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Predicting Physical Activity in Arab American School Children

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Theoretically grounded research on the determinants of Arab American children's physical activity is virtually nonexistent. Thus, the purpose of our investigation was to evaluate the ability of the theory of planned behavior (TPB) and social cognitive theory (SCT) to predict Arab American children's moderate-to-vigorous physical activity (MVPA). Children ($N = 348$, ages 10–14) completed questionnaires assessing the TPB and SCT constructs as well as MVPA. Using multiple regression analyses we were able to account for 9% of the variance in MVPA. Based on standardized beta-weights, variance accounted for, and the significance of F change, we concluded that SCT variables were better predictors of MVPA compared with the TPB constructs. In particular, barrier self-efficacy was the most critical variable within SCT and supports the potentially valuable role that efficacy cognitions play in promoting MVPA in Arab American children.

Keywords: Muslim, physical education, health, fitness

Understanding the antecedents of minority children's physical activity engagement is important. Minority children are less likely to engage in nonschool moderate-to-vigorous physical activity (MVPA) and physical activity in physical education classes (Gordon-Larsen, McMurray, & Popkin, 1999; Kann et al., 1996; Lindquist, Reynolds, & Goran, 1999) and are less fit (Lindquist et al., 1999), relative to Caucasian children. Hispanic American children from the inner city are overweight (38%) or at risk (22%) for overweight, double the national average for all American children (Mirza et al., 2004). Rural Native American children also have elevated levels of overweight (26%) and are at risk (19%) compared with national data (Adams, Quinn, & Prince, 2005). The value of regular physical activity has become well established and includes, for example, a reduced risk of colon and breast cancer, diabetes, high blood pressure, and heart disease (Friedenreich & Orenstein, 2002; USDHHS, 1996).

Thus, understanding the determinants of physical activity among children from minority at-risk populations is important. Despite literature on African American (Martin et al., 2005), Hispanic American (Martin, Oliver, & McCaughtry, 2007),

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and Native American (Bagley, Angel, Dilworth-Anderson, Liu, & Schinke, 1995) children, we could find no research on physical activity and the determinants of physical activity among Arab American children.¹ Arab Americans are one of the fastest growing immigrant populations in the United States, with an estimated population of 3.5 million (Arab American Institute, 2005). The limited health data on Arab American adolescents indicates that 45% of teenagers have tried smoking (Islam & Johnson, 2003).

There is slightly more data on the health behaviors of Arab American adults. Researchers examining Arab American adults from the U.S. Midwest found they had elevated risk factors for heart disease (Hatahet, Khosla, & Fungwe, 2002). Arab American adults also smoke more and quit less relative to national and state data (Rice & Kulwicki, 1992). Read, Amick, and Donato (2005) examined Arab American data from the 2000 and 2001 National Health Interview Surveys (NHIS) by comparing Arab American immigrant data to that of U.S.-born whites and found that Arab Americans were more likely to report their health status as “fair” or “poor.” Arab Americans are also more likely to be unemployed, less educated, uninsured, and live in poverty—all health-risk factors. At the same time, Read et al. (2005) also concluded that many Arab Americans are quite healthy, employed, and educated. For instance, they found that Arab immigrants with U.S. citizenship reported worse health compared with Arab immigrants who were not citizens. Consideration of the role that citizenship plays in health status might best be understood under the umbrella of acculturation.

The relationship of acculturation to physical activity is a complex one and not well understood (Berrigan, Dodd, Troiano, Reeve, & Ballard-Barbash, 2006). In brief, healthy people are thought to be more likely to immigrate than less healthy individuals. Then, as they become acculturated and adopt unhealthy U.S. health habits (e.g., eating fast food), their health status decreases. However, with acculturation, socioeconomic status (SES) often increases and SES is positively associated with physical activity. Recent evidence suggests that acculturation and leisure-time physical activity are positively related, whereas non-leisure-time physical activity and acculturation findings are mixed (Berrigan et al., 2006)

Finally, in the community that was home to the school at which we conducted our study, the following data are illuminating. Based on a random sample of 1,200 households, health and physical activity surveys completed by adult Arab Americans revealed the following: Thirty-four percent are obese, 80% do not regularly exercise, 75% are sedentary, and diabetes is almost four times higher (20% vs. 4.6%) compared with Caucasians (Hammad, 2002). Hatahet et al. (2002) also reported that “few participants” in their study of 342 Arab Americans, living in the same community where our research was carried out, exercised regularly. Given the moderate support for physical activity tracking from childhood to adulthood (Taylor, Blair, Cummings, Wun, & Malina, 1999) and the strong link between physical activity and health, it is clearly important to learn more about the determinants of physical activity in Arab American children.

Both social cognitive theory (SCT) and the theory of planned behavior (TPB) are well-supported theoretical frameworks used to study childhood physical activity (e.g., Saunders et al., 1997). According to the TPB, children with strong intentions to engage in MVPA are more likely to do so compared with children with weaker intentions (Ajzen, 1991). Intentions are thought to be influenced by

social expectations (i.e., subjective norm), individual's attitudes, and perceptions of control. First, children who have favorable attitudes toward MVPA are more likely to have strong intentions compared with children who have unfavorable attitudes. For example, children who enjoy MVPA are more likely to make plans to be active compared with children who do not enjoy MVPA. Second, children who perceive that significant others (e.g., physical education teachers) expect them to engage in MVPA and are motivated to comply with that expectation are likely to have strong intentions to participate in MVPA compared with children who perceive weaker subjective norms. In other words, children who are aware of their physical education teacher's desires for them to be active, and who want to please their teachers in that regard, are more likely to try to (i.e., develop an intention) engage in MVPA compared with children who disregard their teacher's expectations and/or who are not strongly motivated to do what their physical education teacher believes is important.

To our knowledge, researchers have not examined whether the physical education teacher's influence extends to free time physical activity settings. Children in the current study attended physical education 5 days a week for 40 min a day, providing significant (i.e., 200 min) weekly contact time between teacher and student. Given that a common goal in physical education is to instill a lifelong love of physical activity, beyond the gymnasium, examining this relationship seems particularly relevant. Finally, children who express strong feelings of control over their physical activity are likely to report strong intentions to perform MVPA compared with children with weaker perceptions of control.

Researchers have used the TPB to study physical activity with minority children before (e.g., Martin et al., 2005, 2007) but we, and Kahan (2003), could find no physical activity research with Arab American children. In their study of African American children, Martin et al. (2005) found that subjective norm and control were both significant predictors of intention. In addition, the impact of attitude on intention was mediated by both subjective norm and control. In their study of Mexican American children, Martin et al. (2007) accounted for 8–9% of the variance in current and future physical activity using the TPB. Finally, Motl et al. (2002) reported that both attitude and subjective norm were predictive of African American and Caucasian girls' intentions to be physically active.

In regard to SCT, in the current study we specifically examined the ability of barrier self-efficacy and parental support to predict MVPA. In general, self-efficacy has been one of the strongest and most robust psychosocial predictors of physical activity among adolescents (Bungum, Pate, Dowda, & Vincent, 2007; Trost et al., 2002a). Children with strong efficacy to overcome common barriers to being physically active should be more likely to engage in MVPA compared with children with weaker efficacy (Bandura, 1997).

Various researchers have found that self-efficacy is related to exercise behavior in minority children (DiLorenzo, Stucky-Ropp, Vander Wal, & Gotham, 1998; Trost et al., 2002a). For instance, in a study of mostly African American fifth-grade students, children reporting strong self-efficacy for seeking support for their physical activity involvement were more likely to be vigorously physically active compared with less efficacious children. Hausenblas et al. (2002) found that urban middle school children in Florida, in general, had stronger barrier self-efficacy across the stages of change for free time exercise. In other words, children who had been

exercising regularly for over 6 months had stronger barrier self-efficacy compared with children who were not exercising and had no intention to begin exercising. Beets and colleagues (Beets, Pitetti, & Forlaw, 2007) also found strong support (e.g., $\beta = .33$) for the relationship between barrier self-efficacy and physical activity with adolescent girls. In addition to self-efficacy, Beets et al. (2007) also examined social support and found it too was a significant direct predictor of physical activity.

Other researchers have affirmed the parental support and physical activity link. Hoefler, McKenzie, Sallis, Marshall, and Conway (2001) reported that parents transporting their children to physical activity locations had children who were more active than parents who provided less support. Scientists have also found positive relationships among forms of social support and physical activity (Biddle & Goudas, 1996; Davison, 2004). For instance, Biddle and Goudas (1996) reported that adult encouragement of physical activity was a direct predictor of children's strenuous physical activity and their intentions to be active. Cumulatively, the above findings suggest that examining variables from both the TPB and SCT may help increase our understanding of the determinants of Arab American children's MVPA.

Finally, the research on physical activity and related psychosocial variables has shown a consistent pattern of gender differences favoring boys. For instance, Trost et al. (2002) reported that boys obtained more physical activity than girls.

Given the patriarchal nature of Arab American culture (Ajrouch, 2004), in addition to typical North American physical activity and sport norms favoring boys, examining for gender differences among the variables we tested seemed prudent. For instance, in his review of Islam and physical activity, Kahan (2003) suggested that parental concern over girls having contact with boys, immodest clothing, unacceptable facilities, and commitments to family (e.g., keeping house and watching siblings) were plausible reasons for the lack of physical activity participation by girls. Muslim girls living in Western Europe tended to spend their spare leisure time in sedentary activities (e.g., reading, watching television, needlework), whereas boys were more active (e.g., played sports) (De Knop, Theeboom, Wittock, & De Martelaer, 1996). Finally, Ajrouch's (2000) report of a young Arab American girl not being allowed to camp overnight with her Girl Scout troop is illustrative of how cultural norms may limit girl's physical activity. Because parents tend to be more "controlling" of their daughters behaviors (e.g., ensuring that they dress modestly) compared with their boys, girls may feel less control over their ability to engage in MVPA. Parents may also support boys more than girls if they view physical activity and sport as less appropriate for girls.

It is also plausible that girls may sense less support (i.e., subjective norm) from their parents and physical education teachers for MVPA. If boys are more active and feel more supported by parents and physical education teachers, we might then expect them to report greater efficacy and stronger intentions for MVPA. Lastly, if girls grow up in a culture where they perceive MVPA is less appropriate for them, compared with boys, then they may develop a less positive outlook (i.e., attitudes) toward MVPA, compared with boys. In brief, based on the above rationale, we thought it would be important to examine for gender differences favoring boys.

To summarize, our major purpose was to determine whether variables from both the TPB and SCT theory predicted MVPA. Our second purpose was to examine gender differences in the various psychosocial variables and MVPA. Finally, given the value of MVPA, we were also interested in providing basic descriptive

information among a sample of Arab American children and determining whether participants met the recommended guidelines for daily physical activity (Strong et al., 2005; USDHHS, 2000).

Method

Participants

A convenience sample of 348 Arab American children from middle school physical education classes (i.e., grades 6, 7, and 8) participated. This number represented 66% of the total number ($N = 529$) of Arab American children in those grades. Students (i.e., 34%) not in the study were (a) not enrolled in physical education, (b) did not attend physical education during data collection, (c) were ill or sick during data collection, or (d) did not provide completed parental consent forms. The school was located in a large city in the U.S. Midwest, and the particular state in which participants resided has the highest concentration of Arab Americans (i.e., 490,000) in the United States (Abraham & Shryock, 2000). Finally, the school is located in the community with the highest concentration of Arab American's (i.e., 250,000) in the state (Abraham & Shryock, 2000). Children ranged in age from 10 to 14 years ($M = 12.24$, $SD = .94$). Breakdown by gender was 51.4% female and 48.6% male.

Instruments

Students were first asked to report their gender, age, ethnic background, and grade. They then completed questionnaires containing questions assessing the TPB, SCT, and MVPA. All questions were developmentally appropriate, have a history of strong reliability and validity, and were exactly the same questions that have been used with similarly aged minority (e.g., African American and Hispanic American) children before (Martin et al., 2005, 2007). In turn, the TPB questions were based on guidelines provided by Ajzen (2004) and Ajzen and Madden (1986). The phrase *breathe hard or feel tired* was used to help children understand the type of physical activity we were investigating. This phrasing has been successfully used in previous investigations with 5th-grade children (Sallis et al., 1996) and African American (Martin et al., 2005) and Mexican American children (Martin et al., 2007).

Theory of Planned Behavior Variables

Behavioral Intention (BI). Children responded to three items on a 7-point Likert scale. The anchors of *definitely false/definitely true* were used for the questions "I have decided to do physical activity that makes me breathe hard or feel tired tomorrow," and "I will try to do physical activity that makes me breathe hard or feel tired tomorrow." The anchor of *definitely do/definitely do not* was used for the question "I plan to do physical activity that makes me breathe hard or feel tired tomorrow."

Attitude (AT). We used three questions suggested by Ajzen (2004) and which were used with similarly aged minority children (e.g., Martin et al., 2005, 2007) to

assess attitude with scoring based on a 7-point scale. Students responded to three sets of anchors for the question “Participating in physical activity that makes me breathe hard or feel tired is. . . .” To assess the experiential aspect of attitudes, one question was anchored with *very unenjoyable* and *very enjoyable*. To measure the instrumental or functional part of attitudes, we used the opposing anchors *very unhealthy* and *very healthy*. And to obtain an overall evaluation, we used the anchors of *very bad* and *very good* (Ajzen, 2004).

Perceived Behavioral Control (PBC). Participants were asked the following two questions: “If I want to, I can participate in physical activity that makes me breathe hard or feel tired” and “It is mostly up to me whether I participate in physical activity that makes me breathe hard or feel tired.” Responses of *strongly disagree* and *strongly agree* anchoring a 7-point scale were used.

Subjective Norm (SN). We were particularly interested in the role of the physical education teacher. Therefore, subjective norm was determined by examining students’ perceptions of the beliefs of their physical education teachers and their motivation to comply with those beliefs. A four-item scale from previous research (Martin et al., 2007) was used and consisted of two pairs of questions. Participants responded on a 7-point scale. Answers for each question in a pair were, as Ajzen (2004) stipulates, multiplied together, resulting in two numbers potentially ranging from 0 to 49. These two numbers were then added to obtain a final SN score potentially ranging from 0 to 98.

An example of a pair of items, with appropriate anchors following, is “My physical education teacher believes that it is important that I participate in physical activity that makes me breathe hard or feel tired” (*strongly disagree/strongly agree*) and “How important is it to you that your physical education teacher believes you should participate in physical activity that makes you breathe hard or feel tired?” (*not at all important/very important*).

Social Cognitive Theory Variables

Barrier Self-Efficacy (BSE). Children responded to eight items on a 7-point scale. Items were derived from valid and reliable youth physical activity self-efficacy scales used previously (Barnett, O’Loughlin, & Paradis, 2002; Saunders et al., 1997; Trost, Saunders, & Ward, 2002b). A sample item was, “How confident are you of participating in physical activities that make you breathe hard or feel tired when you have a lot of homework to do?” Anchors were *not at all confident* (1) and *very confident* (7). All items were summed and divided by 8 to obtain an overall barrier self-efficacy score ranging from 1 to 7.

Parental Support (PS). Children were asked 10 questions on a 7-point scale. Items were obtained from valid and reliable parental support scales used previously in research with children (Trost et al., 2002a, 2003). A sample question was, “How often do your parents drive you to places to participate in physical activity?” Anchors were *not at all* (1) and *very much* (7). All items were summed and divided by 10 to obtain an overall parental support score ranging from 1 to 7.

Physical Activity Variable

Moderate-to-Vigorous Physical Activity (MVPA). We employed the Godin Leisure-Time Exercise Questionnaire (GLTEQ; Godin & Shephard, 1985), which yields reliable and valid scores (Sallis et al., 1996). Students read the header, “How many times in an average week do you do the following kinds of exercise for more than 15 minutes during your free time?” and responded to the next three items: Strenuous Exercise (Heart beats rapidly), Moderate Exercise (Not exhausting), and Mild Exercise (Minimal effort). Students’ answers for strenuous, moderate, and mild exercise were then multiplied by 9, 5, and 3 METS respectively (Godin & Shephard, 1985) and added together for an overall METS score.

Procedures

We received permission from the university internal review board, the school principal, the full-time physical education teacher, and the students’ parents to conduct our study. The visiting student physical education teacher agreed to administer and collect consent forms and questionnaires. She was a graduate student of the authors and had been trained as a research assistant to collect data in similar projects. Each question was read aloud to the students, and students who had difficulty understanding were given help. Participants who gave incomplete answers were asked to clarify their answers.

Data Analysis

The Statistical Package for the Social Sciences 14.00 was used for all analyses. We first screened the data for missing and incomplete data as well as outliers. Based on this screening, nine participants’ incomplete data were eliminated. We then examined internal reliability via alpha coefficients and conducted descriptive analyses. Next we examined for gender differences, ran correlations among all variables, and conducted multiple regression analyses. To guard against multicollinearity, we examined the variance inflation factors and tolerance figures. Both variance inflation factors (1.2–2.4) and tolerance figures (.42–.79) were indicative of a lack of multicollinearity using the criteria of above 10 and below .10, respectively (Cohen, Cohen, West, & Aiken, 2003).

Results

Descriptive Statistics

Means, standard deviations, ranges, skewness, kurtosis, and internal consistency (i.e., Cronbach’s α ; Cronbach, 1951) for all variables are presented in Table 1. Based on the means and standard deviations of all the variables, most students had favorable cognitions concerning MVPA. For instance, the psychosocial variables ranged from a low of 5.13 for perceptions of control to a high of 5.56 for parental support on the 7-point scales.

Table 1 Means, Standard Deviations, Ranges, Skewness, Kurtosis, and Alpha Values for all Variables in the Model

Variable	<i>M</i>	<i>SD</i>	Min–Max	Skewness	Kurtosis	Alpha
Theory of planned behavior						
ATT	5.49	1.18	1.0–7.0	–1.02	1.24	.75
SN	53.22	18.20	4.5–73.5	–.70	–.54	.81
C	5.29	1.53	1.0–7.0	–.83	.10	.64
BI	5.44	1.24	1.0–7.0	–.79	.42	.82
Social cognitive theory						
BSE	5.13	1.21	1.8–7.0	–.38	–.56	.88
PS	5.56	1.07	1.3–7.0	–.71	.16	.87
Physical activity						
MVPA	73.07	25.07	16.00–235.0	.94	3.94	NA

Note. ATT = attitude, SN = subjective norm, C = control, BI = behavioral intention, BSE = barrier self-efficacy, PS = parental support, MVPA = moderate-to-vigorous physical activity.

Gender Differences

We conducted a MANOVA to determine whether participants differed in intention, attitude, subjective norm, control, barrier self-efficacy, parental support, and MVPA according to gender. The MANOVA was significant, $F(7, 340) = 5.18, p < .001$, partial $\eta^2 = .10$. Follow-up tests indicated two significant differences. Barrier self-efficacy was significant, $F(1, 346) = 5.46, p < .02$, partial $\eta^2 = .016$, with boys reporting slightly stronger self-efficacy ($M = 5.28$) compared with girls ($M = 4.98$). Subjective norm was also significantly different, $F(1, 346) = 7.93, p < .01$, partial $\eta^2 = .022$, with girls ($M = 55.86$) perceiving stronger subjective norms than boys ($M = 50.42$).

Correlation Results

Correlations can be found in Table 2. All correlations were in the expected directions and significant, with one exception, at the $p < .001$ level. The strongest correlations were among the psychosocial variables, and weaker correlations existed between MVPA and the various psychosocial variables.

Multiple Regression Results

To determine which theory, and variables within each theory, accounted for the most variance in MVPA, we conducted two multiple regressions. In the first regression equation, we entered the TPB variables as one block² followed by the SCT variables in a second block. In the second regression equation, we reversed the order of the two blocks. The results can be found in Tables 3 and 4. In brief, we accounted for 9% of the variance in MVPA.

Table 2 Correlations Among Attitude, Subjective Norm, Control, Behavioral Intention, Barrier Self-Efficacy, Parental Support, and Moderate-to-Vigorous Physical Activity

	ATT	SN	C	BI	BSE	PS
SN	.57**	—				
C	.27**	.40**	—			
BI	.51**	.60**	.30**	—		
BSE	.55**	.53**	.38**	.63**	—	
PS	.48**	.51**	.35**	.43**	.63**	—
MVPA	.22**	.22**	.11*	.22**	.28**	.24**

Note. ATT = attitude SN = subjective norm, C = control, BI = behavioral intention, BSE = barrier self-efficacy, PS = parental support, MVPA = moderate-to-vigorous physical activity.

** $p < .001$, * $p < .05$.

Table 3 Multiple Regression Results Predicting MVPA: TPB Variables Entered First Followed by SCT Variables

Step	Variable	R	R ²	ΔR ²	FΔ	df	Sig. FΔ	B	p <
1	BI	.263	.069	.069	6.37	4,343	.001	.105	.12
—	PBC							.012	.83
—	ATT							.111	.09
—	SN							.091	.21
2	BSE	.305	.093	.024	4.45	2,341	.012	.163	.04
—	PS							.078	.26

Note. ATT = attitude SN = subjective norm, C = control, BI = behavioral intention, BSE = barrier self-efficacy, PS = parental support, MVPA = moderate-to-vigorous physical activity.

Table 4 Multiple Regression Results Predicting MVPA: SCT Variables Entered First Followed by TPB Variables

Step	Variable	R	R ²	ΔR ²	FΔ	df	Sig. FΔ	B	p <
1	BSE	.293	.086	.086	16.16	2,345	.001	.216	.01
—	PS							.103	.12
2	BI	.305	.093	.007	0.67	4,341	.612	.031	.67
—	PBC							-.025	.67
—	ATT							.056	.45
—	SN							.052	.44

Note. ATT = attitude SN = subjective norm, C = control, BI = behavioral intention, BSE = barrier self-efficacy, PS = parental support, MVPA = moderate-to-vigorous physical activity.

Discussion

The major purpose of this investigation was to predict Arab American children's MVPA while simultaneously determining whether the TPB or SCT predicted more of the variance in MVPA. We accounted for 9% of the variance in MVPA. According to Tabachnick and Fidell (2001, p. 144–145) the significance of the *F* change associated with the addition of one more variable to the regression equation determines whether that variable adds significantly to the variance accounted for in the criterion variable. Therefore, we concluded that the block of SCT variables was, relatively speaking, more important than the TPB variables. In the first equation, the TPB constructs predicted 7% of the variance and then SCT constructs entered significantly and added 2% more. In contrast, when the SCT variables were entered first, they accounted for 9% of the variance and the TPB did not contribute to predicting more variance. In terms of individual variables, in both equations the strongest standardized beta weight was aligned with barrier self-efficacy, which was statistically significant. No other individual variable entered below $p < .09$. The pattern of standardized beta weights for SCT compared with the TPB variables also supports the stronger impact of SCT and in particular, barrier self-efficacy. Our results are similar to those of DiLorenzo et al. (1998), who found that girls' and boys' physical self-efficacy predicted 5% and 6%, respectively, of the variance in exercise behavior. Our results are also similar to research with middle school children accounting for 6–9% of the variance in MVPA (Martin et al., 2005, 2007; Trost et al., 2002b).

Our support of the value of self-efficacy is consistent with much previous research. However, the minimal influence of parental support warrants commentary. According to SCT, a powerful antecedent of self-efficacy is persuasive feedback (e.g., encouragement) aimed at increasing efficacy. Thus, although speculative, it is plausible that the impact of parental support is partly mediated by increases in self-efficacy. Some support for this line of reasoning can be found in the Beets et al. (2007) study, as they found that peer support was partially mediated by gains in adolescent girl's barrier self-efficacy. Peer support also directly impacted physical activity, whereas, similar to our findings, parental support was unrelated to physical activity. Similar to the Beets et al. (2007) argument to explain their inability to find a parental support and physical activity association, in the current study our global measure of social support may have lacked the specificity necessary to detect a parental support and physical activity link. For instance, given the complex nature of social support (i.e., informational, emotional, functional, and so on) it would seem prudent to assess the multidimensional nature of social support. Furthermore, not only should the specific nature (e.g., praise vs. transportation) of social support be measured, but also the referent group (i.e., mother, father, siblings, peers, and so on) should also be identified, as Beets et al. (2007) suggests.

Based on 9% variance, it might seem that our variables were not particularly powerful in explaining MVPA. Although 9% of the variance might seem trivial to many, Cohen (1988) would categorize such a finding as representative of a "medium" effect size. In addition, based on the wide range of significant health benefits attributable to physical activity, we would also suggest that our findings are important. The Hill, Wyatt, Reed, and Peters (2003) report is particularly impressive in documenting how valuable a "little" physical activity might be. They

calculated that reducing energy intake or increasing energy expenditure by just 100 kilocalories a day would stabilize the weight gain in 90% of the population. Practically, this represents a small amount of time (i.e., 15–20 min) to walk about one mile a day (Hill et al., 2003).

Being overweight in adolescence is also correlated with increased mortality for adult men and reduced functional status for women (Must, Jacques, Dallal, Bajema, & Dietz, 1992). Finally, in a study of 370 overweight adolescent females, Gortmaker and colleagues (Gortmaker, Must, Perrin, Sobol, & Dietz, 1993) reported that, 7 years later, they had less income, higher rates of poverty, and were less likely to be married compared with nonoverweight women. In summary, from a public health perspective, the above research findings indicate that understanding and predicting 9% of the variance in MVPA can have significant quality-of-life implications.

Contrary to our hypotheses, there was a lack of gender differences in MVPA, which is encouraging given that previous researchers have found differences favoring boys. Although boys reported stronger barrier self-efficacy and girls had stronger perceptions of subjective norms, the mean values suggest that both girls and boys had moderately high absolute values. Additionally, the partial eta-squared figures (i.e., effect sizes) suggested small differences. Although De Knop et al. (1996) reported limited physical activity participation among Arab girls living in Western Europe; they did note that physical education and school sport activities were often the only physical activity settings that parents approved of. Thus, as suggested by De Knop and colleagues (1996) physical activity in physical education (i.e., a school context) may help legitimize physical activity participation.

Children's descriptive data for mild, moderate, and strenuous physical activity is remarkably similar to data obtained on over 400 similarly aged African American children from the U.S. Midwest reported on by Martin et al. (2005). Both Arab American and African American children reported participating in strenuous physical activity an average of 4.4 times a week for at least 15 min during their free time. African Americans reported nearly equal levels of mild (4.5) physical activity, compared with Arab Americans (4.4) with similar negligible differences for moderate physical activity (Arab Americans = 4.1; African Americans = 4.0). In brief, Arab American children got at least 3 hours and 15 min of physical activity during their free time in a week, and only slightly over 2 hours of MVPA. These figures fall short of the national recommendation (Strong et al., 2005; USDHHS, 2000).

In summary, SCT predicted a modest amount of variance in MVPA, with barrier self-efficacy playing the biggest role. This finding suggests that adults (e.g., physical education teachers) should consider helping children discover how to overcome common barriers to physical activity in order to enhance their barrier efficacy. Second, minimal gender differences were evident. This finding is particularly notable given the patriarchal nature of Arab American culture. Third, most children reported strong levels of socially rooted variables (e.g., physical education teacher grounded SN) as well as psychologically oriented (e.g., efficacy) constructs.

A few limitations of the current study should be acknowledged. First, our inability to capture more than 9% of the variance in MVPA suggests that additional critical determinants of MVPA were not examined. Second, the MVPA measure reflects "free time" physical activity. Thus it is plausible to think that students got more physical activity in physical education or formal sport programs. Third, our sample may not have been representative of all Arab American children. Fourth, as

with all self-report-based research, measurement error can result from subtle social desirability influences. We sought to minimize this effect by highlighting the value of truthful answers, that no right or wrong answers existed, that children's responses were confidential, and that only the researchers and not teachers or parents would have access to their answers.

Finally, our subjective norm variable captured the influence that the physical education teacher had on free-time physical activity. Although the parental support measure helped offset the lack of a parental subjective norm source, we did not assess peer-based influences (i.e., friends and classmates). Given the value of immediate and extended family in Arab American culture (Ajrouch, 2004), future researchers may also want to consider the role of relatives—cousins, aunts, and uncles—in addition to peers outside the school setting and classmates inside the physical education setting. As discussed early, multidimensional measures of social support are also advocated. Future researchers should also consider examining the unique cultural and religious barriers to physical activity (e.g., girl's dress code), while Read et al.'s (2005) and Berrigan et al.'s (2006) work suggests that acculturation processes may be important and complex influences on health behaviors.

Notes

1. Arab Americans are not considered an "official" minority group according to the U.S. Census Bureau and are coded as "White," making identification and therefore research more difficult.
2. Our primary interest was in how all four variables from the TPB cumulatively predicted physical activity. We are, however, cognizant of the theoretical propositions regarding the role of each variable in influencing behavior. Thus, we entered them in an order consistent with TPB theoretical postulates. In other words, we entered behavioral intention (BI) first because it is the most proximal predictor of behavior, followed by PBC because it is hypothesized to have a direct effect on behavior as well as an indirect effect through BI. Lastly, we entered ATT and SN because they are thought to only impact behavior through BI.

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