

## Exploration of Social Cognitive Factors Associated with Physical Activity Among Chinese-American Children

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### *Abstract*

*This study examined the social cognitive factors associated with participation in physical activity among Chinese-American youth. Utilizing an observational cross-sectional design, data were collected via a self-administered survey from 84 Chinese-American children ages 6-18. The survey employed items from the Health Behavior Questionnaire and the Youth Risk Behavior Survey. Logistic regressions were used to examine the correlates of physical activity. Findings revealed that among children nine years or younger, those with high self-efficacy were six times more likely to engage in sufficient moderate physical activity than children with low self-efficacy (OR=6.6, 95% CI=1.27-33.80). Among participants older than nine years, those with high self-efficacy were almost nine times more likely to engage in sufficient vigorous physical activity than children with low self-efficacy (OR=8.7, 95% CI=1.35-56.05), and those with positive social support were almost eleven times more likely to engage in vigorous physical activity than participants perceiving negative social support (OR=10.90, 95% CI=1.02-116.37). The findings of this study address the association of social cognitive factors with participation in physical activity. Results from this study indicate that socio-environmental factors in addition to personal factors may increase the likelihood of participation in physical activity among Chinese American children.*

**Key Words:** *Chinese-American, Children, Physical Activity, Self-efficacy, Social Support*

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## Introduction

According to the 2000 census, ethnic Chinese are the largest Asian subgroup in the U.S.<sup>1</sup> Recent health statistics indicate higher rates of chronic diseases such as diabetes, heart disease, and certain cancers among Chinese living in North America as compared with those living in Asia<sup>2,3</sup>. The higher rates of these chronic diseases seen in Chinese-Americans have been largely attributed to behavioral factors, such as changes in dietary intake and physical activity.<sup>4-6</sup>

Previous research depicts those living in the U.S. who have immigrated from other countries are subject to a shift in lifestyle and environment; thereby influencing physical activity and eating habits.<sup>4,5</sup> In one study of 2,488 ethnic Chinese in the U.S., Canada, and China, it was reported that native Chinese consumed more calories but less fat than did Chinese in North America. Findings also indicated that Chinese residing in China reportedly spent more time being physical active, and less hours inactive than did Chinese in North America.<sup>5</sup> In another study, Wolf and colleagues<sup>7</sup> found Hispanics and Asians living in the U.S. reporting lower physical activity levels than other racial counterparts. More specifically, results revealed less than 20% of Asian children in this study met the Healthy People 2000 objectives for strenuous physical activity. Likewise, the same study also found Asian girls had lower levels of physical activity than did the girls from other ethnic groups.<sup>7</sup> More recently, it was revealed that Asian female adolescents were found to be the least overweight while also having lower levels of physical activity as compared with their non-Hispanic white counterparts.<sup>8</sup>

Given that Asian Americans represent a wide variety of languages, dialects, and cultures of people originating from the Far East, Southeast Asia, and the Indian subcontinent, it must be noted that they are as different from one another as from non-Asian groups<sup>9</sup>. Subsequently, studies with regard to physical activity among Asian children may not be representative for any specific Asian sub-group (i.e. Chinese). Thus, studies assessing levels and mediators of physical activity among Chinese-Americans (one of the Far East groups) are warranted.

This study used the Social Cognitive Theory (SCT) as the theoretical framework. SCT defines human functions as a triadic and reciprocal interaction of

personal factors, behaviors, and the environment<sup>10</sup>. That is, an individual's behavior is determined by the interaction of each of these three factors. The SCT addresses the notion of *reciprocal determinism*, which considers that (a) personal factors in the form of cognition, affect, and biological events; (b) behavior; and (c) environmental influences create interactions that result in a *triadic reciprocity*.<sup>10</sup> The SCT has been used in various settings to predict behavioral outcomes such as physical activity.<sup>11-15</sup> For the purposes of this study, the SCT was employed as the framework to examine the relationships between personal factors (perceived physical activity self-efficacy) and environmental factors (perceived social support from family, teachers, and peers) on physical activity participation of Chinese-American children.

With regard to perceived physical activity self-efficacy there are substantial indications in the research literature that self-efficacy is an important correlate of physical activity participation.<sup>16-18</sup> Several studies with children and adolescents supported an association between self-efficacy and physical activity behavior.<sup>19-21</sup> Studies also indicated that the development of self-efficacy is often influenced by four sources of information: performance accomplishments, vicarious experiences, verbal persuasive messages, and physiological signals.<sup>10,22</sup> Generally speaking, self-efficacy is enhanced when a person receives positive information through the above four sources. For example, a boy's physical activity self-efficacy is strengthened when he successfully performs a type of vigorous activity, observes another boy successfully perform the activity, and receives positive praise from a parent or a friend as indicators of impending achievement of health.

Regarding social support, studies, both cross-sectional and prospective, have found a strong positive association between physical activity and social support.<sup>18,23</sup> Family, peers, and school support clearly affects physical activity levels in children.<sup>24</sup> Friend and family support have been consistently found to influence participation in physical activity across a wide range of population groups while lack of social support from family and friends is associated with lower levels of physical activity.<sup>25</sup> Parents who play with their children regularly and provide transportation to activities have more active children.<sup>26</sup> McKenzie and colleagues<sup>27</sup> found that parental verbal prompt resulted in increased rate of physical activity.

With respect to Chinese children, it has been noted that Chinese culture and norms may shape a parent's

role differently as compared to their western counterparts. Chinese families place children's academic performance as the top priority; therefore, parents may not support participation in physical activity until all academic assignments and household responsibilities are completed.<sup>28</sup> Additionally, unlike Western fathers, who often interact with children as playmates, Chinese fathers rarely engage in play activities with their children.<sup>29,30</sup> The role of the father as the authority figure in the family is mainly to help children achieve in academic areas, learn societal values, and develop appropriate behaviors.<sup>28</sup>

With a specific interest in physical activity among Chinese American population, this study was designed to examine the relationship between social cognitive factors and physical activity among Chinese-American children residing in three cities located in the Hampton Roads area in Virginia. The results reported here are part of a larger study which explored factors influencing health behaviors among Chinese children.

## Methods

An observational cross-sectional research design was employed. Data were collected via a self-administrated questionnaire among Chinese-American children residing in Norfolk, Chesapeake, and Virginia Beach, Virginia. The current study was carried out in compliance with the Helinski Declaration and was approved by the University's Institutional Review Board.

### Participants

According to 2000 census, 409 Chinese-American children aged 5-19 resided in the selected areas.<sup>31</sup> Snowball sampling was utilized as a special non-probability method due to the difficulty of accessing members of the selected population.<sup>32</sup> All 92 Chinese children enrolled in the regional Chinese Weekend School for the Fall 2003 semester and 16 children recruited through the local Chinese communities were invited to participate. Parents of these children were asked to recommend eligible Chinese families living in the area. Another 20 children were recruited by references. Overall, 128 children were recruited and 94 participated with signed informed consent from their parents or guardians. This sample resulted in a representative rate of 23% (94/409) among the selected area.

Eighty-four of the 94 Chinese-American children completed the survey with a completion rate of 89%. Table 1 depicts the demographic characteristics of study participants. Overall, 42.9% of participants were female and 57.1% were male. The mean age of

participants was  $10.5 \pm 3.7$  years old, with the majority attending elementary school (65%).

### Measurements

The study instrument was developed based on constructs of the Social Cognitive Theory.<sup>10</sup> Questions adapted from the Health Behavior Questionnaire (HBQ)<sup>33</sup> and the Youth Risk Behavior Survey (YRBS)<sup>34</sup> served to assess physical activity behaviors, perceived physical activity self-efficacy, and social support. A pilot study was conducted in two groups of American Children ages 6-18 (n=12) to test the instrument. Pilot results revealed reasonable readability and comprehension of the questions with exception for the younger children age nine or below. The questionnaire took on average approximately 30 minutes for children older than nine years to complete while it took longer up to 50 minutes for children nine years or younger to do so. Based on the pilot test results, administration procedures were adapted for children nine years or younger.

Physical activity was measured via two items adapted from the YRBS to measure participation in vigorous and moderate physical activity.<sup>34</sup> According to YRBS, sufficient vigorous activity was defined as having participated in activities that made children sweat and breathe hard for more than 20 minutes on three or more of the seven days preceding the survey.<sup>35</sup> Sufficient moderate activity was defined as having participated in activities that did NOT make children sweat or breathe hard for more than 30 minutes on five or more of the seven days preceding the survey.<sup>35</sup> Based on the definitions, three days was used as the criterion for defining insufficient (0-2 days) versus sufficient (3-7 days) physical activity. Five days was used as the criterion for defining insufficient (0-4 days) versus sufficient (5-7 days) moderate physical activity.<sup>35</sup>

Physical activity self-efficacy was measured via a 5-item scale contained in the HBQ to assess confidence among the children with regard to engaging in physical activity.<sup>33</sup> The scale used a 3-point ordinal response set for each item and was scored as follows: not sure = -1, a little sure = 0, and very sure = +1. Summary scores of physical activity self-efficacy ranges from -5 to 5, in which -5 indicated the lowest self-efficacy and 5 indicates the highest self-efficacy (Cronbach's alpha=0.76).

Perceived social support for participating in physical activity was assessed via an 18-item scale concerning the perceived support from family, teachers, and friends for physical activity contained in the HBQ.<sup>33</sup> Each item was scored dichotomously. The healthier

or more supportive response option was scored +1, and the alternative option was scored -1. The total score ranges from -18 to +18 in which -18 indicates the least perceived support while +18 indicates the most perceived support (Cronbach's alpha =0.75).

### **Procedures**

Data collection took place either at the regional Chinese Weekend School or in children's homes or a convenient place chosen by the participants or the parents/guardians. Six volunteer Ph.D. students in the Urban Health Services Program were trained by the researcher to help administer the questionnaire prior to the data collection. Information with respect to the study purpose and data collection procedure for different age groups was explained by the researcher. One sheet of the data collection protocol was distributed to each data collector.

The trained data collectors were directed to explain the purpose of the study and study procedures to all participants and their parents. After the parents/guardians signed the informed consent, the data collectors distributed the survey to the children. Depending on the children's age, two procedures for questionnaire administration were implemented<sup>33</sup>. For children nine years or younger, the data collector read the questions and all the possible answers out loud to the children and explained the questions to children when being asked. The children then checked the answers. For children who were older than nine years of age, the participants completed the questionnaire themselves.

### **Data Analysis**

Data were entered and analyzed using Statistical Package for Social Science (SPSS version 11.0; SPSS Inc, Chicago, IL). Initial analysis included descriptive statistics, including frequencies, sum scores attained on the individual constructs, and mean scores on various individual items. Frequency tables were generated for each category in the demographics. The Likert-type scales were summed and treated as interval/ratio level. Cronbach's alpha was used to examine the internal consistency of constructs that used scales as the measurement.

Given the differential survey methods, separated inferential analyses were conducted for children nine years old or younger and children older than nine years. Bi-variate relationships between the social cognitive factors (self-efficacy and social support) and physical activity were explored (Independent t test and  $\chi^2$ ). Logistic regression analyses were employed to test the relationship between physical activity, personal factor (self-efficacy), and environmental factors (social support) of SCT model.

The alpha level of statistical significance for the logistic regression was set at 0.05.

## **Results**

### **Physical Activity**

Table 2 depicts physical activity levels among participants. Approximately 29% of participants reported having participated in sufficient moderate physical activity, while approximately 74% of program participants reported having participated in sufficient vigorous physical activity. No statistically significant differences were observed for physical activity level between boy and girls (vigorous activity  $\chi^2=2.97$ ,  $df=1$ ,  $p=0.09$ ; moderate activity  $\chi^2=1.21$ ,  $df=1$ ,  $p=0.45$ ). Likewise, there were no significant differences of physical activity level between participants nine years or younger and participants older than nine years (vigorous activity  $\chi^2=.63$ ,  $df=1$ ,  $p=0.43$ ; moderate activity  $\chi^2=.67$ ,  $df=1$ ,  $p=0.41$ ).

### **Physical Activity Self-efficacy**

The sum scores for physical activity self-efficacy ranged from -5 to 5 with a mean of  $1.5 \pm 2.9$ . Scores were dichotomized into having high physical activity self-efficacy (sum score  $\geq 1$ ) and low physical activity self-efficacy (sum score  $< 1$ ). As depicted in Table 3, 64% of the children reported scores indicating high physical activity self-efficacy. No statistically significant differences were observed regarding physical activity self-efficacy between boy and girls ( $\chi^2=.97$ ,  $df=1$ ,  $p=.32$ ). However, a statistically significant difference with respect to self-efficacy was found between participants nine years or younger and participants older than nine years ( $\chi^2=2.97$ ,  $df=1$ ,  $p=0.09$ ). Participants older than nine years appeared showed higher self-efficacy score ( $2.2 \pm 2.5$ ) than participants nine years old or younger ( $.71 \pm 3.0$ ) ( $t=-2.40$ ,  $df=82$ ,  $p=.02$ ) (See Table 3).

### **Perceived social support**

The sum scores of perceived social support regarding physical activity ranged from -16 to 16 with a mean of  $7.2 \pm 5.9$ . Scores were dichotomized into having perceived positive social support (sum score  $\geq 1$ ) and negative social support (sum score  $< 1$ ). Eighty-three percent of participants reported having perceived positive support for physical activity (Table 3). As depicted in Table 3, no statistically significant differences were observed regarding perceived social support between participants nine years or younger and participants older than nine years ( $\chi^2=.03$ ,  $df=1$ ,  $p=.87$ ), nor between boy and girls ( $\chi^2=.42$ ,  $df=1$ ,  $p=.52$ ).

### **Bivariate Relationships**

No significant relationships were found between demographics (i.e. age and gender) and participation in physical activity among participants (Table 2). Among participants nine years or younger, physical activity self-efficacy was found to be significantly related to their moderate physical activity ( $\chi^2=4.50$ ,  $df=1$ ,  $p=.03$ ) but not to vigorous activity ( $\chi^2=.13$ ,  $df=1$ ,  $p=.72$ ). Of the participants with high self-efficacy, 50% had participated in sufficient moderate physical activity, while only 17% of those with low self-efficacy did the same. Perceived social support was not found to be significantly related to either their vigorous physical activity ( $\chi^2=.24$ ,  $df=1$ ,  $p=.62$ ) or moderate physical activity (Fisher Exact Test  $\chi^2=.47$ ,  $df=1$ ,  $p=.65$ ). Among participants older than nine years, physical activity self-efficacy ( $\chi^2=10.24$ ,  $df=1$ ,  $p=.001$ ) and perceived social support (Fisher Exact Test  $\chi^2=7.64$ ,  $df=1$ ,  $p=.02$ ) were found to be significantly related to their vigorous physical activity, but not to their moderated physical activity (Fisher Exact Test self-efficacy  $\chi^2=1.55$ ,  $df=1$ ,  $p=.24$ ; social support  $\chi^2=.26$ ,  $df=1$ ,  $p=.63$ ). Of the participants with high self-efficacy, 88% had participated in sufficient vigorous activity, while only 40% of those with low self-efficacy did the same. Within those having perceived positive social support, 84% reported participating in sufficient vigorous activity, while only 33% of those perceiving negative social support had the same activity (Table 4).

### *Logistic Regression Models*

The logistical regression models identified different correlates of physical activity between the younger and older participants. As shown in Table 5, among children nine years or younger, those with high self-efficacy were six times more likely to engage in sufficient moderate physical activity than children with low self-efficacy (OR=6.6, 95% CI=1.27-33.80). Among participants older than nine years, those with high self-efficacy were almost nine times more likely to engage in sufficient vigorous physical activity than children with low self-efficacy (OR=8.7, 95% CI=1.35-56.05), and those with perceiving positive social support were almost eleven times more likely to engage in vigorous physical activity than participants perceiving negative social support (OR=10.90, 95% CI=1.02-116.37). Boys were less likely than girls to engage in moderate physical activity (OR=.13, 95% CI=.02-.90). No other significant correlates were observed.

## Discussion

The purpose of this study was to apply Social Cognitive Theory constructs to explore personal and social mediators of physical activity among Chinese-American children. Findings of the current study indicate that about 29% of the Chinese-American participants engaged in sufficient moderate physical activity, while about 74% of the participants engaged in sufficient vigorous physical activity. These findings may add new knowledge to the use of YRBS in small minority group such as Chinese-American. As indicated in YRBS's 2003 report, the minority group examined in the data was a combination of ethnic sub-groups which included Chinese-Americans rather than a direct report on Chinese-American.<sup>36</sup> Gordon-Larsen et al<sup>8</sup> revealed that differences of physical activity level existed among Asian subgroups with Chinese-American children are less likely to be inactive when compared with Filipino and Other Asian subgroups. By focusing on one single specific minority group, this study provides an exploratory assessment of factors associated with physical activity behaviors among Chinese-American children.

Results of the current study indicate the relationship between physical activity and social cognitive factors among Chinese-American children may differ with respect to age. This finding is consistent with SCT concepts in that experiences and perceptions in different development stages would have different impact on behaviors.<sup>37</sup> More specifically, current findings suggest that the participation in physical activity is influenced by high physical activity self-efficacy and perceived positive social support but the extent of such influence differs between younger and older participants.

Current findings depict self-efficacy as a significant factor related to moderate physical activity among younger children and also a significant factor related to vigorous physical activity among older participants. Moreover, current results revealed significant differences regarding perceived physical activity self-efficacy with respect to age alone. It was found younger Chinese American children in this study had lower perceived physical activity self-efficacy as compared to the older Chinese American participant. This finding is consistent with many previous studies which suggest that self-efficacy is an important correlate of physical activity participation.<sup>16-18, 38, 39</sup> Findings of this study on self-efficacy is particularly important to older children because it has been shown that when children grow older they tend to participate in less physical activity.<sup>40, 41</sup>

Understanding the difference between younger children and older children with respect to physical activity self-efficacy may assist health professionals in developing effective health education programs. For younger children, the important task for the health professional may be improving children's physical activity self-efficacy. While for older children, social support may be crucial in maintaining and/or improving physical activity self-efficacy, and thereby levels of physical activity. As describe earlier with regard to the SCT, social support is a source of self-efficacy, therefore, health education or health promotion programs could emphasize the social environment in which the children can observe and learn positive behaviors, and hence, develop better self-efficacy.

With respect to the importance of social support in the development of self-efficacy, current study results indicate perceived social support is significantly related to physical activity among older participants. These findings are consistent with previous studies that also found a strong positive association between physical activity and social support.<sup>18, 23, 25</sup> Current findings also support one previous study which indicated that family plays an important role in helping children establish health behaviors.<sup>42</sup> The adoption of health behaviors takes place most effectively in the context set up by a supportive family environment. It is reported that children's activity level was related to that of their parents<sup>43</sup>. These observations suggest that families should share certain activities and that parents can serve as role models who give values and support to physical activity, especially among children older than nine years of age.<sup>44</sup>

Findings of this study may be particularly important for Chinese parents. As stated previously, Chinese culture and norms may shape a parent's role in supporting children's physical activity differently than their western counterparts. The current study calls for more attention to be paid to the small minority group of Chinese-American with its own culture and norms. A better understanding of Chinese culture and traditions may assist health professionals in developing appropriate strategies for this ethnic group. Traditional Chinese families are authoritarian and hierarchical, with the dominance of elders and men and fathers and mothers may assume different socialization duties and interact with children in different manners.<sup>29</sup> Like their Western counterparts, Chinese mothers are often regarded as important for providing care and affection to the child.<sup>45,46</sup> It has been found that in Chinese families, children are more likely to turn to mothers for emotional support,

physical needs, and help in dealing with problems of daily life.<sup>47</sup> Physical activity may be the area suitable for parents to have influence on their children.<sup>44</sup> Parents are highly recommended to be available to children if they intend to provide positive influences on their children's lives. In some cases, parents may not be available to accompany their children nor able to provide useful information about health behavior due to busy schedules. It is recommended that parents use other helpful resource such as other family members ( e.g., grandparents or sibling), who may also influence children positively, to take care of the children when needed.

### *Limitations and Recommendations for Future Research*

There are several limitations in the current study. This study employed a cross-sectional study that can establish associations between many variables while using statistical controls. It also ensures a rapid turnover of data.<sup>32</sup> However, no causal relationship can be derived because the data are collected at one point in time. This is particularly true for this study, because SCT addresses the reciprocal determinism. For instance, one self-efficacy is higher may simply be caused by previous positive participation experience in physical activity other than anything else. Therefore, longitudinal study is highly recommended to examine the causal relationship between social cognitive factors and behaviors. Another major concern of this study is the impact of the small sample size and large age variations of the participants. The current study did not find statistically significant relationships between age and physical activity, which are consistent with previous studies on demographics.<sup>44, 48</sup> However, it is possible that no statistical significant difference was found between age groups due to small sample rather than lack of a true difference. Another threat to internal validity of this study is social desirability bias, i.e. participants in the study may want to present themselves to researchers in the best possible light. Further, due to the ethnicity and geographic characteristics of this sample population, great cautions need to be taken when generalize the findings to children of other ethnicity and locations. In summary, future research should employ a longitudinal design to better understand the interaction between personal factors, environmental factors and behaviors over time in a larger sample.

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**Table 1.** Participant demographic characteristics (n=84)

Demographics	n (%)
Age (Mean =10.5 year SD=3.7)	
6-9 years old	38 (45.2)
10-18 years old	46 (55.8)
Gender	
Male	48 (57.1)
Female	36 (42.9)
Grade in regular school	
Elementary school (K-6)	55 (65.0)
Middle school (Grade 7-9)	17 (20.0)
High School (Grade 10-12)	13 (15.0)
Birth order	
No brother or sister	14 (16.7)
The oldest child	30 (35.7)
Middle child	8 (9.5)
Youngest child	32 (38.1)

**Table 2.** Dichotomized physical activity by gender and age (n=80)

Physical Activity	Total n (%)	Gender		Age	
		Boys n (%)	Girls n (%)	(≤9 yrs) n (%)	(>9 yrs) n (%)
Moderate <sup>a</sup>					
Insufficient Activity (0-4 days)	57 (71.3)	32 (68.1)	25 (75.8)	24 (66.7)	33 (75.0)
Sufficient Activity (5-7 days)	23 (28.8)	15 (31.9)	8 (24.2)	12 (33.3)	11 (25.0)
Vigorous <sup>b</sup>					
Insufficient Activity (0-2 days)	21 (26.2)	9 (19.1)	12 (36.4)	11 (30.6)	8 (22.7)
Sufficient Activity (3-7 days)	59 (73.8)	38 (80.9)	21 (63.6)	25 (69.4)	15 (77.3)

<sup>a</sup> Activity that did not make children sweat or breathe hard for at least 30 minutes

<sup>b</sup> Activity that did make children sweat or breathe hard for at least 20 minutes)

**Table 3.** Perceived physical activity self-efficacy and social support by gender and age (n=84)

Social Cognitive Factors	Total		Gender				Age			
	Mean ±SD	n (%)	Boys Mean ±SD	n (%)	Girls Mean ±SD	n (%)	≤9 yrs Mean ±SD	n (%)	>9 yrs Mean ±SD	n (%)
Self-Efficacy	1.5 ± 2.9		1.5 ± 3.0		1.5 ± 2.7		.71 ± 3.0		2.2± 2.5*	
High (≥1)		54 (64.3)		33 (68.8)		21 (58.3)		18 (47.4)		36 (78.3)
Low (<1)		30 (35.7)		15 (31.3)		15 (41.7)		20 (52.6)		10 (21.7)
Social Support	7.2± 5.9		7.0± 5.9		7.5± 6.1		8.1± 5.8		6.5± 5.6	
Positive (≥1)		70 (83.3)		39 (81.3)		31 (86.1)		31 (86.1)		39 (84.8)
Negative (<1)		14 (16.7)		9 (18.8)		5 (13.9)		5 (13.9)		7 (15.2)

\*p<.05

**Table 4.** Dichotomized physical activity by self-efficacy and social support (n=80)

Physical Activity	Total n (%)	Self-Efficacy		Social Support	
		High n (%)	Low n (%)	Positive n (%)	Negative n (%)
Nine years or younger					
Moderate <sup>a</sup>					
Insufficient Activity (0-4 days)	24 (66.7)	9(50.0)	15 (83.3)	20 (64.5)	4 (80.0)
Sufficient Activity (5-7 days)	12 (33.3)	9(50.0)	3 (16.7)*	11 (35.5)	1 (20.0)
Vigorous <sup>b</sup>					
Insufficient Activity (0-2 days)	11 (30.6)	5 (27.8)	6 (33.3)	9 (29.0)	2 (40.0)
Sufficient Activity (3-7 days)	25 (69.4)	13 (72.2)	12 (67.7)	22 (71.0)	3 (60.0)
Older than nine years					
Moderate <sup>a</sup>					
Insufficient Activity (0-4 days)	33 (75.0)	27(79.4)	6 (60.0)	29 (76.3)	4 (66.7)
Sufficient Activity (5-7 days)	11 (25.0)	7 (20.6)	4 (40.0)	9 (23.7)	2 (33.3)
Vigorous <sup>b</sup>					
Insufficient Activity (0-2 days)	10 (22.7)	4 (11.8)	6 (60.0)	6 (15.8)	4 (66.7)
Sufficient Activity (3-7 days)	34 (77.3)	30 (88.2)	4 (40.0) **	32 (84.2)	2 (33.3)*

<sup>a</sup> Activity that did not make children sweat or breathe hard for at least 30 minutes

<sup>b</sup> Activity that did make children sweat or breathe hard for at least 20 minutes)

\* p<.05

\*\*p<.01

**Table 5.** Logistic regression models for physical activity

Dependent Variables	Independent Variables	Reference	$\beta$	SE of $\beta$	OR	95% CI for OR	
						Lower	Upper
Nine year or younger							
Vigorous Activity							
Sufficient vs. Insufficient Activity	Gender	Girl=0 Boy=1	-.390	.741	.677	.159	2.892
	Self-efficacy	Low=0 High=1	.374	.761	1.454	.327	6.460
	Social Support	Negative=0 Positive=1	.620	1.045	1.858	.240	14.402
Moderate Activity							
Sufficient vs. Insufficient Activity	Gender	Girl=0 Boy=1	.779	.803	2.179	.452	10.511
	Self-efficacy	Low=0 High=1	1.880	.837	6.553*	1.270	33.798
	Social Support	Negative=0 Positive=1	1.413	1.249	1.278	.258	4.107
Older than nine years							
Vigorous Activity							
Sufficient vs. Insufficient Activity	Gender	Girl=0 Boy=1	-1.515	.964	.220	.033	1.454
	Self-efficacy	Low=0 High=1	2.164	.950	8.708*	1.353	56.050
	Social Support	Negative=0 Positive=1	2.388	1.208	10.896*	1.020	116.368
Moderate Activity							
Sufficient vs. Insufficient Activity	Gender	Girl=0 Boy=1	-2.030	.982	.131*	.019	.900
	Self-efficacy	Low=0 High=1	-1.527	.960	.217	.033	1.424
	Social Support	Negative=0 Positive=1	-.282	1.074	.069	.755	6.196

\*p&lt;.05