

## Examining Psychosocial Correlates of Adolescent Girls' Physical Activity Levels

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### Abstract

**Background:** It has been evident that there is a sharp decline in participation in physical activity for adolescent girls. Using social cognitive theory as a theoretical framework, this study was designed to examine the relationships between several psychosocial constructs and physical activity levels in adolescent girls, as well as their differences across several ethnicities.

**Methods:** Participants were 92 sixth through ninth grade girls recruited from four urban schools. All girls' psychosocial correlates (self-efficacy, outcome expectancy, and social support) were measured and used to predict their physical activity levels as measured by W4L Neo II pedometers (mean steps per day and mean time spent in Moderate to Vigorous Physical Activity [MVPA]).

**Results:** Girls' self-efficacy emerged as the sole predictor of their mean steps ( $\beta = .36, p < .01$ ) and mean time in MVPA ( $\beta = .38, p < .01$ ). However, girls' outcome expectancy and social support failed to predict physical activity levels. Additionally, White girls had more daily steps and daily physical activity time than the African-American girls did.

**Conclusion:** Adolescent girls' self-efficacy appeared as the only predictor of their daily physical activity levels,

and therefore interventions to enhance their self-efficacy should be considered.

**Keywords:** Self-efficacy; Outcome Expectancy; Social Support; Steps per Day

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### Introduction

Physical activity literature revealed that gender is an important correlate of regular physical activity levels [1-4]. Girls were less physically active than boys when they became adolescents [2, 4, 5]. Comparing to boys, girls showed a lower level of exercise intensity and tended to be more reluctant to be influenced by interventions [6]. As increasing physical activity has been identified as a goal for future public health [7], it is critical to investigate factors that help young girls develop a

habit of regular physical activity behavior for personal and social benefits [8].

Social cognitive theory asserts that some social cognitive variables may affect individuals' physical activity through self-regulation of health behavior [9, 10]. Based on the theory, self-efficacy, social support and outcome expectancy can all influence and predict individuals' behavioral attempt and persistence [11]. Self-efficacy refers to individuals' beliefs about their ability to learn or perform a specific task/activity within particular situations and appears to be a major determinant of performance and physical activity levels [12, 13]. In general, a high level of self-efficacy can motivate people to perform a given behavior at a greater level, to explore new behaviors while spending more efforts on those behaviors, and to persevere longer when encountering difficulties [11]. Gao and colleagues revealed that in physical education children who had higher self-efficacy showed higher intention to participate in the future physical education classes and also tended to exert more effort [14].

Social support refers to the emotional and physical comfort provided by family, peers, co-workers, and others [15, 16]. Typical social supports are family support and peer support. The most current knowledge about the role of self-efficacy and social support to young girls' physical activity participation comes from a series of studies conducted by Dishman and his colleagues [2]. These studies examined the social cognitive correlates to physical activity in a large group of girls with diverse ethnicities during their 6th and 8th grade school years. The results of the studies indicated that self-efficacy moderated the relationship of perceived social support and physical activity changes. White girls had higher levels of self-efficacy to physical activity than non-white girls. However these studies only investigated middle school girls at two grade levels (6th and 8th), further research is warranted investigating the relationship of self-efficacy, social support, and physical activity behaviors among adolescent girls from all the grades at middle school level.

Outcome expectancy reflects a person's beliefs concerning the likely outcomes of a behavior and perceived

values for the behavior [17-19]. Outcome expectancy focuses on the result of behavior instead of on the behavioral performance itself [11]. More specifically, outcome expectancy includes physical outcomes, social reactions of others, or self-evaluative reactions to personal behavior. Both positive and negative expectancy can exist for each of these outcomes and can serve as an incentive or disincentive for a particular behavior [18]. For instance, Bozionelos and Bennet [20] found a moderately negative association between individual barriers (negative expectancy), including laziness and lack of time, and physical activity among college students. Research examining the direct relationship between outcome expectancy and actual behavior in physical activity has yielded inconclusive findings [21-24]. The mixed findings on the relationships between outcome expectancy and physical activity levels in youth, especially adolescent girls, warrant further empirical investigation.

This study will add to the body of knowledge by moving beyond self-reported physical activity measurement that has inherent limitations. For example, in Sallis and colleagues [25] review of children's physical activity levels' studies, girls tended to overestimate their physical activity on self-report surveys more than boys did. When using objective measures to assess physical activity levels, Sheng and Gao found that, among adolescent girls from low-income families, Hispanic girls had more steps than White girls through pedometer reads of three weekdays' recording [26]. These researchers recommended more objective measures of physical activity (e.g., pedometers and accelerometers) should be applied to the future research. As a result, this study used objective measures of physical activity to investigate its relationship with the psychosocial correlates described earlier.

The need to understand more about the potential psychosocial correlates of physical activity in girls, the inconsistency of existing results in the relationship of outcome expectancy and physical activity level and the benefit of using objective measures to record physical activity levels served as the main impetus for this study. To clarify, this study will help facilitate the understanding of health professionals about the

motivational factors underlying girls' physical activity behaviors so they can design more motivating and effective physical activity programs that will enhance the daily physical activity levels particularly among adolescent girls. The current study also attempted at investigating whether girls' psychosocial correlates and physical activity levels differed as a function of ethnicity. We hypothesize that: (1) girls' self-efficacy, outcome expectancy, and social support will be positively related to their mean steps and mean time in MVPA (moderate-to-vigorous physical activity); (2) girls' self-efficacy, outcome expectancy, and social support will predict their mean steps and mean time in MVPA; and (3) White girls will have significantly higher levels of psychosocial correlates and physical activity time than non-White girls.

## Methods

### Participants and Research Setting

A convenience sample of 106 participants from four public schools in a large city in New Mexico (U.S.A) voluntarily agreed to participate in this study. Of the original sample, some girls declined to participate in the study, or dropped out, or provided invalid data. This resulted in a final sample size of 92 girls and their parents or guardians with a final participation rate of 86.8%. The most of the participants were raised up in middle class families. The mean age of the participants was  $12.63 \pm 1.45$  years. The specific inclusion criteria for this study were: (1) enrolled in a public middle school; (2) children aged 11-14 years; (3) without a diagnosed physical or mental disability according to school records; (4) with parental consent and child assent. The girls were recruited into the study through the words of school teachers and administrators. The ethnicity composition of the participants was 21 White, 48 African American, 19 Latinos, and 4 Asian Americans. Prior to the participation, child and informed parental consent forms were signed and collected in accordance with the University Institutional Review Board.

### Instrumentations

At the beginning of the data collection period in fall 2009, three aforementioned questionnaires along with the

consent and assent forms were documented in one large envelope packet and assigned to the potential participants and their parents/legal guardians at the designated school site. Then, after the principal data collector received the questionnaires, consent and assent forms, she collected the physical activity data using the pedometers. When collecting the survey data, the researcher clearly stated that there were no right or wrong answers, and the physical education teachers would not have access to their responses. To minimize students' tendency to give socially desirable responses, students were encouraged to answer truthfully and were assured that their responses were confidential and would not affect their grades.

### Psychosocial Correlates

All girls' psychosocial correlates of physical activity (self-efficacy, outcome expectancy and social support) were measured at baseline in fall of 2008. The measure of self-efficacy included 9 items rated on a 5-point Likert-type scale ranging between "strongly disagree (1)" to "strongly agree (5)" [27]. The scale used a stem like "I have confidence that I can ..." [28]. Some example items were: "complete my exercise using proper technique", "exercise when I feel discomfort", and "consistently exercise three times per week". The mean score of the items was used as girls' self-efficacy.

The measure of outcome expectancy was adopted from Gao et al.'s instrument and contained 10 items rated on a 7-point Likert-type scale of outcome likelihood (ranging between "Very unlikely 1" to "Very likely 7") and outcome value (ranging between "Very unimportant 1" to "Very important 7").<sup>17</sup> That is, outcome expectancy is formed by the interaction of outcome likelihood and outcome values. Sample outcomes were: (a) knowing how to exercise after finishing school; (b) developing a nice body; (c) developing physical conditioning; and (d) learning how to exercise to improve health. The multiplying product of outcome likelihood and value was calculated for each of the outcomes, and the sum of these 10 outcomes was then used to represent girls' outcome expectancy.

The social support variable was measured on a 4-point Likert-type scale that ranged from 1 (hardly ever or never) to 4 (every day). Sample items of social support were following: "I can run to my teacher if I have problems with physical activity." "I can ask for my parents for physical activity." The mean score of the items was used as girls' perceived social support. All the self-reported measures have demonstrated acceptable validity and reliability in the previous studies among similar populations [14, 27].

### Physical Activity Levels

The W4L Neo II pedometers were used to assess the participants' overall physical activity levels through counting daily wake time steps and physical activity duration by minutes (estimated MVPA) for four school days. W4L Neo II Pedometers are pedometer products of Walk 4 Life Pedometer Company. Empirical research has been evident that the W4L pedometers are valid and reliable for both field and laboratory research in physical activity and has also indicated W4L Neo II Pedometers to be accurate within  $\pm 1\%$  error at a speed of 80 m/min or greater and accuracy when compared to hand-counted steps [28-30]. In the present study, pedometers were worn in a clip pouch at the right side hip of each participant. Prior to the pedometer-based data collection, several preliminary steps were completed. To accurately calibrate and to address any potential inter-instrument errors with the pedometers, a standardized shake test was used prior to the data collection, as well as after the completion of all the data collection. In addition, to prevent accidentally resetting and losing data, all of the pedometers were sealed with plastic cable ties before being distributed to the students. Participants were required to wear the pedometers for 16 hours/day (7:00am-11:00pm) for recording their daily physical activity levels. Their data were recorded by one researcher on a daily basis. During the data collection, 10 (20%) pedometers were lost by the participants. Girls' mean steps per day and mean time spent in MVPA per day were used to capture their regular physical activity levels.

### Data Collection and Analyses

The entire procedure of data analysis contained four steps. The first step involved testing Cronbach's coefficient

alphas to ensure the internal consistency of the questionnaire data. Girls' mean scores of self-efficacy, outcome expectancy, and social support were then calculated. The second step involved testing Pearson correlations to evaluate the relationships among participants' self-efficacy, outcome expectancy, social support, and their mean steps per day and mean time spent in MVPA. Prior to the main analysis, the assumption of multivariate normality and homogeneity of variance-covariance matrices was examined. The values of skewness ranged from  $- .68$  to  $1.15$  and the values of kurtosis ranged from  $-.45$  to  $1.69$ , indicating that the variables (self-efficacy, outcome expectancy, social support, and mean steps per day and mean time spent in MVPA) were approximately normally distributed. In addition, the Box's M test revealed no violation of the assumption of homogeneity of variance-covariance matrices ( $F = 1.39, p > .05$ ). The next step involved using multiple regression analyses to determine whether participants' self-efficacy, outcome expectancy, and social support predicted their mean steps per day and mean time spent in MVPA. The last step involved using one way MANOVA to test the ethnicity difference on girls' psychosocial correlates and physical activity levels. Because only a small number of Asian girls participated in the study, only African-American, White and Latino girls were compared in this study. All data were analyzed in IBM® SPSS® Statistics 21. A 95% confidence interval was used for all statistical analyses ( $\alpha = .05$ ).

## Results

### Descriptive Analyses

Internal consistency coefficients for each of the self-reported measures are listed in Table 1. As shown, Cronbach's alpha coefficients of the measures exceeded  $.70$  and represented acceptable internal consistency values. Means and standard deviations for the study variables are shown in Table 1. In general, girls scored moderately on self-efficacy, outcome expectancy, and social support, as their scores are above the median of the scales. The mean and standard deviation for the scores of girls' physical activity levels are also included in Table 1. The adolescent girls accumulated an average of 8323 steps/day and had an average of 76.80 minutes in MVPA.

**Table 1:** Correlations among Girls' Psychosocial Correlates and Physical Activity Levels (n=88)

Variables	1.Steps	2.Time	3.Self-efficacy	4.Outcome Expectancy	5.Social Support	Cronbach's alpha $\alpha$
1.Steps	-	-	-	-	-	-
2.Time (Minutes)	.976**	-	-	-	-	-
3.Self-efficacy	.362**	.380**	-	-	-	.84
4.Outcome Expectancy	.191	.180	.452**	-	-	.79
5.Social Support	.054	.079	.109	.424**	-	.82
Mean	8324	76.80	3.80	38.58	2.95	-
Standard Deviation	2901	25.73	.58	10.71	.47	-

Notes. \*\*  $p < .01$ .

### Correlation and Regression Analyses

The same level of correlation existed between social support and outcome expectancy ( $r = .42$ ;  $p < .01$ ). As expected, the mean steps and mean time were highly associated with each other ( $r = .98$ ;  $p < .01$ ) which supports the reliability of the measures used in this study.

Regression analyses further yielded that girls' self-efficacy emerged as the sole predictor of their mean steps ( $\beta = .36$ ,  $p < .01$ ) and mean time in MVPA ( $\beta = .38$ ,  $p < .01$ ), accounting for 13% and 14.4% of the variance for mean steps and time in MVPA. Girls' outcome expectancy and social support failed to predict physical activity levels.

**Table 2:** Ethnicity Difference of the Study Variables

	White American (W)			African American (A)			Hispanic American (H)			
	n=21			n=48			n=19			
	Age = 12.45±1.42			Age= 12.72±1.49			Age= 12.67±1.38			
	Mean	SD	p (W-A)	Mean	SD	p (W-A)	Mean	SD	p (W-A)	F
Step	8979	3037	.097	7716	2971	.209	8703	2354	.763	1.732
Time	80.26	25.28	.242	72.28	27.54	.241	78.56	21.60	.970	1.075
Self-efficacy	3.83	.44	.536	3.74	.65	.296	3.90	.43	.698	.610
Outcome Expectancy	41.27	7.40	.146	37.10	10.66	.571	38.77	14.07	.469	1.089
Social Support	3.16	.44	.988	3.16	.46	.994	3.15	.51	.985	.000

Notes: SD = Standard Deviation

$p = t$  test

The one-way MANOVA revealed that White girls had significantly more steps and spent more time in MVPA than African-American girls: Wilks'  $\Lambda = .91$ ,  $F(4, 168) = 2.25$ ,  $p < .05$  (see Table 2); however, no significant differences were found between any other ethnic groups on steps and time in MVPA. There were no other significant differences identified for girls' psychosocial correlates across the ethnic groups.

## Discussion

The primary purpose of the study was to investigate the correlations between adolescent girls' psychosocial correlates and their daily physical activity levels. The first hypothesis was that girls' self-efficacy, outcome expectancy and social support would be significantly positively related to their mean steps and mean time in moderate-to-vigorous physical activity. The Pearson correlations revealed that only self-efficacy was moderately positively related to the physical activity level variables examined in the study. The results provided support for the positive relationships between self-efficacy and physical activity behaviors such as steps and time of MVPA. The data in the study concur with the previous research findings suggesting that, if girls this age are competent in their capability to engage in physical activity, they tend to be physically active in their regular life. The positive relationship between self-efficacy and outcome expectancy observed in the present study also suggests that adolescent girls prefer to envision higher or more positive outcome to physical activity levels if they maintain a high level of self-efficacy [12-14].

The second hypothesis focused on whether self-efficacy, outcome expectancy, and social support predicted the participants' steps and time in MVPA. Regression analyses further confirmed that only self-efficacy predicted girls' daily physical activity levels as it accounted for 13% of variance in mean steps and 14.4% of variance in mean time in MVPA. These results partially supported the research hypothesis and highlighted Bandura's conclusion toward self-efficacy as "a uniformly good predictor of diverse forms of behavior" [11]. Multiple previous studies have reported self-efficacy to be a significant exercise determinant to children and young adults [3,

31-35]. For example, Gao and his colleagues [18] revealed that self-efficacy is an important motivational factor that may influence intention and facilitate to achieve outcomes in physical activity such as cardiovascular fitness [3].

The finding that self-efficacy predicted girls' daily physical activity levels has indications for resolutions concentrated on promoting physical activity in the targeted populations. Adolescent girls are more likely to produce the physical activity behavior when they trust that they can complete it. Education and health professionals should facilitate adolescent girls who are preteen to develop and maintain high self-efficacy toward physical activity levels. Physical educators and coaches, for instance, need to pay special attention to the female students' ability, allow them to achieve success and positive perceptions of ability, provide accurate and timely feedback, and use role models to provide vicarious experiences [11, 12, 14]. When designing effective intervention programs for risk health behavior prevention, it is important to consider girls' self-efficacy and implement effective strategies to help adolescent girls become adherent to physical activities.

The finding in this study that girls' outcome expectancy did not significantly predict their physical activity levels has been evident in previous studies showing no to little association with physical activity behaviors among youth and young adults [12, 14, 21]. One plausible explanation might be due to the participants' age since adolescent girls might not yet clearly understand the benefits of physical activity and the harmful consequences of being physically inactive [36]. Future research is needed to determine the contributing factors to this insignificant relationship. Such research should include qualitative methods such as interviews with similarly-aged participants to help to glean more insights about the link between outcome expectancy and physical activity levels. It would also be useful to examine such relations in older age girls and compare the results with adolescent girls.

Our finding that social support failed to predict girls' physical activity levels adds to the plethora of conflicting findings regarding associations between social support and physical activity [15, 36, 37]. Collectively, this research seems

to signal that social support has a less than expected strength of relationship with adolescent girls' physical activity behaviors. Of course, conceptualizations of social support might also be worth considering. For example, social support in this study was provided by the entire social group including parents, teachers, and friends; however, several researchers have found that the overall amounts of social support may be less influential on individuals' physical activity levels than specific social support such as transportation, activity organization, and/or praise from significant others [38, 39]. We therefore recommend future research into potential links between specific social support (e.g., activity organization from parents or teachers) and physical activity levels in adolescent girls. Prospective or longitudinal designed studies that do so would also be valuable.

In regards to differences between ethnic groups, the results showed that the White adolescent girls generated more daily steps and physical activity time than the African-American girls while no significant differences were yielded between other ethnic groups. The findings partially support the previous results stating that White children had higher physical activity levels than non-White children through self-reported data [40]. This study enriches the literature about adolescent girls' psychosocial correlates and physical activity levels by providing a supplemental finding with objectively-measured physical activity levels among adolescent girls from different ethnicities.

The findings of this study should be interpreted with caution. As a cross-sectional study, predictive utility and/or causal effects between the variables cannot be identified. Further, the majority of participants came from middle to low income families so future studies should recruit a large number of girls with a wider range of socioeconomic status to increase the generalizability of the findings. Despite these limitations, the study applied Social Cognitive Theory to add new insights into relations between self-efficacy, outcome expectancy, social support, and physical activity levels among adolescent girls. Another noteworthy contribution of the study was the objective measurement of the girls' physical activity which reduced potential overestimation of physical activity levels.

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