tennis, swimming and diving, competitive spirit squads, and golf. Considering the after-school setting, schools' condition, and participants' choices, football, basketball, soccer, and volleyball were selected in the present intervention. Youth in the intervention group participated in a sports-based PA program lasting 8-week, 5 days per week, the duration of each session was approximately 50 minutes. The intervention program was offered and monitored by the researcher and research assistants. The after-school program was also supervised by respective after-school supervisors. A typical session included a warm-up, basic technique and strategy exercises, and competitions. After arriving at the gym, youth chose one of the four sports on a daily basis. In order to ensure that all four sports were chosen equally, the researcher or research assistants decided sports for two days each week. The intervention program was offered and monitored by the researcher and research assistants. Children in the comparison group did not participate in the intervention program. They usually left campus after school.

Instruments

Self-efficacy. An 8-item **Physical Activity Self-Efficacy Scale** (Bartholomew, Loukas, Jowers, & Allus, 2006) was used to assess youth's level of self-efficacy for PA participation. Participants were asked to rate how confident they were in their ability to successfully accomplish each of the 8 items. Each item was scored on a 5-point Likert scale with ranging from 1 = *strongly disagree* to 5 = *strongly agree*. Example items were: (a) I can be physically active most days after school; (b) I can ask my parent/ other adult to do physically active things with me; and (c) I can be physically active even if I could watch TV/play video games. The mean score of all eight items was used to indicate the children's PA self-efficacy. Acceptable validity and reliability scores on this scale have been reported among children (Bartholomew et al.,). Standardized factor loadings ranged from .53 to .79. The internal consistency was adequate (alpha = .74-.88).

Outcome expectancy. The *Outcome Expectancy Scale* (Ommundsen et al., 2008) is comprised of two subscales: Functional outcome expectations and social outcome expectations. Participants were asked to rate the level of agreement with the 9 items to indicate their exercise expectations, by responding to the stem, "If I were to exercise most days it would . . ." A 5-point Likert scale, ranging from 1 = *strongly disagree* to 5 = *strongly agree*, was used for all responses. Example statements were: (a) be fun; (b) help me make new friends; (c) help me look good to others; and (d) make me better in sports. The mean score of the 9 items was used to indicate children's exercise outcome expectancy. Acceptable reliability scores and validity were reported by Ommundsen, et al. (2008). Their confirmatory factor analyses indicated that the outcome expectancy model for all groups (country, gender and age) yielded a satisfactory good fit to the data (CFI = .91 - .95; Changes in CFI < .01; 90%CI < .08; RMSEA = .03 - .05; SRMR < .08). Alpha estimates within outcome expectancy ranged from .44 to .65.

Social support. The *Perceived Social Support Scale* (Ommundsen et al., 2008) is comprised of four subscales: (a) parental support, (b) parental encouragement, (c) peer support, and (d) teacher support. Participants were asked to rate the level of agreement with the 11 items to indicate their perceived social support, by responding to the stem, "How often … " A 5-point Likert scale, ranging from 1 = *strongly disagree* to 5 = *strongly agree*, was used for all responses. Example questions were: (a) does your mom or dad take you to exercise or play sports; (b) does your mom or dad tell you to exercise or play sports; (c) do your friends exercise or play sports with you; and (d) does your teacher tell you to exercise or play sports? Items of each subscale were summed and divided by number of items per subscale to represent the mean score for each construct. The mean score of the four constructs was used to determine children's perceived social support. The evidence of the reliability and validity of this scale have been reported by Ommundsen et al. (2008). Their confirmatory factor analyses indicated that the outcome expectancy model for all groups (country, gender and age) yielded a satisfactory good fit to the data (CFI = .96 - .98; Changes in CFI < .01; 90% CI < .08; RMSEA = .02 - .05; SRMR < .08). Alpha estimates within outcome expectancy ranged from .45 to .79.

Physical activity levels. The *Physical Activity Questionnaire for Children* (PAQ-C; Crocker, Bailey, Faulkner, Kowalski, & McGrath, 1997) was used for students to self-report their overall PA over the last 7 days. The PAQ-C is a self-administered, 7-day recall instrument. It provides a summary PA score derived from nine items, each scored on a 5-point scale. The PAQ-C is appropriate for elementary school-aged children (grades 4-8; approximately ages 8-14 yrs.) and has been reported to be a valid and reliable measure (RMSEA < .01; 90% CI = .00–.04; CFI = 1.00, NNFI = 1.00; G = .80 - .90) of general PA levels of children and youth (Crocker et al.; Kowalski, Crocker, & Faulkner, 1997).

Statistical Analysis

The Predictive Analytics Software (PASW) 18.0 was used for all analyses. First, Cronbach's alpha coefficients were computed to ensure the internal consistency of the self-reported measures of exercise correlates and PA levels over time. Second, a MANCOVA was used to examine mean level changes in students' self-efficacy, outcome expectancy, social support, and PA levels while controlling for the covariate of gender.

Finally, multiple regression was used to determine the predictive utility of the exercise correlates to the combined group of 98 children's PA levels in which all the independent variables were entered simultaneously (Tabachnic & Fidell, 2007). The value of this approach is that each independent variable is evaluated like it was entered last. Thus, unique variance attributed to it in predicting the dependent variable can be determined.

Results

Descriptive Statistics

In regard to scale reliability, Cronbach's alpha coefficients of the exercise correlates exceeded .80 (.86 - .89 for the pretest and .90 -.92 for the posttest). The Cronbach's alpha coefficients of PA measures (PAQ-C) were .86 for pretest and .87 for posttest. These values were greater than .70, representing acceptable internal consistency values (Nunnally, 1978). Descriptive statistics of the difference scores are reported in Table 1. Interestingly, children in the intervention group had increased exercise correlates except parental encouragement, whereas children in the comparison group demonstrated a slight decrease in self-efficacy, outcome

Table 1. ***Descriptive Statistics of Mean Scores (N=98)***

	Intervention group			Comparison group		
Variable	Pretest	Posttest	Change scores	Pretest	Posttest	Change scores
Self-efficacy	3.53	3.72	.19	4.07	3.99	-.08
Outcome expectancy	3.93	3.95	.02	4.27	4.12	-.15
Social support						
Parental support	2.92	3.30	.38	2.97	3.10	.13
Parental encouragement	3.76	3.62	-.14	3.75	3.64	-.11
Peer support	3.47	3.78	.31	3.91	3.67	-.24
Teacher support	3.47	3.61	.14	3.06	3.35	.29
Physical activity	2.99	3.40	.41	3.12	3.31	.19

expectancy, parental encouragement, and peer support. On the other hand, children displayed increased PA participation, as the changed scores of PA were positive for both the intervention group and the comparison group.

MANCOVA Results

The results of MANCOVA demonstrated a significant main effect for the intervention after controlling the effect of sex, Wilk's Lambda = .88, $F(6,90) = 2.14$, $p = .05$, $\eta^2 = .13$. Follow-up univariate tests indicated that children in the intervention group reported significantly greater increases in self-efficacy ($F(1,95) = 3.98$, $p < .05$, $\eta^2 = .04$) and peer support ($F(1,95) = 6.93$, $p < .05$, $\eta^2 = .07$) than those in the comparison group. However, there were no significant differences on the change of outcome expectancy, parental support, parental encouragement, teacher support, as well as PA.

Multiple Regression Results

In order to discover which exercise correlates explain children's PA, multiple regression analysis was separately used with the pretest and posttest data. Because of the limited sample size, social support was used as opposed to its 4 components. The results of multiple regression analysis are listed in Table 2. Multiple regression analysis revealed significant models for the predictor variables for both pretest and posttest data ($R^2 = .58$, F (3, 94) = 43.23, $p < .01$ for pretest; $R^2 = .49$, F (3, 94) = 30.19, $p < .01$ for posttest). As seen in Table 2, children's self-efficacy and social support were significant predictors for PA at both the pretest and the posttest scores. However, outcome expectancy scores were not significant predictors of PA at both pretest and posttest.

Table 2. ***Multiple Regression Analysis Predicting Physical Activity***

Variable	*B*	*SE B*	*β*
Pre-test			
Self-efficacy	.53	.10	.47**
Outcome expectancy	-.11	.12	-.08
Social support	.54	.09	.48**
Post-test			
Self-efficacy	.28	.12	.28*
Outcome expectancy	-.20	.13	-.17
Social support	.65	.12	.58**

Note: $R^2 = .58$, F (3, 94) = 43.23, $p < .01$ for pre-test; $R^2 = .49$, F (3, 94) = 30.19, $p < .01$ for post-test; *$p < .05$; **$p < .01$.

Discussion

The major purposes of this study were to examine the effect of a sport-based after-school PA program on children's self-efficacy, outcome expectancy, social support, and daily PA levels, as well as to investigate the relative contributions of self-efficacy, outcome expectancy, and social support on children's PA levels.

It was proposed in the first hypothesis that children in the intervention group would exhibit greater increases in self-efficacy, outcome expectancy, social support, and daily PA levels than those in the comparison group. The data of PA showed no significant differences on the gain scores over time between the intervention group and the comparison group, although the intervention group showed a trend of greater increased PA participation than the comparison group. It seems that the results did not support the hypothesis completely. It may be because the intervention was simply sport-based PA after school and it could not effectively change children's PA behavior. Researchers have posited that behavior change involves an array of factors and is a dynamic process (Nahas et al., 2003). Previous researchers also have shown that combined PA with behavioral modification strategies can be effective in increasing the short-term (Lubans & Sylva, 2006; Schneider-Jamner, Spruijt-Metz, Bassin, & Pate, 2004) and long-term (Dale & Corbin, 2000) PA levels of adolescents. Other researchers have demonstrated that an 8-week, 4 days per week, and 50 minutes each day extracurricular school sport program was effective in promoting PA among adolescents (Lubans & Morgan, 2008). The 8-week intervention used in that study involved both structured exercise activities and informational sessions.

The present results revealed that youth in the intervention group reported significantly greater increased scores in their self-efficacy and peer support over time than youth in the comparison group. Based on the fact that the intervention was a structured sports-based program, youth in the intervention group were organized and instructed by research assistants who were experienced in physical education teaching. They received feedback and comments from their peers and instructors. They practiced organized sports step by step and learned from instructors' demonstration or peers' model. Bandura (1997) posited that self-efficacy, as a product of a complex process of self-persuasion, relies on cognitive processing of diverse sources of efficacy information including mastery experiences, vicarious experiences, and verbal persuasion. Therefore, the youth in the intervention group were more likely to improve their self-efficacy than those in the comparison group.

Similarly, youth in the intervention group had significantly greater increased scores in perceived peer support. As mentioned earlier, youth in the intervention group were placed in a structured sports-based after-school program. They had more opportunities to interact with one another than those in the comparison group. In other words, they experienced more support from friends. Therefore, youth in the intervention group tended to display greater increased scores in perceived peer support. However, no significant changes of youth's self-reported outcome expectancy were detected between the intervention group and comparison group. A previous review revealed that some researchers have reported strong support and others revealed a null effect on the effect of outcome expectancy as the predictor of PA (Williams, et al., 2005).

With respect to the second hypothesis that youth's perceived self-efficacy, outcome expectancy, and social support would be the predictors of their PA behaviors, the results of multiple regression analysis over the pretest and the posttest data revealed that this hypothesis was partially supported. Youth's self-efficacy appeared to be the positive predictors of PA behaviors in both the pretest and

the posttest, whereas parental support was the positive predictor of PA in pretest and peer support was the positive predictor of PA in the posttest. This is consistent with the findings of numerous investigators who have reported that self-efficacy is associated with PA (McAuley & Blissmer, 2000; Reynolds et al., 1990; Sallis et al., 2000; Sallis, Hovell, & Hofstetter, 1992). Numerous investigators also reported that social support is associated with PA (Beets, Pitetti, & Forlaw, 2007; Biddle, & Goudas, 1996; Davison, 2004; Hoefer et al., 2001; Sallis et al., 2000; Stucky-Ropp, & DiLorenzo, 1993).

Outcome expectancy does not seem to be a predictor of PA. Based on social cognitive theory, outcome expectancy is also considered as a personal determinant of behavior (Bandura, 1997). However, preliminary empirical research on the role of outcome expectancy in understanding PA has yielded mixed results that seem to be related to age (Williams et al., 2005). Some studies of young to middle-aged adults and rural youth have shown small but significant or no association (Dzewaltowski, 1989; Dzewaltowski, Noble, & Shaw, 1990; Pate et al., 1997; Rovniak, Anderson, Winett, & Stephen, 2002; Sallis, Hovell, Hofstetter, & Barrington, 1992), whereas studies with older populations showed a stronger correlation (Resnick, 2000, 2001; Resnick, Zimmerman, Orwig, Furstenberg, & Magaziner, 2001). These mixed findings and age-dependent effect may partially explain why outcome expectancy seems not to be a predictor of PA in this study in which participants were middle school students.

Conclusions

To conclude, the intervention with a single sports-based PA over 8 weeks did not secure the effect to promote children's PA. However, the sports-based after-school PA program did raise children's beliefs in their capacity to participate in PA and their perceived support for PA received from friends. This study also has potential for documenting that self-efficacy and social support are positive predictors of PA behaviors.

However, this study has several limitations. Firstly, due to the relative small sample, analysis on gender differences was not possible. Further study should include a larger sample with greater variations. Secondly, the intervention singularly based on sports activities, has limited effects to PA behaviors. Combined interventions (e.g., sports combined with psychosocial strategies) should be researched in future studies. Thirdly, because of the mixed results on the relationship between outcome expectancy and PA behaviors, it needs further study in the future.

Findings of this study add to the growing body of literature on the effects of after-school PA programs and children's PA levels and exercise correlates, as well as, the relationships between psychosocial factors and PA behaviors. These are important for health professionals to fully understand issues associated with correlates of student PA behaviors and to design effective interventions to promote students' daily PA levels. By focusing on the integration of multiple factors related to students' PA behaviors, health professionals may better understand the in-depth correlates for children's PA behaviors. In this way, professionals and practitioners can develop and implement systematic measures to promote children's PA behavior change in after-school settings.

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