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A preliminary study was conducted to compare the relationships between different types of self-efficacy and youth physical activity. Two samples of sixth- and seventh-grade students (Sample 1: $N = 57$; Sample 2: $N = 49$) reported their confidence to be physically active (physical activity efficacy), to overcome barriers to physical activity (barriers efficacy), to ask others to be active with them (asking efficacy), and to find and create environments that support physical activity (environmental-change efficacy). Physical activity was measured by averaging three 24-hour recalls of physical activity. Regression analyses were used to test the relationships between the types of self-efficacy and youth physical activity. Compared with the other types of self-efficacy, environmental-change efficacy had the strongest relationship with youth physical activity. This suggests that strengthening young persons' belief in their ability to find and create environments that support physical activity might promote increases in their physical activity.

Childhood and adolescence are a critical developmental period for the promotion of physical activity.[1] Despite evidence showing a relationship between physical activity in youth and the reduction of cardiovascular disease risk factors such as obesity and blood lipid levels,[2,3] total caloric expenditure decreases sharply during the adolescent years.[4-6] Interventions designed to reduce this developmental trend could result in larger accumulations of physical activity across the life span and could prevent the onset of chronic diseases, such as coronary heart disease, later in life.[7-9] Given these findings, scientific consensus panels have recommended that youth should be active daily, or nearly every day, and that some of this activity should be at a moderate or vigorous intensity.[10,11]

To develop effective strategies to promote physical activity in youth, an understanding of theory-based determinants is needed.[12-14] Self-efficacy, a central component of Bandura's social cognitive theory, has been advanced as an important personal determinant of human behavior.[15] Self-efficacy can be defined as the beliefs an individual has about his or her ability to engage in behaviors that lead to expected outcomes. These beliefs influence decisions about whether a behavior will be adopted and maintained and

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are therefore important in the promotion of physical activity. The application of self-efficacy to research on physical activity centers on the hypothesis that strong belief in one's ability to be physically active relates to participation in physical activity. Among adults, there has been a relatively consistent relationship between self-efficacy and the adoption and maintenance of physical activity (see MacAuley and Mihalko for a review).[16-24] However, results among children and adolescents have not been as consistent.

A recent review by Sallis et al.[13] showed that the evidence for self-efficacy as a determinant of physical activity in children and adolescents is equivocal; some results have supported self-efficacy as a determinant,[25-29] and others have not.[30-33] However, closer examination of the self-efficacy scales used in the reviewed studies shows that a number of different types or components of self-efficacy were examined. For example, the Self-Efficacy Scale used by Reynolds and colleagues[25] among high school students combined questions about engaging in regular physical activity with questions about overcoming barriers to physical activity. The studies by Stucky-Ropp and DiLorenzo[31,32] included a Self-Efficacy Scale measuring belief in one's ability to be active relative to peers. Finally, another group of studies by Pate and colleagues[26] and Trost and colleagues[27,28] have examined three types of self-efficacy among fifth-grade students: self-efficacy for seeking social support for physical activity, for overcoming barriers to physical activity, and for being active despite competing activities such as watching television. Recent studies by Trost and colleagues[34,35] and Motl and colleagues[36] have attempted to rectify problems with using different self-efficacy measures by creating unidimensional scales that combine barriers-efficacy items with items measuring self-efficacy for seeking support, being active despite competing activities, and engaging in the task of being regularly active. Differences in the types of self-efficacy measured may be contributing to the inconsistency in self-efficacy research among children and adolescents, and theoretically, differences between types of self-efficacy are important for gaining a complete understanding of the relationship between self-efficacy and physical activity.

McAuley and Mihalko,[16] in their review of self-efficacy and its measurement, suggested that different types of self-efficacy generally represent one of two broad categories or components of the self-efficacy construct, a task component and a regulatory component. The task component refers to beliefs an individual has about his or her ability to perform a specified behavior. Task self-efficacy with regard to physical activity has been commonly measured with items asking about belief in one's ability to be physically active at some prescribed intensity, frequency, and duration (physical activity efficacy). Adult studies have shown that this type of self-efficacy is related to the adoption and maintenance of physical activity.[19-21] However, among children and adolescents, we are not aware of any studies that have examined the task-related component of self-efficacy as a separate construct. The regulatory component of self-efficacy refers to beliefs in one's ability to manage difficulties inherent in performing complex behavior. Regulatory self-efficacy for physical activity has been commonly measured with items asking about one's belief in his or her ability to be active despite common barriers to physical activity such as bad weather and fatigue (barriers efficacy). Both youth[27-29,37,38] and adult[22-24] studies have shown relationships between barriers efficacy and physical activity.

Even though barriers efficacy is the most common measure of regulatory efficacy, other measures of regulatory efficacy have been developed and tested in adults and youth and may provide important information regarding the promotion of physical activity. In

the adult literature, Ducharme and Brawley[17] showed that self-efficacy for scheduling regular bouts of physical activity into one's daily routine was related to physical activity independently of barriers efficacy. In the youth literature, Pate and colleagues[26] showed that self-efficacy for seeking social support for physical activity was related to physical activity in fifth-grade students. These two examples focus not on whether individuals believe they can overcome barriers to physical activity in general, as in a barriers efficacy measure, but whether individuals believe they can engage in specific strategies to manage the difficulties associated with participating in a complex behavior such as regular physical activity. Scheduling efficacy centers on a strategy to overcome lack of time as a barrier,[17] whereas support-seeking efficacy centers on a strategy to overcome the barrier of having to be physically active alone.[26] Understanding self-efficacy for specific self-regulatory strategies such as these may provide more information about how people successfully overcome barriers to physical activity and, in turn, inform interventions that teach such strategies.

Bandura has suggested that one important self-regulation strategy is selecting and creating environments that support desired behaviors.[15] Although support-seeking efficacy does relate to the selection and creation of social environments conducive to physical activity, no study has examined self-efficacy for finding and creating both social and physical environments that support physical activity. Increasing self-efficacy for finding and creating supportive environments may be a particularly effective strategy for promoting the adoption and maintenance of regular physical activity because it requires less self-regulatory effort to perform a behavior in an environment that supports the behavior than it does to cope with barriers in an unsupportive environment.

The purpose of this study was to compare the relationships between different types of self-efficacy and youth physical activity. Self-efficacy for engaging in regular physical activity (physical activity efficacy) was included as a separate measure of the task-related component of self-efficacy. Self-efficacy for overcoming barriers to physical activity (barriers efficacy) was included as a measure of regulatory efficacy that has already been used with youth to compare our results with previous research. Self-efficacy for asking others to be physically active with the person (asking efficacy), which is based on support-seeking efficacy, was included as a measure of regulatory efficacy in addition to, and separate from, the common barriers-efficacy measure. Finally, we constructed a measure of environmental-change efficacy to examine self-efficacy for finding and creating both social and physical environments conducive to physical activity. We hypothesized that each type of self-efficacy would be independently related to youth physical activity because each type of efficacy addresses different challenges inherent in the physical activity task.

METHOD

Participants

Two separate samples of sixth- and seventh-grade students were selected from existing classes at a local elementary school and middle school for this study. Only those students who had completed a majority of the assessment instruments were included in analyses. Sample 1 consisted of 57 students; 25 were in the sixth grade and 32 were in the seventh grade. There were 37 girls and 18 boys; ages ranged from 11 to 13 years old (M = 12.4 years). Forty-six students were White, 4 were Asian American, 2 were African American,

2 were Hispanic, and 1 was Native American. Two students in Sample 1 did not disclose gender or race/ethnicity information.

Sample 2 consisted of 49 sixth-grade students. There were 30 girls and 19 boys; ages ranged from 10 to 13 years old ($M = 11.4$ years). Thirty-nine students were White, 4 were African American, 2 were Native American, 2 were Hispanic, and 1 was Asian American. All students volunteered to participate in the study and received parental consent prior to completing any assessments.

Measures

Self-Efficacy. For Sample 1, three self-efficacy scales were used to measure self-efficacy for engaging in regular physical activity (Physical Activity Efficacy), overcoming barriers to physical activity (Barriers Efficacy), and asking others to be physically active with the person (Asking Efficacy). Items for these scales were based on items developed for use with children and adolescents[39] and were structured based on guidelines described by McAuley and Mihalko.[16] For each item, students were asked how sure they were that they could engage in a specified behavior and responded on a 0 to 10 scale, ranging from *not at all sure* to *completely sure*.

The first scale, Physical Activity Efficacy, consisted of a single item asking students how sure they were that they could do vigorous exercise for 20 minutes or more on 3 or more days per week. Students' scores on this scale ranged from 0 to 10. The second scale, Barriers Efficacy, consisted of eight items asking students how sure they were that they could participate in vigorous exercise at least three times per week despite common barriers to physical activity. For example, one item asked, "How sure are you that you can do vigorous exercise three times per week if you have a lot of homework to do?" Responses to the eight items were averaged. Students' scores on this scale ranged from 0.63 to 8.50, and Chronbach's alpha measure of internal consistency was adequate ($\alpha = .83$). The third scale, Asking Efficacy, consisted of four items asking students how sure they were that they could ask their parents, best friend, and teachers to be physically active with them. For example, one item asked, "How sure are you that you can ask your best friend to play sports or exercise with you?" This scale is similar to the Support-Seeking Efficacy Scale developed by Saunders and colleagues.[39] However, we focused specifically on those items addressing the ability to ask others to be physically active with the person. Responses to the four items were averaged. Students' scores on this scale ranged from 0 to 10, and internal consistency was adequate ($\alpha = .79$). Table 1 shows descriptive statistics and intercorrelations between the self-efficacy scales. Although the three efficacy scales were moderately correlated in Sample 1, none of the correlations was above .70, thus suggesting that the scales were relatively independent.[40]

To explore self-efficacy for finding and creating social and physical environments conducive to physical activity, students in Sample 2 completed a measure of environmental-change self-efficacy in addition to the existing measures of physical activity, barriers, and asking efficacy. The new measure consisted of 12 items asking students about their ability to do the following: find people to be active with them, find places to be active, find transportation to physical activities, and ask parents and teachers to create options for physical activity. Example items include the following: "How sure are you that you can find people to be active with, find a park near your house where you can be active, ride your bike or walk to school instead of having to wait for a ride, ask your parents to make room for physical activity in your house?" These items were measured on a 0 to 5 scale from *com-*

Table 1. Correlation Matrix and Descriptive Statistics for the Psychosocial and Behavioral Variables

	1	2	3	4	5	6	*M*	*SD*
				Sample 1				
1. Physical activity efficacy (0-10)	—	.62***	.54***	NA[a]	.28*	.08	6.98	3.10
2. Barriers efficacy (0-10)		—	.49***	NA	.12	–.02	4.97	2.00
3. Asking efficacy (0-10)			—	NA	.34**	.24*	5.71	2.61
4. Environmental-change efficacy (0-5)				—	NA	NA	NA	
5. No. of 30-minute blocks ≥ 3 METs (MVPA)					—	.68***	3.46	2.14
6. No. of 30-minute blocks ≥ 6 METs (VPA)						—	1.63	1.77
				Sample 2				
1. Physical activity efficacy (0-10)	—	.41**	.48***	.40**	.36**	.42**	6.12	3.03
2. Barriers efficacy (0-10)		—	.33**	.23	.12	.08	4.32	1.91
3. Asking efficacy (0-10)			—	.55***	.25*	.13	4.95	2.46
4. Environmental-change efficacy (0-5)				—	.46***	.48***	3.22	1.15
5. No. of 30-minute blocks ≥ 3 METs (MVPA)					—	.68***	2.47	1.50
6. No. of 30-minute blocks ≥ 6 METs (VPA)						—	1.15	1.19

NOTE: The range of possible scores for the self-efficacy scales is indicated in parentheses. One MET, or metabolic equivalent, is equal to energy expenditure at rest. MVPA = moderate to vigorous physical activity; VPA = vigorous physical activity.

a. NA indicates that environmental-change efficacy was not assessed in Sample 1.

*$p < .05$. **$p < .01$. ***$p < .001$.

pletely sure to *not at all sure* and were averaged to form the Environmental-Change Efficacy Scale. Students' scores on this scale ranged from 0.50 to 4.83, and internal consistency was adequate ($\alpha = .88$).

Modifications were made to the Physical Activity, Barriers, and Asking Efficacy scales in Sample 2 to reflect a new youth physical activity recommendation that focuses on accumulating 60 minutes of moderate and vigorous physical activity rather than three 20-minute bouts of vigorous exercise.[10] Specifically, the term *exercise* was replaced with *physical activity* or *activity*, and self-efficacy for participating in vigorous exercise for 20 minutes or more on 3 or more days per week was changed to participating in moderate or vigorous activity for at least 60 minutes on most days after school. For Sample 2, Physical Activity Efficacy scores ranged from 1 to 10, Barriers Efficacy scores ranged from 1.75 to 8.50, and Asking Efficacy scores ranged from 0.75 to 9.50. Internal consistency was adequate for both the Barriers Efficacy Scale ($\alpha = .71$) and the Asking Efficacy Scale ($\alpha = .71$). Descriptive statistics and intercorrelations for the four self-efficacy scales used in Sample 2 are shown in Table 1. Similar to Sample 1, intercorrelations among the self-efficacy scores were moderate, but no correlation exceeded .70, suggesting that the scales were relatively independent.[40]

Youth Physical Activity. Students' physical activity was measured with the Previous-Day Physical Activity Recall (PDPAR).[41] This instrument requires respondents to recall the main activity completed during each 30-minute block of time beginning at 3:00 p.m. and ending at 11:30 p.m. of the previous day. A list of activities youths commonly engage in is provided on the recall to assist in the remembering of specific activities. In addition to recalling specific activities, respondents are asked to rate the intensity of the activity as *very light*, *light*, *medium*, or *hard*. To aid respondents in selecting the appropriate intensity, the intensity levels are described in the recall, and cartoon illustrations are used to show activities performed at the various intensities. Using the validated coding scheme described by Weston and colleagues,[41] each 30-minute block of time is assigned a metabolic equivalent (MET) value (one MET is equal to energy expenditure at rest) based on the type and intensity of activity reported. The recall is commonly administered on multiple days, and the average number of 30-minute blocks with an assigned MET value of 3 or greater is used to indicate moderate to vigorous physical activity (MVPA standard). Similarly, the average number of 30-minute blocks with an assigned MET value of 6 or greater is used to indicate vigorous physical activity (VPA standard). The 3- and 6-MET cutoffs and the 30-minute block scoring scheme are common ways of reporting PDPAR results[26,28,38] and have been validated in youth samples. Weston and colleagues[41] showed high reliability and moderate to high validity for the PDPAR among youths in the 7th to 12th grades, whereas Trost and colleagues[42] showed moderate validity for the vigorous physical activity standard among 5th-grade students.

Some students were absent from school during data collection; therefore, not all students completed all three recalls. In Sample 1, 36 of the 57 students had all three recalls complete, and in Sample 2, 35 of the 49 students had three recalls complete. Given the missing data, a minimum of two to a maximum of three recalls were used to calculate the average number of 30-minute blocks of MVPA and VPA standards, respectively. Descriptive statistics and correlations between the MVPA and VPA standards are shown in Table 1. For Sample 1, MVPA scores ranged from 0.0 to 9.0 30-minute blocks ≥ 3 METs, and VPA scores ranged from 0.0 to 8.5 30-minute blocks ≥ 6 METs. For Sample 2,

MVPA scores ranged from 0.0 to 6.0 30-minute blocks ≥ 3 METs, and VPA scores ranged from 0.0 to 4.0 30-minute blocks ≥ 6 METs. The moderately high correlations between the MVPA and VPA standards should be expected given that 30-minute blocks ≥ 6 METs, vigorous physical activity, are included in both the VPA and MVPA standards.

In addition to descriptive statistics, we calculated intraclass correlation coefficients (ICCs)[43] among the multiple PDPAR assessments to examine how consistent students' physical activity scores were across the multiple assessments and, thus, how closely the average of the multiple assessments approximated students' typical physical activity. In Sample 1, ICCs for the MVPA and VPA standards were .64 and .60, respectively. In Sample 2, the ICCs were .41 and .48 for the MVPA and VPA standards, respectively. These intraclass correlations are low; however, this is the first study to report ICCs for the PDPAR, and although 3 days of assessment are preferable to a single assessment, researchers have suggested that more than 3 days are needed to achieve high ICCs and adequately represent typical physical activity.[44,45] Finally, it is important to note that the ICCs do not indicate the reliability of the PDPAR assessment directly; rather, they indicate the consistency of the students' physical activity across a number of separate assessments.

Procedures

Sample 1 data were collected in the spring semester of the 1997-1998 academic year. Students completed the three self-efficacy scales at home with their parents and returned their completed assessments to school. Across a 1-week period of time, each of the three PDPAR assessments was completed in class on a separate nonconsecutive day selected by the classroom teacher.

Sample 2 data were collected in the fall semester of the 1998-1999 academic year. Students completed the four self-efficacy scales in class with their teachers. Similar to Sample 1, the PDPAR assessments were completed in class with teachers on three nonconsecutive days. Trained staff assisted with data collection in both samples. No attempt was made in either sample to make up missed assessments due to student absences.

Statistical Analyses

Given differences in data collection procedures between the two samples, Sample 1 and Sample 2 data were analyzed separately. Analysis of variance tests examining gender and grade differences among the students' physical activity scores were conducted first to examine the validity of our PDPAR results. On the basis of previous research,[13] we expected gender differences such that boys would report more physical activity than girls and grade differences such that older students would report less physical activity than younger students. Next, multiple regression analyses were conducted to compare the relationships between the different types of self-efficacy and youth physical activity. The self-efficacy scales were entered in the regression analysis simultaneously, and separate analyses were conducted for the MVPA and VPA standards. Analyses in Sample 2 were identical except that the regression analyses included an additional step to examine the relationship between environmental-change efficacy and youth physical activity. An alpha level of .05 was used for all statistical tests.

RESULTS

Sample 1

Results from the analysis of variance tests in Sample 1 showed that there was a significant gender difference for the VPA standard ($F_{1, 53} = 9.87$, $p = .003$). Boys reported more vigorous physical activity (2.62 30-minute blocks ≥ 6 METs) than girls did (1.13 30-minute blocks ≥ 6 METs). The gender difference for the MVPA standard was not significant ($F_{1, 53} = 3.12$, $p = .08$). Boys reported 4.07 30-minute blocks ≥ 3 METs, whereas girls reported 3.07 30-minute blocks ≥ 3 METs. There were no significant grade differences in Sample 1 for the MVPA or VPA standards. Sixth- and seventh-grade students reported 4.03 and 3.01 30-minute blocks ≥ 3 METs ($F_{1, 55} = 3.30$, $p = .08$) and 1.67 and 1.59 30-minute blocks ≥ 6 METs ($F_{1, 55} = 0.03$, $p = .87$), respectively.

Results from the multiple regression analyses in Sample 1 showed that the relationship between the types of self-efficacy and youth after-school physical activity was significant for the MVPA standard ($F_{3, 53} = 3.06$, $p = .04$) but not the VPA standard ($F_{3, 53} = 1.63$, $p = .19$) (Table 2). Asking efficacy was the only type of self-efficacy independently related to the MVPA standard, indicated by the significant beta coefficient ($\beta = .31$, $t_{53} = 2.00$, $p = .05$).

Sample 2

Similar to Sample 1, Sample 2 analysis of variance test results showed a significant gender difference for the VPA standard ($F_{1, 47} = 7.01$, $p = .01$). Compared with girls (0.82 30-minute blocks ≥ 6 METs), boys reported more vigorous physical activity (1.68 30-minute blocks ≥ 6 METs). Again, the gender difference for the MVPA standard was not significant ($F_{1, 47} = 2.35$, $p = .13$). Boys reported 2.88 30-minute blocks ≥ 3 METs, and girls reported 2.21 30-minute blocks ≥ 3 METs. There were no grade differences to examine in Sample 2 because all the students were in the sixth grade.

The first step of the regression analyses for Sample 2 included the three measures of self-efficacy examined in Sample 1: physical activity, barriers, and asking efficacy. Results showed a significant relationship for the VPA standard ($F_{3, 45} = 3.56$, $p = .02$), but not the MVPA standard ($F_{3, 45} = 2.42$, $p = .08$). Physical activity efficacy was the only type of self-efficacy independently related to vigorous activity ($\beta = .50$, $t_{45} = 3.11$, $p = .003$). Table 2 shows regression analysis results after the addition of environmental-change efficacy. Both the MVPA ($F_{4, 44} = 3.82$, $p = .01$) and VPA regression analyses ($F_{4, 44} = 6.52$, $p = .0003$) were significant. Environmental-change efficacy was the only type of self-efficacy with a significant beta coefficient in the MVPA analysis ($\beta = .42$, $t_{44} = 2.66$, $p = .01$), whereas physical activity efficacy ($\beta = .41$, $t_{44} = 2.82$, $p = .007$), asking efficacy ($\beta = -.32$, $t_{44} = -2.07$, $p = .04$), and environmental-change efficacy ($\beta = .52$, $t_{44} = 3.56$, $p = .0009$) were all independently related to the VPA standard.

DISCUSSION

The main purpose of this study was to compare the relationships between different types of self-efficacy and physical activity in youth. Our results showed (a) that asking efficacy was related to moderate to vigorous physical activity in Sample 1 but was negatively related to vigorous activity in Sample 2; (b) that environmental-change efficacy, which was measured in Sample 2 only, was related to both moderate to vigorous activity

Table 2. Multiple Regression Analyses Testing the Relationship Between Types of Self-Efficacy and Youth Physical Activity After School

	r	β	R^2
Sample 1			
No. of 30-minute blocks ≥ 3 METs (MVPA)			
Physical activity efficacy	.28**	.22	
Barriers efficacy	.12	–.17	
Asking efficacy	.34**	.31*	.15*
No. of 30-minute blocks ≥ 6 METs (VPA)			
Physical activity efficacy	.09	.03	
Barriers efficacy	–.02	–.19	
Asking efficacy	.24*	.32*	.08
Sample 2[a]			
No. of 30-minute blocks ≥ 3 METs (MVPA)			
Physical activity efficacy	.36**	.25	
Barriers efficacy	.12	–.06	
Asking efficacy	.25*	–.08	
Environmental-change efficacy	.46***	.42**	.26**
No. of 30-minute blocks ≥ 6 METs (VPA)			
Physical activity efficacy	.42***	.41**	
Barriers efficacy	.08	–.10	
Asking efficacy	.13	–.32*	
Environmental-change efficacy	.48***	.52***	.37***

NOTE: *r* indicates Pearson correlation coefficient, β indicates standardized regression coefficient, and R^2 indicates multiple coefficient of determination. One MET, or metabolic equivalent, is equal to energy expenditure at rest. MVPA = moderate to vigorous physical activity; VPA = vigorous physical activity.

a. Results from the second step of the regression analyses, after the addition of environmental-change efficacy ($\Delta R^2 = .12$, $p = .01$ for MVPA; $\Delta R^2 = .18$, $p = .0009$ for VPA).

*$p < .05$. **$p < .01$. ***$p < .001$.

and vigorous activity alone; (c) that barriers efficacy was not significantly related to physical activity in either sample; and (d) that physical activity efficacy was not related to physical activity in Sample 1 but was related to vigorous activity in Sample 2. These results suggest that the relationship between different types of self-efficacy and youth physical activity is complex. A better understanding of these complexities might be gained by examining the types of tasks referenced in each of the self-efficacy measures.

First, our result from Sample 1 showing a positive and significant relationship between asking efficacy and youth physical activity suggests that a young person's ability to ask others to be physically active with him or her is related to his or her ability to participate in physical activity. Such a finding is consistent with results from Pate and colleagues showing a link between similar support-seeking behaviors and physical activity in youth[26] and is consistent with the general link between social support and adolescent physical activity cited in the recent review by Sallis and colleagues.[13] Therefore, interventions that strengthen the ability young people have to garner social support for physical activity may be important in building the resiliency needed to participate in physical activity on a regular basis.

However, in contrast to the positive results for asking efficacy in Sample 1, there was a significant negative beta coefficient for asking efficacy in the VPA regression analysis of

Sample 2. Seemingly, this would suggest a negative relationship between asking efficacy and physical activity and would contradict the previous conclusion about the importance of garnering social support for physical activity. However, given that the zero-order correlations between asking efficacy and physical activity were positive in all analyses, we believe that the negative beta coefficient found in Sample 2 was a case of suppression resulting from collinearity among the self-efficacy measures.*[46,47] Such collinearity interference is not surprising given the moderate correlations among the self-efficacy measures and the conceptual overlap between the asking efficacy and environmental-change efficacy measures. Asking efficacy focuses on the social environment, whereas environmental-change efficacy focuses on both the physical and social environment. Future research should attempt to reduce collinearity by refining the different self-efficacy measures.

Second, relative to the other types of self-efficacy included in the study, environmental-change efficacy had the strongest relationship with both indicators of youth physical activity. The regulatory task referenced in the environmental-change efficacy measure referred to students' ability to find and create environments that support physical activity. As previously mentioned, asking efficacy focused on a strategy to garner social support or, in other words, build a supportive social environment. The environmental-change efficacy measure goes further than asking efficacy by including a broader range of environmental-change strategies and by focusing on both the social and physical environment. It is likely that youths must engage in a variety of regulatory behaviors to be physically active on a regular basis; and given our results, environmental-change efficacy seems to have tapped into regulatory tasks relevant for physical activity in youth. Enhancing a young person's ability to find people to be active with, to find places to be active, to find transportation to physical activities, and to ask parents and teachers to create physically active options for him or her might help that person establish important environmental conditions needed to successfully engage in regular physical activity.

Third, barriers efficacy was not significantly related to physical activity in this study. Asking efficacy and environmental-change efficacy both had stronger relationships to physical activity than barriers efficacy did. This suggests that the ability to cope with or overcome general barriers to physical activity might not be the strongest predictor of youth physical activity and adds to the inconsistent evidence for barriers efficacy as a determinant of physical activity in youth. Some studies have shown a significant relationship between barriers efficacy and youth physical activity,[27-29,37,38] whereas others have not.[26,30,33] Although coping with barriers in a harsh environment may be effective in the short term, it may be difficult to sustain motivation for physical activity over time without building social and physical environments that support one's activity.

Finally, this is the first study with children or adolescents that we are aware of in which self-efficacy for engaging in physical activity at some recommended level was examined

* To determine if the relationship between asking efficacy and youth physical activity was suppressed in Sample 2, we conducted hierarchical regression analyses in which we added barriers, physical activity, and environmental-change efficacy to asking efficacy in successive steps and examined changes in the asking efficacy beta coefficients for the MVPA standard and the VPA standard. Zero-order correlations for asking efficacy were $r = .25$ and .13 for the MVPA and VPA standards, respectively. Beta coefficients for asking efficacy were $\beta = .24$ and .11 when barriers efficacy was added, were $\beta = .11$ and –.08 when physical activity efficacy was added, and were $\beta = -.08$ and –.32 when environmental-change efficacy was added. It is evident that the relationship between asking efficacy and youth physical activity was suppressed in our Sample 2 analyses. It appears that although some suppression resulted from the inclusion of physical activity efficacy, the greatest amount of suppression occurred when environmental-change efficacy was added.

as a separate construct (physical activity efficacy). Although physical activity efficacy was related to vigorous activity in Sample 2, it was not related to physical activity in Sample 1. This difference could be the result of the different physical activity standards used for the physical activity efficacy item. A vigorous activity standard was used in Sample 1, and a moderate or vigorous standard was used in Sample 2. Students' belief in their ability to be at least moderately active might be more closely related to their level of physical activity than their belief in their ability to engage in vigorous exercise. Future research could improve by including a multiple-item measure of physical activity efficacy. Such a measure could capture a wider range of efficacy beliefs regarding the physical activity task by including separate items referring to different levels of frequency, intensity, and duration.[16]

The fact that the relationship between physical activity efficacy and students' physical activity changed in accordance with a change in the standard, or task, referenced in the self-efficacy measure (vigorous exercise versus moderate or vigorous physical activity) supports our assertion that examining the type of task referenced in a self-efficacy measure can help make sense of the relationship between self-efficacy and physical activity in youth. Such understanding could help direct intervention efforts by providing a set of strategies, or self-regulatory tasks, shown to be related to physical activity in youth. The results of this study provide some strategies that may be useful. Practitioners could develop young people's belief in their ability to build social and physical environments that support physical activity. In addition, practitioners could promote participation in a range of physical activities conducted at both moderate and vigorous intensities rather than focusing solely on structured exercise at a vigorous intensity.

An important strength of the present study is that a valid measure of physical activity was used to assess activity across multiple days. Too often researchers rely on a single self-report of physical activity when multiple assessments would increase the validity of the findings.[45] Validity for our PDPAR results was established by testing for expected gender and grade differences in the students' physical activity. Our results showed that boys reported significantly more vigorous activity than girls did. This gender difference is consistent with other research using the PDPAR[26-28,38] and is consistent with a recent review of the correlates of physical activity among children and adolescents that cites a strong relationship between gender and physical activity.[13] Although the grade-level differences and the gender difference for moderate to vigorous physical activity were not statistically significant, the results were in the expected direction. Seventh-grade students reported less physical activity than sixth-grade students did, and boys reported more moderate to vigorous physical activity than girls did. Lack of statistical power, which is related to the main limitation of this study, might have hindered our ability to detect these differences.

The small sample sizes were the main limitation of the present study. They prevented detailed analyses and reduced statistical power for finding significant results. Conducting separate analyses for boys and girls would have been informative, but these analyses were not possible given the small samples. Combining the two samples to increase statistical power would have been helpful, but differences in data collection procedures between the samples prevented such consolidation. Nevertheless, the fact that there were significant results despite the lack of statistical power suggests that the relationships found might be quite strong.

Other limitations of the study should also be noted. Generalization of the results is limited given the homogeneous nature of the convenience sample. Approximately 80% of the students in each sample were White, and students for both samples were selected from

a local elementary school and middle school. In addition, the cross-sectional nature of the study does not allow for causal inferences to be made; we cannot determine whether self-efficacy led to participation in physical activity, only that self-efficacy was higher in youths who reported higher levels of physical activity. Given the limitations, the results of this study should be viewed as preliminary findings and additional research should be conducted to confirm the relationships found in this study.

Implications for Practice

Health education practitioners could use the results of this study to build resiliency skills in youth. In an attempt to counter social norms and environmental influences that favor sedentary behaviors, health educators could help students learn to find and create more options for physical activity in their everyday environments. Students could be encouraged to organize an after-school physical activity club where it would be easy to find other people with which to be active. Teachers could help students find bike trails, parks, and other places for physical activity located near the student's home. Assignments could be given in which students would create new physical activity options at home with the help of their parents. Students could also be encouraged to coordinate their schedules with their friends and parents so that they have a safe way to get to a park or other physical activity. The focus of these types of interventions is on learning skills that create supportive environments rather than on trying to cope with a difficult environment. It will be easier for students to initiate and sustain regular physical activity in a supportive environment, and as students learn and practice environmental-change skills such as those described above, their self-efficacy and physical activity should increase.

Summary

This study provides some preliminary evidence for the importance of measuring self-efficacy for regulatory tasks other than overcoming barriers. Behaviors such as asking others to be active with you and changing the environment by finding people, places, transportation, and options for physical activity may be important in enabling the adoption and maintenance of physical activity in youth. Health education practitioners could play an important role in promoting physical activity in youth by teaching and modeling these important resiliency skills.

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