Objectives: To identify factors that motivate adolescents to be physically active; to assess differences in motivators for groups at risk for physical inactivity, including girls vs boys, overweight vs nonoverweight youth, and youth with low vs high perceived sport competence; and to assess links between activity motivation and physical activity.

Design: Cross-sectional study.

Setting: A middle school in rural central Pennsylvania.

Participants: Two hundred two girls (n=92) and boys (n=110).

Main Exposure: Motivations to be physically active were assessed using the Activity Motivation Scale. Perceived sport competence was measured by the Physical Self Description Questionnaire. Participants' height and weight were measured and used to classify their overweight status.

Main Outcome Measure: Three self-reported measures were used to assess adolescents' physical activity.

Results: Adolescents were most likely to report personal fulfillment as the strongest motivating factor for physical activity (mean [SD], 3.49 [0.56]), followed by weight-based motivation (mean [SD], 2.39 [0.93]), peer motivation (mean [SD], 2.09 [0.67]), and parent motivation (mean [SD], 1.72 [0.73]; F=680.74; P<.001). Overweight adolescents reported significantly higher weight-based motivation (mean [SD], 2.84 [0.79]) compared with nonoverweight adolescents (mean [SD], 2.06 [0.89]; F=40.52; P<.001), and adolescents with low perceived sport competence reported significantly lower personal fulfillment motivation (mean [SD], 3.20 [0.68]) compared with adolescents with higher perceived sport competence (mean [SD], 3.69 [0.32]; F=52.31; P<.001). Personal fulfillment was the only motivating factor that showed a consistent moderate to strong association with physical activity across all regression models.

Conclusion: Personal fulfillment motivation should be considered when designing physical activity promotion programs for adolescents.

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Ensuring that youth are physically active is essential for their physical and emotional health.1-3 Rates of physical activity, however, are low among youth and decline during adolescence.4-6 To increase physical activity among youth, motivations to be physically active must be understood more clearly. Motivations to be active are an important construct to assess because they are a likely antecedent of physical activity patterns7 and information about specific sources of motivation can help guide the development of public health intervention programs to increase physical activity among youth.

Studies assessing motivations to be active among youth have largely focused on characteristics at the individual level (eg, perceived competency) as motivating factors to be active and have often included indirect measures of physical activity such as self-determination to be active (ie, the process by which a behavior becomes intrinsically motivated)8 and enrollment in sport programs as the outcome variables of interest. Key findings from this literature indicate that youth who perceive a motivational climate that emphasizes mastery rather than performance9,10 and who perceive that they are more athletically competent8,11 report higher self-determination to be active. Research also shows that youth with higher intrinsic motivation to be active, more positive outcome expectancies, and higher perceived competence are more likely to be enrolled in after-school sport programs.12-14

An extensive emphasis on intraindividual characteristics and cognitive processes such as intrinsic motivation, perceived competence, and perceived motivational climate as factors that motivate youth to be

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active reflects the theories that have driven this body of research, including goal perspectives theory,15,16 theories of ability beliefs,17,18 self-determination theory,7,18-20 and amotivation theory.13,19 Few studies have considered social systems external to the individual, such as the family and peer network, as sources of motivation. These systems are part of the larger context or ecology that shapes human behavior.21,22 According to the Looking-Glass Self theory, individuals define themselves through the eyes of others.23 From this perspective, significant others, including parents and peers, can have a crucial role in shaping an individual’s sense of self and his or her motivation to perform particular behaviors. Consequently, the family and peer network are important to consider to understand the emerging health behaviors among youth and to develop comprehensive, relevant, and effective health promotion programs.

We examined individual, family, and peer factors that may motivate adolescent girls and boys to be physically active and assessed links between such motivations and self-reported physical activity. In addition, we examined differences in activity motivations in adolescents at risk for physical inactivity (ie, low levels of physical activity) compared with those who are not at risk. Research shows that particular subgroups of youth are at increased risk for physical inactivity, including girls,24-25 overweight youth,25,26 and youth with low perceived sport competence.27,28,30 This study builds on work assessing physical activity motivations among youth by linking motivations to reported levels of physical activity and by focusing on groups that are at higher risk for being physically inactive. To this end, the primary goals of this study were to identify key sources of activity motivation among youth (ie, to examine the factor structure of the Activity Motivation Scale), to test differences in sources of motivation for youth at risk versus not at risk for physical inactivity, and to examine links between activity motivations and self-reported physical activity.

**METHODS**

**PARTICIPANTS**

Participants included 202 middle school girls (n=92) and boys (n=110) in grades 6 to 8 from a rural community in central Pennsylvania. The mean ±SD age of participants was 12.7 ±0.8 years for boys and 12.5 ±0.8 years for girls. Participants were predominantly non-Hispanic white (97%). The study received institutional review board approval from Pennsylvania State University. Signed parental consent and participant assent were required for participation in the study. Questionnaires were completed while the students were in class.

**MEASURES**

**Activity Motivation**

The Activity Motivation Scale was developed for this study to assess activity motivations or reasons why adolescents exercise or play sports. An extensive list of motivations was compiled that included items across a variety of domains, such as personal interest, family and social influences, weight loss, competition, and health. The original questionnaire contained 22 items. All items began with “Do you play sport/exercise? following by a list of reasons (eg, “Do you play sport/exercise to be healthy?”). A 4-point Likert scale was used (1 indicating no, definitely not; 2, no, not really; 3, yes, sometimes; and 4, yes, definitely).

**Physical Activity**

Three self-reported measures of physical activity were used to assess physical activity of the participants, including the Children's Physical Activity Scale, an activity checklist, and the physical activity subscale of the Physical Self-Description Questionnaire (PDSQ).

The Children’s Physical Activity Scale measures a general tendency or inclination to be physically active.31 This questionnaire contains 15 items (eg, “I would rather watch TV or relax inside than be active outside”; “I participate in some type of physical activity almost every day”) and uses a 4-point Likert scale (1 strongly agree) to 4 [strongly disagree]). Scores on the Children’s Physical Activity Scale have been significantly associated with a 1-mile run or walk time ($r=-0.43; P<.001$), body fat percentage ($r=-0.41; P<.001$), and body mass index (BMI; calculated as weight in kilograms divided by the square of height in meters) ($r=-0.32; P<.001$). In the present study, the internal consistency coefficient for the Children’s Physical Activity Scale was $\alpha=.80$. The activity checklist presented 28 activities (eg, basketball, Rollerblading, and tennis), and participants were asked to indicate whether they had participated in the activity competitively (eg, played on a team or had lessons) or on a regular basis (30 minutes 3 times a week) within the past year. Activities included on the checklist are consistent with preferred activities as reported by rural youth.32 The total number of activities marked was summed to produce a total activity score. Finally, the physical activity subscale of the PDSQ33 was used to ascertain general levels of physical activity. This scale includes 6 items (eg, “Several times a week I exercise or play hard enough to breathe hard or sweat”; “I do lots of sports, dance, gym, or other physical activities”) and uses a 6-point response scale (1 indicates false; 2, mostly false; 3, more false than true; 4, more true than false; 5, mostly true; and 6, true). Research supports the psychometric properties of this scale, which includes test-retest reliability and convergent and discriminant validity.33

Physical activity is multidimensional and complex.34 Therefore, a summary score, using principal component analysis, was created based on all 3 self-report measures of physical activity. In concept, in principal component analysis all variables are converted to a standard metric with a mean of 0 and an SD of 1 and are combined to form a single score using weights (or factor loadings) that reflect the intercorrelations between the measures. An activity score based on multiple measures is more representative of general levels of physical activity, helps to reduce error involved in its measurement,35,36 and decreases the likelihood of a type I error by reducing the number of analyses performed.

**Perceived Sport Competence**

In addition to measuring general levels of physical activity, the PDSQ was used to measure perceived sport competence.31 The sport competence subscale of the PDSQ includes 6 items (eg, “I am good at most sports”) and uses a 6-point response scale. In addition to the general measurement qualities of the PDSQ as outlined earlier, scores on the sport competence subscale are associated with higher levels of physical activity, greater strength, and greater endurance.31 The internal consistency coefficient for the PDSQ for this study was $\alpha=.93$. 

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Participants’ height (to nearest one-fourth inch) and weight (to nearest 1/10 lb) were measured by the school nurse. Participants were weighed without shoes and in light clothing. Data were converted to kilograms and meters to calculate BMI. Age-specific and sex-specific BMI percentiles were then calculated using the Centers for Disease Control and Prevention 2000 growth charts.38 Participants with a BMI greater than or equal to the 85th percentile were considered overweight or at risk for overweight; however, for the sake of parsimony, this group is referred to collectively as “overweight.”

STATISTICAL ANALYSES

Exploratory factor analysis was used to identify the number of factors present in the Activity Motivation Scale. Items with factor loadings of 0.40 or more and that did not cross-load or have conceptual discrepancies with the other factors were retained. Subscale scores were created by taking the mean of the items loading onto each factor. After specifying the factors in the scale, a within-subjects analysis of variance (ANOVA) (ie, repeated-measures ANOVA) was performed to determine whether some sources of activity motivation were more strongly endorsed by participants than were others (ie, the relative ranking of the various sources). The different sources of activity motivation were considered the repeated factor. In addition, for each source of motivation, 1-way ANOVA was performed to test that youth at high risk vs low risk for physical inactivity differentially endorsed that source of support.

A series of multiple regression models was used to examine associations between activity motivation and physical activity and whether associations differ for youth at high risk vs low risk. A separate model was run for each risk factor. All sources of activity motivation, the risk factor (eg, weight status, sex, and perceived competence), and interactions between the risk factor and each source of activity motivation were included in the model. All nonsignificant interactions were dropped from the model and the model was rerun (Table). Interactions were examined by running the model in question separately for each risk group. All analyses were run with and without mother’s educational achievement level and family income included as covariates. Analyses were performed using SAS software (version 8.2; SAS Institute Inc, Cary, NC).

SAMPLE CHARACTERISTICS

Participants were from families with low to middle levels of income and education. Specifically, the percentages of families with a combined income of less than $20,000, between $20,000 and $50,000, and $50,000 or more were 29%, 57%, and 14%, respectively. In addition, 56% of the fathers and 45% of the mothers reported some high school or graduation from high school as their highest level of education attained. Forty percent of girls and 40% of boys were overweight (BMI ≥85th percentile). Among overweight girls, 75% had a BMI between the 85th and 95th percentile, and 25% had a BMI at the 95th percentile or higher. Among overweight boys, BMI was at the 85th percentile or higher but less than the 95th percentile in 25% and was in the 95th percentile or higher in 75%. Results of the analyses did not differ with and without mother’s highest level of education attained and family income included in the models. Therefore, unadjusted results are presented.

FACTOR STRUCTURE OF THE ACTIVITY MOTIVATION SCALE

Four factors were identified in the factor analysis. These factors conceptually represented personal fulfillment motivation (eg, health, improved skills, and enjoyment), weight-based motivation (eg, self-perception of being overweight), peer motivation (eg, social activity with friends), and parent motivation (eg, parents are active, parents want me to be active). Reliability coefficients indicated that the scores created for each source of motivation were internally consistent: personal fulfillment activity motivation, α = .78; weight motivation, α = .77; peer-influenced activity motivation, α = .77; and parent-influenced activity motivation, α = .84.

KEY SOURCES OF ACTIVITY MOTIVATION FOR THE ENTIRE SAMPLE AND BY RISK GROUP

Mean ± SD scores for each source of motivation for the entire sample were as follows: personal fulfillment, 3.49 ± 0.56; weight-related motivation, 2.39 ± 0.93; peer-influenced motivation, 2.09 ± 0.67; and parent-influenced motivation, 1.72 ± 0.73. Results from the within-subjects 1-way ANOVA showed that the mean scores were significantly different from each other.
higher perceived sport competence (3.69±0.32; F=52.31; P<.001).

**LINKS BETWEEN ACTIVITY MOTIVATION AND PHYSICAL ACTIVITY**

Results from the regression models are given in the Table. Model 1 included overweight status as the risk factor of interest. In this model, personal fulfillment motivation and overweight status were significant predictors of physical activity. Nonoverweight youth and youth reporting high personal fulfillment motivation reported the highest levels of physical activity. In addition, a significant interaction was identified between overweight status and parent motivation. Results from post hoc analyses showed that parent motivation was positively associated with physical activity among overweight youth (β = .19; P<.10) and negatively associated with physical activity among nonoverweight youth (β = -.16; P<.10). Specifically, a 1-unit increase in parent motivation (on a scale of 1-4) was associated with a 0.19-SD increase in physical activity among overweight youth and a 0.16-SD decrease among nonoverweight youth.

Model 2 included sex as a risk factor. In this model, higher personal fulfillment motivation, higher weight-based motivation, and male sex were associated with higher levels of self-reported physical activity. The relationship for weight-based motivation was moderated by sex. Specifically, weight-based motivation was negatively associated with physical activity among boys (β = -.32; P<.001), whereas no association was found for girls (β = .06; P = .54).

Model 3 included perceived competence as the risk factor of interest. Results showed that higher personal fulfillment motivation and higher perceived competence were associated with higher reported physical activity; no interactions with perceived competence were identified. Variables in models 1, 2, and 3 (Table) explained 41%, 42%, and 42% of the variance in physical activity, respectively.

**COMMENT**

Low levels of physical activity among youth are of public health concern, given the health risks associated with physical inactivity. Identifying key sources of motivation to be active among youth will help guide the development of effective physical activity promotion programs. In this study, 4 sources of motivation were identified: personal fulfillment motivation (eg, enjoyment, wanting to be fit), weight-based motivation (eg, wanting to lose weight), parent-influenced motivation (eg, parents want them to), and peer-influenced motivation (eg, social activity with friends, to be like the popular kids at school). Personal fulfillment was the most readily endorsed motivation to be active among all participants regardless of risk status, and was the only motivation that was consistently associated with significantly higher levels of self-reported physical activity. Results from this study suggest that personal fulfillment motivation could be used as a basis for physical activity promotion pro-

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**Figure.** Mean scores for each source of activity motivation for adolescents at high risk (gray bars) vs low risk (black bars) for physical inactivity. Asterisk indicates means are significantly (P<.05) different for risk groups. (F=680.74; P<.001). Follow-up post hoc analyses showed that all means were significantly different from each other.

Means scores for each source of motivation for each risk group are shown in the **Figure.** Few differences in the mean for each source of motivation were identified for the high-risk and low-risk groups. There were 2 exceptions. Overweight adolescents reported significantly higher weight-based motivation (2.84±0.79) than did nonoverweight adolescents (2.06±0.89; F=40.52; P<.001). In addition, adolescents with low perceived sport competence reported significantly lower personal fulfillment motivation (3.20±0.68) than did adolescents with higher perceived sport competence (3.69±0.32; F=52.31; P<.001).
grams for youth and that this strategy may be effective for all youth regardless of their risk status.

Few associations were identified between adolescents’ physical activity and their reports of parent-influenced and peer-influenced motivation. One exception was a significant interaction between parent motivation and weight status. In contrast to nonoverweight youth, reports of parent motivation among overweight youth were associated with higher levels of physical activity. The general lack of associations for parent-influenced and peer-influenced motivation is somewhat surprising given that parent and peer support of physical activity have consistently been identified as predictors of physical activity among children and adolescents. These results suggest that parents and peers may influence youth physical activity through mechanisms other than activity motivations, such as direct facilitation. For example, peers may arrange a group activity that includes physical activity (e.g., a soccer game) and parents may enroll their children in sports or take them to places where they can be active. Each of these sources of support may not be directly perceived by youth as a motivation to be active.

Although overweight adolescents reported significantly higher weight-related motivation than did nonoverweight adolescents (Figure), there was no evidence to suggest that weight-based motivation could be used to promote physical activity among youth. Results suggested the contrary: weight-based motivation was negatively associated with physical activity (Table, models 2 and 3). The negative association between weight-based motivation and physical activity may reflect that overweight youth are more likely to report weight-based motivation and are generally less active than nonoverweight youth. The cross-sectional nature of the design did not allow us to test the direction of this association. Personal fulfillment surpassed weight-based motivation as a motivation to be active, even among overweight youth, and was consistently associated with higher levels of physical activity. Including personal fulfillment as a central component of activity promotion programs may promote enjoyment of physical activity and may encourage overweight youth to persist in their efforts to be active regardless of their rate of weight loss, which is often much slower than anticipated.

Strengths of this study include the use of a contextual approach (i.e., by examining factors related to the individual, parents, and peers as possible sources of activity motivations), assessment of physical activity rather than correlates of physical activity such as self-determination to be active, and the direct relevance of the findings to programs to promote physical activity among adolescents. Limitations of the study include the homogenous nature of the sample, the reliance on self-report measures of physical activity, and the inability to determine the direction of the associations. Consequently, future research could build on these findings by recruiting a more diverse sample, using objective measures of physical activity such as accelerometers, and using a longitudinal or intervention design. Intervention research in particular could manipulate various forms of motivation and enable assessment of their effect on physical activity levels among youth. Furthermore, future research could assess additional measurement qualities of the Activity Motivation Scale (e.g., test-retest reliability) and variables that may mediate or moderate the relationship between motivation and physical activity, such as physical health, socioeconomic status, mental health, and parental involvement.

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