

The Youth Physical Activity Promotion Model: A Conceptual Bridge Between Theory and Practice

Gregory J. Welk

Many theoretical models have been proposed to understand the factors influencing physical activity behavior; however, few have been specifically developed for children. The purpose of this paper is to describe a conceptual model of physical activity promotion that is based on the unique developmental, psychological, and behavioral characteristics of children. The current model adopts a social-ecological framework by acknowledging the input of various personal, social, and environmental influences on children's physical activity. The model also unites constructs from competing theoretical frameworks to provide a conceptual basis for comparing various models. It is hoped that this model will serve as a bridge between theory and practice and will enhance the promotion of physical activity among children.

Physical activity is known to provide important physical and emotional benefits for the entire population, yet participation rates have remained low. Several models of physical activity behavior have been proposed, each providing an alternative or sometimes related perspective for how physical activity behaviors can be explained or influenced. At best, these models have only explained 35% of the variance in physical activity behavior (Dishman, 1994). This is partly due to difficulties with measuring physical activity, but it also reflects the complexities of the behavior itself. Clearly, physical activity determinants are multifactorial, with contributions from a variety of factors (Sallis & Hovell, 1990). Moreover, they vary by exercise type and intensity (Dishman & Sallis, 1994) and across the stages of exercise behavior (Marcus, Selby, Niaura, & Rossi, 1992).

While research and promotional efforts are needed on many different demographic groups, concerns about the precipitous declines in physical activity among

Gregory J. Welk is with the Cooper Institute for Aerobics Research, 12330 Preston Rd., Dallas, TX 75230.

adolescents (Myers, Strikmiller, Webber, & Berenson, 1996; Pate, Long, & Heath, 1994; Kann et al., 1996) have prompted increasing interest in understanding physical activity behaviors among youth. A working group from the National Heart Lung and Blood Institute (NHLBI) on determinants of physical activity and interventions in youth (Sallis et al., 1992) concluded that efforts are needed to clarify factors in multiple domains that influence physical activity in youth. *The Surgeon General's Report on Physical Activity and Health* (U.S. Department of Health and Human Services, 1996) also highlighted the need for additional work on determinants of activity at various developmental transitions. Despite the acknowledged importance of age-related differences in activity behavior, few models of exercise behavior specifically focus on children. Most studies on this age group have applied models that were developed in adults, with the assumption that they would also prove effective for youth (Brustad, 1998; Gould, 1996). While elements of these models may apply, it is premature to assume that youth and adults are influenced in the same way.

To better understand and promote physical activity among youth, we need to develop and test models that specifically account for the developmental, psychological, and behavioral characteristics that distinguish them from adults (Council for Physical Education for Children, 1998). One major distinction is their capacity for abstract thought. According to Piaget (1952), children do not develop adult-like capacity for abstract thought and reason until age 11–14. This explains children's inability to delay gratification in pursuit of some future, less tangible benefit, like health or fitness. Children also have a lower capacity for informational processing (Thomas, Thomas, & Gallagher, 1993). Brustad (1998) pointed out that children cannot accurately distinguish between effort and ability as causes of specific achievement outcomes. They also rely more heavily on parents and peers for their values and beliefs (Horn & Hasbrook, 1987). Children are clearly motivated and influenced in different ways than adults, and these differences must be considered in efforts to better understand their behavior.

The goal of this paper is to summarize the research on determinants and activity promotion in youth and advance a simple conceptual framework to facilitate the promotion of physical activity in this age group. The goal is not to provide a new view of physical activity behavior but rather to synthesize existing research into a more usable, heuristic model—one that can hopefully help bridge the gap between theory and practice and serve as a starting point for connecting some of the known determinants and influences on physical activity behavior in youth.

For the purpose of the present manuscript, *youth* refers to school-age (elementary, middle, and secondary) children and adolescents. Rather than creating separate models for children and adolescents, potential maturational differences in activity behavior between children and adolescents are described using a single model.

Development of the Youth Physical Activity Promotion Model

Explanations of exercise behavior are profoundly influenced by prevailing philosophies in psychology and perspectives regarding potential influences. Intrapersonal theories reflect the belief that the root of behavior lies primarily within an individual's control. Interpersonal theories, such as Bandura's (1986) social cognitive theory, take a broader view and suggest that behavior is influenced by reciprocal relationships between an individual and the social and physical

environments. Recently, researchers have shown interest in even broader social-ecological approaches to understanding exercise behavior (Sallis & Owen, 1997; Stokols, 1992). This framework suggests that multiple levels of environmental influence (e.g., social, cultural, physical, institutional) can directly and indirectly influence behavior. This framework is advantageous in that it acknowledges that self-regulation is difficult to establish without broader social and institutional support (Dzewaltowski, 1997).

In accordance with this ecological view, the youth physical activity promotion (YPAP) model provides a broad perspective on the factors that influence physical activity behavior in children. The model utilizes aspects of Green and Kreuter's (1991) Precede-Proceed health promotion planning model as an organizational framework. This model was developed to provide guidelines for establishing health education programs for a variety of different behaviors. An advantage of this model is that it advocates a "bottom-up" approach to program planning rather than a "top-down" perspective. With this approach, a given population's specific characteristics and needs are considered prior to establishing the program. Thus, it is well suited to developing a youth-specific activity model. An additional advantage of this framework is that it accepts multiple theoretical perspectives. A variety of factors may influence a given behavior, but some theoretical approaches may offer intervention targets that are more effective than others. As described by Gielen and McDonald (1997), the Precede-Proceed model provides the road map, while theories identify the most efficient route to a specific destination.

To facilitate the planning process, the Precede-Proceed model outlines a series of steps that should be followed. The first step is a behavioral and environmental diagnosis to identify the primary determinants of the given behavior. The second step is an educational and organizational diagnosis for classifying the determinants into factors that predispose, enable, or reinforce the given behavior and then weighting them based on their relative importance and potential for change. The last step is an administrative and policy diagnosis in which intervention approaches are planned based on available resources and potential barriers. Thus, this approach allows us to characterize a variety of influences into a conceptual framework that can then be used to guide interventions and programs. Keeping with the spirit of this planning model, the same approach was used to develop and describe the YPAP model.

Behavioral and Environmental Diagnosis

The primary objective of this stage is to identify the common determinants of physical activity among youth. Several issues have complicated this area of research. First, assessments of children's physical activity are much more difficult than those for adults due to limited recall and more sporadic activity patterns. Without accurate measures of physical activity, identifying the important determinants (correlates) of this behavior is difficult. Second, fewer validated instruments of potential determinants are suitable for research with youth. In many cases, instruments that are effective in adults are reworded and assumed to be valid among children and adolescents (Brustad, 1991, 1998). Last, little is known about potential developmental differences in determinants with age. The majority of work in the area has been done with older children and adolescents, but activity determinants for younger children may be considerably different.

As mentioned, the predominant framework for research on determinants has been social cognitive theory. Because of this, constructs based on this theory are emphasized in the literature. Other studies have employed mixed social learning models or alternative frameworks and have often reached different conclusions. Because research results and interpretations depend on the choice and quality of measures, an attempt has been made to categorize studies into their predominant theoretical framework.

Social-Cognitive Theoretical Approaches

Using social cognitive theory as a basis, Trost et al. (1997) examined various demographic, psychosocial, and environmental variables as potential determinants of physical activity behavior in fifth-grade children. The psychosocial category included three different dimensions of self-efficacy (support seeking, overcoming barriers, and competing activities), social influences, and beliefs about activity outcomes. The environmental category included access to programs, equipment, like or dislike of physical education, and parental activity behaviors. For boys, the strongest predictors of physical activity (both vigorous and moderately vigorous) were self-efficacy (overcoming barriers), beliefs about activity, social influences, and involvement in community programs. For girls, self-efficacy, community programs, race, and enjoyment of PE were significant predictors. The same group (Pate et al., 1997) performed a different analysis with the same general population and measures. Confidence in overcoming barriers (self-efficacy) was important for both boys and girls, but the barriers were different for each group. Boys reported that weather was the most significant barrier, whereas girls indicated that time constraints due to homework were more problematic. Using a similar social learning approach, Zakarian, Hovell, Hofstetter, Sallis, and Keating (1994) examined social, cognitive, and physiological/demographic correlates of activity behavior among low socioeconomic status (SES), minority adolescents (grade 9–11). The social category included modeling and support measures for parents, friends, teachers, and coaches. The cognitive category included perceived barriers, benefits, and self-efficacy as well as several environmental variables (facilities and safe neighborhood). Among males, school year, self-efficacy, friend support, benefits, and cigarette use were predictive of activity outside physical education. Among females, the significant predictors were school year, self-efficacy, perceived barriers, family support, and unfavorable attitudes toward physical education. These studies collectively support the basic premises of social cognitive theory: Personal, social, and environmental variables were all found to influence behavior.

Expectancy-Value Based Approaches

The theory of reasoned action and theory of planned behavior (Ajzen, 1985) both suggest that an individual's attitude toward activity and perception of social norm determines subsequent intentions to perform that activity. Reynolds et al. (1990) tested components of the theory of reasoned action among tenth-grade students. After controlling for baseline physical activity and body mass index (BMI), significant relationships with physical activity were found for intentions, self-efficacy, and direct social influence. Craig, Goldberg, and Dietz (1996) applied the theory of planned behavior to study psychosocial correlates of physical activity among youth in grade 5–8 and found that domains of perceived behavioral control

and attitude predicted exercise intentions. Perceptions of competence, safe access to facilities, parental encouragement, and interest in activity were the most important control variables influencing a child's perception of behavioral control. Variables such as cost, time, lack of equipment, and injury were not found to be important determinants in this study.

Mixed Social-Learning Approaches

Garcia et al. (1995) employed an extension of social cognitive theory—the health promotion model—to study activity behaviors among youth in grade 5–8. This model highlights three domains of influence on health-promoting behaviors: background (self-esteem and demographics), health-related (perceptions of health) and behavior-specific factors (cognitions, past behavior, and interpersonal and situational variables). Gender, a benefit-barrier differential, and access to programs/facilities were the only significant predictors of exercise behavior in these analyses. Additional analyses suggested that the effects of variables such as self-efficacy, social support, and social norms might be mediated through the benefits/barriers differential. Other studies have employed mixed social learning models to explore activity behaviors among elementary- (Stucky-Ropp & DiLorenzo, 1993) and middle-school students (Ferguson, Yesalis, Pomrehn, & Kirkpatrick, 1989). In Stucky-Ropp and DiLorenzo's (1993) study, boys' significant predictors were enjoyment, friend and family support, and mother's perceived barriers or support for exercise. Girls were influenced by enjoyment, exercise-related equipment, parental modeling, and mother's perceived barriers. In Ferguson et al.'s combined gender analysis, perceived benefits, self-esteem, and attitudes toward physical education directly influenced exercise intentions. Intent, outside sports activities, perceived benefits, gender, and attitudes toward physical education directly influenced physical activity.

Biddle and colleagues have also explored psychosocial determinants of activity in children (age 11–12) from several mixed-model approaches. From a motivational perspective, Biddle and Armstrong (1992) found that intrinsic motivation was related to physical activity participation in boys but not girls. Active and inactive girls had varied perceptions of physical self-concept (perceived body attractiveness, physical self-worth, and self-esteem). However, this cannot be considered causal. Adopting a socialization perspective, Biddle and Goudas (1996) reported that strenuous physical activity was associated with degree of adult encouragement, perceived sports competence, and intentions among 13- and 14-year-old youth. Adult encouragement was also related to intentions, which implies that youth activity behaviors were influenced both directly and indirectly through parental feedback.

Summary of Determinants

The determinants of physical activity most commonly reported in recent studies are summarized in Table 1. To facilitate comparisons with previous reviews (e.g., Sallis et al., 1992; Taylor & Sallis, 1997), determinants were grouped into the most commonly accepted categories (i.e., personal, biological psychological, social, and environmental). As Sallis et al. (1992) noted, the term *determinants* should be more appropriately defined as *correlates*. High correlations between two variables reveal potential relationships between measures but do not indicate the direction of causality.

Table 1 Categorical Breakdown of Common Determinants of Physical Activity in Boys and Girls

| Category of determinants | Boys | Girls | Combined |
|---------------------------------|-----------------|-----------------|------------------|
| Demographic characteristics | | | |
| Age | Zakarian | Zakarian | |
| Cigarettes | Zakarian | | |
| Alcohol | | Zakarian | |
| Gender | | | Ferguson |
| Biological characteristics | | | |
| BMI | | Zakarian | |
| Psychological characteristics | | | |
| Perceptions of competence | Craig, Biddle | | Biddle, Craig |
| Self-efficacy (barriers) | Trost, Zakarian | Trost | |
| Beliefs about activity | Trost | | |
| Interest/benefits of activity | Craig, Zakarian | | Craig, Ferguson |
| Benefits-barriers differential | | | Garcia |
| Enjoyment of PA | Stucky-Ropp | Stucky-Ropp | |
| Enjoyment of PE or lack of | | Trost, Zakarian | Ferguson |
| Intentions | | | Biddle, Ferguson |
| Social/cultural characteristics | | | |
| Parental encouragement | | | Biddle, Craig |
| Parental modeling | | Stucky-Ropp | |
| Friend and family support | Stucky-Ropp | Zakarian | |
| Social influences | Trost | | |
| Parental barriers | Stucky-Ropp | Stucky-Ropp | |
| Parental social support | Stucky-Ropp | Stucky-Ropp | |
| Environmental characteristics | | | |
| Access to facilities | | | Craig, Garcia |
| Community programs | Trost | Trost | Garcia |
| Time outdoors | | | Ferguson |
| Exercise equipment | | Stucky-Ropp | |

Note. Lead authors were used to delineate the studies. Please refer to references for complete citations.

Several conclusions are apparent from this analysis. First, physical activity determinants in youth, like adults, are clearly multifactorial. There were significant determinants in each major category, with most studies reporting relationships in at least three of the five categories. Second, differences in instruments and theoretical orientations influence how various determinants are operationalized. For example, parental influence was examined in most studies but was alternatively operationalized as parental modeling, parental encouragement, family support, and parental barriers. While conceptual differences exist between some of these

constructs, there is likely considerable overlap in the nature of these measures. In Stucky-Ropp et al.'s (1993) study, parental modeling was measured as the amount of time parents exercise with their child; however, this could also be viewed as a form of parental encouragement. Several constructs were also used to assess environmental variables. Access to facilities (Craig, Goldberg, & Dietz, 1996), programs (Trost et al., 1997), and equipment (Stucky-Ropp & DiLorenzo, 1993) were each cited independently as important predictors. All three are most likely important and distinct, but most researchers made little distinction between types of environmental variables.

Self-efficacy was studied most frequently, but results were inconsistent. Several (Trost et al., 1997; Zakarian, Hovell, Hofstetter, Sallis, & Keating, 1994) though not all studies (Ferguson, Yesalis, Pomrehn, & Kirkpatrick, 1989; Stucky-Ropp et al., 1993) found it to be a significant predictor. Part of this discrepancy may lie in how the variables were operationalized or defined. True self-efficacy, which Bandura (1997) referred to as *perceived self-efficacy*, is defined as "beliefs in one's capabilities to organize and execute the courses of action required to produce given attainments" (p. 3). However, for familiar activities that must be performed regularly to achieve desired results, Bandura suggested that *self-regulatory efficacy* becomes more salient. DuCharme and Brawley (1995) identified a variant of this, namely, *barriers self-efficacy*, and viewed it as "confidence in overcoming barriers." If self-efficacy is operationalized as barriers efficacy, it may not predict activity because children may not be in control of some of the commonly cited barriers. For example, parents often dictate the activities that children pursue through their own behaviors (e.g., willingness to drive children to parks) or rules (e.g., allowing them to play outside). Thus, some of the discrepant findings may be explained by differences in the way that questions are operationalized or measured.

Overall, the most commonly identified determinants were self-efficacy/perceived competence, enjoyment, some degree of parental influence, and access to programs and equipment. These determinants are further clarified in the following section.

Educational and Organizational Diagnosis

The primary goal of the educational and organizational diagnosis is to classify the various determinants into factors that predispose, reinforce, or enable physical activity behavior. Because the model is intended to guide promotional efforts, this classification emphasizes those determinants that are most likely causally related to activity and more amenable to change. To facilitate subsequent research and promotional efforts, potential links between some of the factors have been proposed (see Figure 1).

Predisposing Factors

Predisposing factors include variables that collectively increase the likelihood that a person will be physically active on a regular basis. As Godin (1994) pointed out in a recent review, most theoretical models have focused on capturing the essence of predisposing elements that govern exercise behavior. Therefore, synthesizing the existing literature on exercise behavior provides the most logical approach for categorizing determinants into this category.

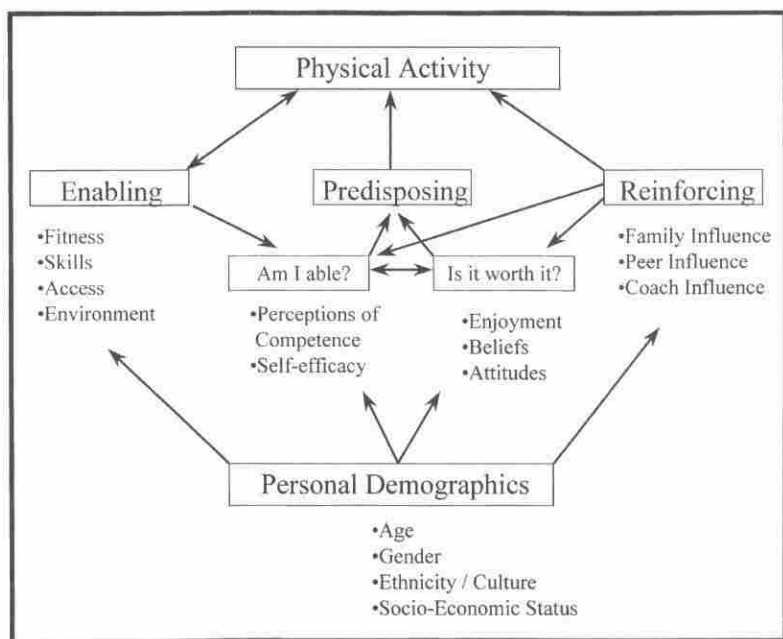


Figure 1—A conceptual diagram of the Youth Physical Activity Promotion Model.

With a few exceptions, most current theories of exercise behavior can be broadly classified into two primary rubrics: social-learning and motivational theories. Social-learning approaches, such as social cognitive theory, suggest that activity behaviors are primarily influenced by the interaction between a person's attitude, the social norm, and surrounding influences. Motivational theories take a more emotional focus and explain what drives a person to participate or maintain interest in a volitional behavior, such as physical activity. While both sets of theories have different philosophical approaches, they share some common elements.

The most notable similarity is the importance of some self-evaluative construct. Depending on the theoretical approach, this has been referred to as *self-efficacy* (Bandura, 1986), *perceived competence* (Deci & Ryan, 1985; Harter, 1978), *perceived behavioral control* (Ajzen, 1985), and *facilitating conditions* (Triandis, 1977). In general, this construct reflects a person's perceived degree of control over personal behavior. While there are important theoretical differences among the various measures, there is general consensus regarding the importance of this self-evaluative construct.

Another similarity is a cognitive assessment of perceived outcomes. For example, most social-learning theories are based on an expectancy-value framework in which behavior is thought to be determined by expected outcomes and the value that is placed on them. Others have operationalized this construct as a cost/benefit or barriers/benefits assessment. Recent studies using the transtheoretical model provide strong support for the importance of this benefit-cost assessment in adults. While youth will possess different views regarding the benefits and costs of participating in physical activity, the decision-balance construct remains salient.

Because these themes are so consistent in various models, exercise behavior is likely influenced to some degree by both principles. Different theoretical frameworks may embellish certain aspects of the decision-making process (Godin, 1994), but most include some self-evaluative construct and some type of decision-balance relationship. Fox (1991) provided a conceptualization of exercise behavior that unites these themes. This model essentially reduces physical activity behavior into two fundamental questions: *Is it worth it?* and *Am I able?* The first question addresses the benefits and costs of participating in physical activity and includes cognitive and affective components. The second question addresses perceived competence. Individuals can value physical activity but will not persist in it unless they feel capable of competently performing the activity. Thus, youth who can answer *yes* to both questions will likely possess an "active identity" and be predisposed to an active lifestyle.

This particular view of predisposing factors was selected for the present model because it incorporates elements of various interpersonal theories without being specifically tied to any one approach. The didactic nature of the questions also permits categorizing the psychological determinants (see Table 1) into two related but distinct categories. The first component (*Is it worth it?*) would include both cognitive (attitudes, perceived benefits, and beliefs about physical activity) and affective (enjoyment of physical education/physical activity and interest in physical activity) variables. The second component (*Am I able?*) would include variables such as perceived competence, self-efficacy, and physical self-worth. Because children usually value what they are good at doing and pursue things that they value, we would expect strong links between the two dimensions.

Reinforcing Factors

Reinforcing factors include variables that reinforce a child's physical activity behavior. This domain includes determinants primarily from the social/family category in Table 1. The determinants literature has emphasized parent and peer influence, but coaches likely play a major role in reinforcing physical activity among children and adolescents.

Reinforcing factors are an important influence on youth activity behaviors, but the mechanisms through which this effect is transmitted are not well understood. Numerous studies have documented that children of active parents are often more active themselves (Freedson & Evenson, 1991; Moore et al., 1991; Sallis, Patterson, McKenzie, & Nader, 1988). The general assumption has been that role modeling is a primary influence. However, recent research (Brustad, 1996; Dempsey, Kimiecik, & Horn, 1993; Kimiecik, Horn, & Shurin, 1996; Kimiecik, & Horn, 1998) suggests that socialization forces may be more significant. For example, Brustad (1996) found that parental encouragement of physical activity, but not role modeling, was significantly related to perceived competence and general attraction to physical activity. Similarly, Kimiecik et al. (1998) found no links between parents' and children's levels of exercise behavior, but significant ties were identified between parental beliefs (perception of child's competence and overall task orientation) and children's physical activity participation. Based on these findings, it seems that other socialization forces may play a more significant role in this process.

In the model presented here, reinforcing factors influence a child's physical activity behavior directly and indirectly. The direct effect results from parents

actively facilitating their child's participation (e.g., driving their child to sports practice or pursuing active family activities) or from parents', peers', or coaches' direct encouragement to be active. The indirect effects stem from forces that shape a child's predisposition to physical activity. Kimiecik and colleagues' (1996, 1998) work provides empirical support for a path through the *Is it worth it?* dimension. They observed links between parental and child beliefs and between child beliefs and behaviors but not between parental beliefs and child behaviors. That is, parents were influential in shaping their child's activity behaviors only to the extent that the child adopted the same belief system.

There is also evidence of an indirect path through the *Am I able?* dimension. Biddle and Goudas (1996) reported that adult encouragement predicted vigorous activity indirectly through an enhanced perception of competence. This indirect path is also well supported by extensive literature on sources of physical competence information. Several studies (e.g., Horn et al., 1987; Weiss, Ebbeck, & Horn, 1997) confirm that young children rely heavily on adults (especially parents) as sources of information regarding their physical abilities. As children mature, they undergo a developmental shift in their preference for sources of competence information. At this stage, peer influence (Weiss, Smith, & Theeboom, 1996) and internal standards of comparison are emphasized (Weiss et al., 1996). More work is needed to clarify the mechanisms involved in these pathways. However, reinforcing factors clearly play a major role in shaping a child's predisposition toward physical activity.

Enabling Factors

Enabling factors include variables that allow youth to be physically active. Conceptually, this domain would include determinants from both the environmental and biological categories. As described, environmental attributes, such as access to equipment, parks, and programs, are frequently identified as important determinants (see Table 1). Sallis et al. (1993) reported that availability of play spaces was significantly related to children's physical activity levels. Trost et al. (1997) concluded that access to physical activity programs was one of the strongest predictors of physical activity in rural youth. Other environmental variables, such as good weather, presence of sidewalks, or safety, may also influence physical activity among children and adolescents. Collectively, these variables are viewed as enabling factors in the present model because they are necessary but not sufficient determinants of physical activity. Youth that have access may not make use of their resources, but without it they do not even have that opportunity. Because of this relationship, environmental/access variables are thought to directly affect physical activity (see Figure 1).

Biological factors, such as physical skills, fitness, and body fat, are also considered enabling factors. While few studies from Table 1 addressed the impact of biological factors, these variables can influence activity behavior. Youth who are physically fit and skilled are more likely to seek out opportunities to be active and will most likely persist, whereas children with poor fitness and skills are less likely to achieve the same level of success. While direct effects of biological factors on activity behavior are possible, indirect effects through the child's perception of competence (*Am I able?*) are perhaps more likely.

This proposed indirect path is well supported by an extensive base of literature on physical self-concept (Fox, 1997). The psychological model for physical

activity participation (Sonstroem, 1978) provided the base for this notion. Sonstroem theorized that physical activity will improve physical abilities (fitness and skill), which will enhance a person's estimation and subsequent attraction to physical activity. Subsequent research by multiple groups (Fox, Corbin, & Coudry, 1985; Fox & Corbin, 1989; Page, Ashford, Fox, & Biddle, 1993; Sonstroem, Speliotis, & Fava, 1992; Welk, Corbin, & Lewis, 1995) confirmed that physical self-concepts are important predictors of perceived competence and self-efficacy as well as physical activity participation. With respect to competence, evidence shows that children's perceptions may be more important than actual ability. Thus, the extensive literature on physical self-concept fits conceptually within the proposed links of the present model.

Demographics

A demographic factor is not present in the original Precede-Proceed model because one of its basic premises is individualizing a program based on the given population's needs. Most other theoretical models acknowledge the importance of individual differences as an influence on behavior. Because the model presented here provides a more generalized view of activity behavior, a demographic factor was included. Such factors are placed at the base of the YPAP model because they directly influence how a particular individual will assimilate various influences.

The review of determinants in Table 1 revealed gender differences for each primary domain (predisposing, enabling, and reinforcing). Differences in these determinants can potentially account for the documented gender differences in the amount and type of activity performed by girls and boys (Myers et al., 1996). Trost et al. (1996) examined causes of gender differences in physical activity by examining the prediction of activity with and without adjustments for various determinants. They reported that adjusting for access to community programs (enabling) and self-efficacy (predisposing) reduced gender differences in boys' and girls' activity, implying that boys may be more active than girls due to greater confidence and access. Biddle and Armstrong (1992) also reported differences in various determinants between boys and girls. In this study, correlations between intrinsic motivation (predisposing) and physical activity were positive for boys but negative for girls. This suggests that boys have a more intrinsic drive toward physical activity, whereas girls may depend on extrinsic incentives. Moreover, girls may need direct reinforcement to develop or maintain interest. Therefore, differences in activity levels between boys and girls may stem from major differences in predisposing, reinforcing, and enabling factors.

Age can also influence attitudes toward and participation in physical activity. Garcia et al. (1995) reported several Gender by Age interactions, which suggest that development and maturation may affect boys and girls differently. In particular, adolescent girls were less likely to have positive decision-balance scores (*Is it worth it?*) compared to younger females, whereas adolescent boys were more likely than younger males to have positive scores. Similar but nonsignificant relationships were also observed for self-efficacy. Thus, the steeper declines in girls' participation in physical activity may stem from different maturational outcomes. Brustad (1996) suggested that gender differences in physical activity may stem from differential reinforcement and modeling from parents.

In addition to these demographic differences, evidence indicates considerable cultural and interindividual differences in male and female developmental

orientations toward physical activity. Weiss et al. (1997) identified differences in children's sources of competence information. Children with high perceived competence generally relied on internal (social comparisons) and external (parental feedback) information to judge their own competence. Individuals with lower perceived competence displayed varying preferences for information sources depending on age and other psychological factors. This study supports Horn and Hasbrook's (1987) work and suggests that children differ in the information sources they use to evaluate their competence.

To improve our understanding of physical activity behavior in youth, we must acknowledge the potential interactions created by different demographic and interindividual influences on behavior. The model presented above incorporates this concept by indicating that demographic variables can influence each major component. While specific models for various subpopulations are desirable, lack of additional data prevents making any specific delineations at this time.

Administrative and Policy Diagnosis

The purpose of the administrative and policy diagnosis is to develop and refine intervention or promotional strategies that are most likely to be effective based on the existing diagnostic stages and relevant resources/barriers. The paths proposed in the model suggest some specific promotional opportunities. Consistent with other behavioral models (Godin, 1994), the central influence on activity behavior is from the predisposing factors. To promote activity among youth, efforts should emphasize perceptions of competence (*I am able*) and a general attraction to physical activity (*It is worth it*). Promotional opportunities are also available through enabling and reinforcing factors because these can exert both direct and indirect effects.

To most effectively promote activity in children, efforts are needed to develop comprehensive, community-based initiatives that address each link in the model. This type of comprehensive, community-wide approach is consistent with the social-ecological framework on which this model is based. Collaborative efforts are also highlighted in the Centers for Disease Control's (1997) *Guidelines for School and Community Physical Activity Programs*. Specifically, the guidelines recommend that physical activity be promoted through a coordinated school health program, with links established between the school, family, and community. Such ties must be specifically developed for each community, but the proposed model suggests mechanisms to explain how they collectively influence physical activity behavior in children. Key promotional issues for school, family, and community programs are described in the following section.

Physical Education

Physical education has been recognized as an optimal vehicle for influencing physical activity habits among youth. It provides an existing organizational structure and opportunities to reach nearly all school-age children. With respect to the model presented above, physical education plays a primary role in influencing the enabling and predisposing factors. Most schools recognize this responsibility and have written goals or objectives for activity, fitness, skills, attitudes, and knowledge (Collins et al., 1995). Pursuing these goals is advocated, but the dimensions that specifically underlie a child's predisposition to physical activity should be

emphasized, namely, perceptions of competence and enjoyment of activity (Whitehead and Corbin, 1997). The Council for Physical Education for Children (1998) guidelines are a valuable resource for ensuring that physical activities are developmentally appropriate for children.

An important point with respect to the physical education curriculum is the need for a vertically oriented program in which skills and competencies build through each grade level (Corbin, 1994). At a young age, children need to master a variety of physical skills to participate in different physical activities. With a broader repertoire of physical skills, children will have a greater chance of finding activities that they can do well and enjoy. During adolescence (middle to high school), behavioral skills (self-monitoring, self-reinforcement, and program planning) that will promote lifelong patterns of physical activity should be emphasized (Pate & Hohn, 1994). Thus, the type of training (enabling factors) changes, but the need for physical education skills remains consistent. This objective is readily apparent in the National Association for Sport and Physical Education (1995) guidelines, which provide hierarchical content standards for grades K-12.

Family Influence

The documented aggregation of physical activity habits within families suggests that they play an important role in shaping a child's activity habits. Instigators of many school-based activity interventions have realized this potential and included components to impact the family environment or modify family behaviors (Hopper, Gruber, Munoz, & MacConnie, 1996; Nader et al., 1996). Unfortunately, these studies have generally reported little impact from the parental components of the interventions. The model presented above suggests that families influence physical activity in children primarily through reinforcing factors; however, in most interventions, the direct forms of reinforcement (e.g., taking children to parks, exercising with them) have been primarily emphasized. While these direct effects are important, the proposed model suggests that parents also influence children's behavior indirectly through predisposing factors. Socialization variables, such as parental encouragement, play an especially important role (Brustad, 1996). To increase the success of parental interventions, additional research is needed to clarify the nature of parental socialization influence and identify the most effective ways to promote it. Efforts are also needed to clarify the nature of peer influence and identify developmental transitions where this may become more important.

Community Programs

Community programs reach a large segment of the population in a cost-effective manner and provide opportunities to promote activity among children. From this perspective, these programs primarily influence enabling and predisposing factors. To improve youth activity promotion, access to facilities and programs for all children should be improved, including sport and nonsport activities as well as bike paths or parks and playgrounds, which enable more children to be physically active. Existing community programs may also require modifications since the environment of most competitive sports programs promotes peer comparison and inhibits the self-mastery concept generally recommended for youth physical activity promotion (Black & Weiss, 1992; Weiss et al., 1996; Whitehead & Corbin, 1997). Community sport and recreation programs should help youth

monitor individual improvement and mastery rather than focusing purely on the outcome. This would help children build higher competence levels and encourage them to pursue other opportunities to be active.

At the community level, there is also a need for more innovative after-school programs. Because most children today come from families with two working parents, they may be unable to participate during after-school hours. Innovative programming at community centers, schools, or daycare centers can create opportunities for children to be active after school.

Summary

The implicit goal of youth fitness promotion is to increase the probability that youth will adopt a physically active lifestyle and maintain a regular habit of physical activity into adulthood. From a developmental perspective, most children start out with a physically active identity, as evidenced by the ease and willingness with which they run and play when given a chance. As they age, sociological, cultural, and personal forces develop, and physical activity becomes more of a choice among multiple options. Some youth maintain their interest and involvement; others begin withdrawing from physical activities. Because most recent data support the idea that physical activity tracks in the lifespan (Malina, 1996; Pate, Baranowski, Dowda, & Trost, 1996), it is important to clarify the factors that influence a child's likelihood of being physically active.

The model presented above provides a conceptual framework for understanding the factors that may predispose, enable, and reinforce a child to be physically active. The model most closely reflects the general principles of a social-ecological models of behavior as described by Sallis et al. (1997). It includes multiple dimensions of influence (intrapersonal, sociocultural, and environmental) and postulates interactions among the various factors. The model also includes multiple levels of environmental effects and proposes that these can directly influence physical activity behavior. Last, the model is behavior (and population) specific. Although some of its elements may apply to adults, the proposed model was developed specifically for children and youth.

The model is also consistent with the social-ecological perspective that supports including multiple theoretical approaches. In this model, predisposing factors are based on the general precepts of social cognitive theory, which describes reciprocal relationships proposed between an individual, the environment, and behavior. Elements included in the predisposing factors reflect constructs from the individual domain, whereas proposed links from the enabling and reinforcing factors reflect the physical and social aspects of the environmental domain, respectively. Socialization behavior models (Dempsey et al., 1993; Eccles & Harold, 1991) may be helpful in understanding the mechanisms through which parents influence their children. Competence motivation theory (Harter, 1978) and models of physical self-perception (Fox et al., 1989; Sonstroem, 1978) may facilitate understanding how children develop perceptions of competence regarding physical activity. Because various constructs can be included within the primary domains of the model (predisposing, reinforcing, and enabling), this framework welcomes related constructs from different theoretical approaches. This would allow the structures and links among variables to be compared across different, perhaps competing, theoretical frameworks.

On a practical note, an additional advantage of the youth physical activity promotion model is its inherent simplicity. The conceptual links provide ways to integrate potential influences from school, family, and community interventions into a single model of activity behavior for children. In recent years, there has been a tendency to overspecify models to improve the prediction of isolated cases. Once a model becomes so complex that it cannot be easily applied or disseminated, it loses some of its inherent value. As Green et al. (1994) pointed out, "theory must strive for a level of abstraction that generalizes beyond the specific case, and a level of simplification that achieves efficiency of explanation without distortion" (p. 398). Hopefully, this paper will open lines of communication between scientists, fitness professionals, and physical educators and permit better application of our science to promoting physical activity among children.

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