CHAPTER 6

SELF-EFFICACY, ADOLESCENTS' RISK-TAKING BEHAVIORS, AND HEALTH

Ralf Schwarzer and Aleksandra Luszczynska

Perceived self-efficacy makes a difference in how people feel, think, and act (Bandura 1997). Thus, it is reasonable that self-efficacy also governs health behaviors. The role that self-beliefs play in the realm of health behaviors, health outcomes, and health care has been the object of many studies, and the construct of self-efficacy has sparked a great deal of valuable research in health psychology. This construct is of particular value when the aim is to predict whether people engage in healthy behaviors or avoid risky ones. We will commence with providing a brief definition of health behaviors and discuss the specificity of health behaviors in adolescence compared to other periods across the life span. We will provide an overview of health behavior theories and will then proceed to review the evidence reported in empirical studies conducted with adolescents.

HEALTH BEHAVIORS ACROSS THE LIFE SPAN

Health behaviors can be defined as actions and habits that are related to health maintenance, restoration, and improvement. Health-compromis-

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ing behaviors refer to lack of physical activity, unhealthy diet, substance use, risky sexual behaviors (e.g., unprotected intercourse) or nonadherence to medication or to a therapeutic regimen among individuals with chronic or acute illness. Health-promoting behaviors include dental hygiene, regular physical activity, healthy nutrition, safe sex practices, adherence to medication, and many others.

Various health behaviors such as smoking, alcohol use, and condom use are usually initiated during the developmental periods of adolescence or childhood. Child and adolescent behavior may predict health behaviors and health status in early adulthood. A study of 1000 individuals assessed at regular intervals from age 5 to age 26 revealed that viewing television during childhood and early adolescence predicts body mass index, cardiorespiratory fitness, serum cholesterol, and smoking status at the age of 26 (Hancox, Milne, & Poulton, 2004).

Adolescents differ from adults or seniors in some health behaviors (in particular in physical activity), although for most health behaviors the differences are not very salient (see Pronk et al., 2004). Adolescents meet recommendations regarding physical activity (59%) more frequently than do adults (39%) or seniors (41%). Regarding other health behaviors, there may be no major difference between adolescents and adults or seniors. Approximately 91% of adolescents, 85% of adults, and 93% of seniors meet the recommendations regarding no smoking, and 64% of adolescents, 64% of adults, and 80% of seniors adhere to a healthy diet. Rates of condom use among adolescents and young adults are similar (Siegel, Klein, & Roghmann, 1999). Some health behaviors, such as smoking, may vary to a higher degree within adolescence than across the life span. Among smokers, adolescents in Grade 7 smoke less intensely than do adolescents in Grade 10 (Wills, Resko, Ainette, & Mendoza, 2004). Among 2,387 high school students from Poland, Turkey, and the United States, self-efficacy was found unrelated to age. Across countries, physical activity of adolescents is predicted by age, whereas nutrition is unrelated to age (Luszczynska, Gibbons, Piko, & Tekozel, 2004).

PERCEIVED SELF-EFFICACY IN HEALTH BEHAVIOR CHANGE: BRIEF OVERVIEW OF THEORIES

In this chapter, we examine the role that self-efficacy plays in the process of health behavior change. Self-efficacy instigates the adoption, initiation, and maintenance of health-promoting behaviors. The most prominent theories of health behavior change—such as the Theory of Planned Behavior (TPB), Social Cognitive Theory (SCT), the Transtheoretical

Model (TTM), and the Health Action Process Approach (HAPA)—include a variety of cognitions that either directly or indirectly influence health behaviors.

According to the *Theory of Planned Behavior* (Ajzen, 1991), intention is the most proximal predictor of behavior. Cognitions that affect a specific intention are (a) *attitude toward the behavior* (evaluation of performing the behavior), (b) *subjective norm* (the extent to which a person believes that significant others would want the individual to perform a behavior), and (c) *perceived behavioral control* (perception about being able to perform a specific behavior). Self-efficacy and behavioral control are seen as nearly synonymous constructs.

According to social cognitive theory (Bandura, 1997), personal sense of control facilitates a change of health behavior. Self-efficacy pertains to a sense of control over one's environment and behavior. Self-efficacy beliefs are cognitions that determine whether health behavior change will be initiated, how much effort will be expended, and how long it will be sustained in the face of obstacles and failures (Schwarzer, 2001). Self-efficacy influences the effort one puts forth to change risk behavior and the persistence to continue striving despite barriers and setbacks that may undermine motivation. Self-efficacy is directly related to health behavior, but it also affects health behaviors indirectly through its impact on goals. Self-efficacy influences the challenges that people take on as well as how high they set their goals (e.g., "I intend to reduce my smoking" or "I intend to quit smoking altogether"). Individuals with strong self-efficacy select more challenging and ambitious goals (DeVellis & DeVellis, 2000). They focus on opportunities, not on obstacles (e.g., "At my university there is a smoking ban, anyway," instead of "There are still a lot of ashtrays at my university.").

The Transtheoretical Model (Prochaska, DiClemente, & Norcross, 1992) proposes five *stages of change*. The first one is the pre-contemplation stage, in which individuals consider changing a specific health behavior, but they have not yet decided to make any changes. In the preparation stage, they prepare to change the behavior. In the action stage, a new goal behavior is initiated. When the action is performed for a longer time period, the maintenance stage is reached (Prochaska et al., 1992). A sixth stage is sometimes mentioned, the termination stage, in which individuals no longer experience any temptation to revert to their old habits. According to the TTM, self-efficacy and perceived positive ("pros") and negative ("cons") outcomes are seen as the main social-cognitive variables that change across the stages. Self-efficacy is typically low in early stages and increases when individuals move on to the later stages.

Health Action Process Approach (Schwarzer, 2001) applies to all health behaviors, paying particular attention to post-intentional mechanisms. HAPA theorists argue for a distinction between (a) pre-intentional motivation processes that lead to a behavioral intention and (b) post-intentional volition processes that lead to actual health behavior. Within both phases, different patterns of social-cognitive predictors may emerge.

In the initial *motivation phase*, a person develops an intention to act. In this phase, risk perception ("I have a high risk of suffering from diabetes because of my body weight") is merely seen as a distal antecedent within the motivation phase. Risk perception in itself is not enough to entice a person to form an intention. Rather, it sets the stage for a contemplation process and further elaboration about consequences and competencies. Similarly, outcome expectancies ("If I eat healthful foods, I will reduce my weight") are chiefly seen as being important in the motivation phase, when a person balances the pros and cons of the consequences of a certain behavior. Further, one needs to believe in one's capability to perform a desired action ("I am capable of initiating a healthier diet in spite of temptations"), otherwise one will fail to initiate that action. Outcome expectancies operate in concert with perceived self-efficacy, both of which contribute substantially to the formation of an intention.

In the subsequent *adherence phase*, after a person has developed an inclination toward adopting a particular health behavior, the "good intention" has to be transformed into detailed instructions on how to perform the desired action. These plans, which specify the *when, where*, and *how* of a desired action, carry the structure of "When situation *S* arises, I will perform response *R*." Thus, a global intention can be specified by a set of subordinate intentions and action plans that contain algorithms of action sequences. The adherence phase (also called the volition phase) is strongly affected by self-efficacy. The number and quality of action plans depend on one's perceived competence and experience. Self-efficacy influences the cognitive construction of specific action plans, such as visualizing scenarios that may guide goal attainment. The adherence phase includes the processes of taking initiative, maintaining behavior change, and managing relapse. Self-efficacy beliefs may be specific to these processes (see Luszczynska & Schwarzer, 2003; Marlatt, Baer, & Quigley, 1995).

As seen in the examples above, most prominent health behavior theories include self-efficacy (or similar constructs). Self-efficacy is a proximal and direct predictor of intention and of behavior. Its effects on behavior can also be mediated by other cognitions, such as intentions. Across stages of change, an increase of self-efficacy is expected.

SELF-EFFICACY, RISK REDUCTION, HEALTH PROMOTION, HEALTH AND DISEASE MANAGEMENT: SUMMARY OF RESEARCH

Sexual Risk Behaviors

Adolescents form a particularly vulnerable group for human immunodeficiency virus (HIV) infection, given that approximately 20% of HIV-positive adults contract the virus during adolescence (Hein, 1989). Among sexually active adolescents, those who expressed confidence in their ability to put on a condom and in being able to refuse intercourse with a sexual partner were more likely to use condoms consistently. In addition, holding favorable outcome expectancies associated with condom use predicted protective behaviors (Dilorio et al., 2001).

Interventions that aim at reducing risky sexual behaviors usually affect self-efficacy beliefs. Compared to people in control groups, higher levels of self-efficacy regarding safe sexual behaviors are observed in intervention groups at the 10-month follow-up (Siegel, Aten, & Enaharo, 2001). In addition, stronger effects of intervention are found among youths who were not sexually active prior to the intervention. A short intervention (2 hours) addressing knowledge and self-efficacy in condom use negotiation skills affects knowledge, planning, beliefs about one's ability to negotiate condom use, and intention to use condoms (Dunn, Ross, Caines, & Howorth, 1998). Additionally, if the intervention is led by peer educators (compared to health care professionals), the effects are even stronger: in one study, 87% of the participants were confident that they could use condoms properly (compared to 67% and 57% in interventions led by health care professionals and controls, respectively).

Some adolescents are particularly at risk for sexually transmitted diseases (STD). Gay, lesbian, and bisexual youths are at high risk for HIV infection primarily because of their more frequent unprotected sexual behaviors. Rosario, Mahler, Hunter, and Gwadz (1999) reported that, for gay and bisexual boys, intentions were the strongest predictors of unprotected anal sex and unprotected oral sex. Self-efficacy emerged as the only predictor of the intention itself. Besides intention, variables such as attitudes, social norms, and skills were also directly or indirectly related to behavior, but the associations were weaker. A similar pattern was found in a sample of lesbian and bisexual girls, with intentions as the strongest predictor of unprotected oral sex and unprotected vaginal-digital sex, and self-efficacy as the strongest predictor of intentions. Employing a natural experimental paradigm, Brown and Baranowski (1996) showed that self-efficacy may be more easily enhanced in low-risk groups (i.e., never hav-

ing had sex or always using condoms, absence of intravenous drug use) than in high-risk groups.

HIV prevention projects should be directed to adolescents who are HIV infected. Such interventions should aim to reduce risky sexual behaviors, increase self-efficacy, and kindle a transition to more advanced stages of behavior change. Butler et al. (2003) designed an intervention for HIV-positive adolescents and young adults with hemophilia. Patients tuned their social skills and participated in self-efficacy exercises during 1 year. Increased self-efficacy but unchanged positive or negative outcome expectations or peer norms were found at posttest. Cognitions or knowledge about risk behaviors did not change, but the increase of self-efficacy was sufficient to increase safer sex rates (consistent condom use, outercourse, or abstinence) and to observe progress in stages of health behavior change. Regarding safe sex, 79% of the participants were in the action or maintenance stages at posttest, compared with 62% at pretest.

In preventing STD, self-efficacy beliefs could refer to the ability to communicate about condom use and HIV/AIDS. This kind of self-efficacy distinguishes between sexually active adolescents who are at high risk from those who are at low risk for STD. According to Holschneider and Alexander (2003), youths who consistently use condoms and report having fewer sexual partners have high optimistic beliefs about their ability to negotiate condom use. Such results, often obtained in cross-sectional studies, might be interpreted in two ways: (a) self-efficacy is enhanced as a result of past mastery experiences (when an individual has successfully negotiated condom use), or (b) high self-efficacy led to successful performance (e.g., negotiation of condom use). Further support for SCT has been provided by experimental studies designed to increase adolescents' confidence in refusing unprotected sex, using condoms, and communicating about safe-sex practices. For example, Coyle et al. (1999) found that changes in condom use self-efficacy were observed 7 months after the intervention. Sexually active high-school students reported more frequent use of condoms than did peers in a control group. They also tended to report a smaller number of partners with whom they had unprotected sex.

It is possible that more general social self-efficacy, such as the perceived ability to engage in successful social interactions, might reduce risk behaviors among adolescents. For African American adolescent boys, refusal and condom-use self-efficacy are significant predictors of condom use, whereas social self-efficacy is not (Colon, Wiatrek, & Ewans, 2000). Similarly, condom-use self-efficacy is a significant predictor of the intention to use condoms, whereas social self-efficacy is not. When behavior-specific beliefs (e.g., ability to refuse having sexual intercourse if one's partner does not agree to use condoms) are entered into a regression

equation, more general beliefs (e.g., ability to act on one's intentions in various problematic peer contexts) no longer predict behavior.

In addition to frequency of performing a healthy behavior, it is necessary to measure the behavior as adequately as possible. For example, prevalence of laboratory-diagnosed STDs may be employed as a measure of unsafe sexual behavior. A study conducted with sexually active African American girls revealed that self-efficacy for correct use of condoms were unrelated to skills, measured by demonstrating condom application skills on a penile model (Crosby et al., 2001). Skills of proper condom use determine whether condom use can prevent an infection. Condom use skills are considered a direct and proximal predictor of safe sex practices (Kalichman et al., 2002). However, condom application skills are unrelated to the sexual risk behavior of adolescent girls, self-reported STD symptoms, or laboratory-diagnosed STDs (Crosby et al., 2001). Other studies have confirmed that condom use skills and knowledge may not be good predictors of safe sex practices among adolescents. Kalichman et al. (2002) found that self-efficacy had a direct, unmediated effect on the frequency of unprotected sex whereas condom application skills did not. The relationship between self-efficacy and condom use was stronger than were the relationships between condom use and either gender, age, pro-condom norms, or risky sexual practices within a 3-month period. It is likely that self-efficacy is the most proximal predictor of safe sex practices.

Christ, Raszka, and Dillon (1998) reported that self-efficacy to apply condoms correctly were unrelated to the intention of using condoms. A closer look at the data collected among sexually active girls suggests, however, that the lack of relationship may have resulted from a ceiling effect: 91% of the girls were sure that they were able to use condoms properly, 97% declared optimistic self-beliefs regarding their ability to convince a partner to use condoms, and 94% were sure that they were able to discuss condom use with a new partner. However, only 22% reported regular condom use, and 38% reported that they used condoms usually. Condom use may be predicted by self-efficacy and by expected outcomes of condom use (e.g., reduction of pleasant sensations during sexual intercourse). Girls with high self-efficacy and low negative outcome expectations regarding condom use are most likely to use condoms regularly.

Some studies report very high levels of condom use self-efficacy (Christ et al., 1998). This may be due to measurement problems. Self-efficacy is sometimes assessed in terms of being able to perform a task (e.g., "I am able to buy condoms"). Such an assessment may result in high rates of positive responses. Measures of self-efficacy should include specific barriers (e.g., "I am able to buy condoms even if my friends would laugh at me while I am doing this").

Contraceptive Behavior

Teenage girls with a high rate of intercourse have been found to use contraceptives more effectively if they believed they could exercise control over their sexual activities (Wang, Wang, & Hsu, 2003). Several variables may moderate the effects of self-efficacy on contraceptive behavior. Data from the National Longitudinal Study of Adolescent Health showed that being female, being older, and living with stepparents resulted in high self-efficacy for contraceptive use. Conversely, adolescents whose mothers had less education (high school dropouts) reported low self-efficacy for contraception use (Longmore, Manning, Giordano, & Rudolph, 2003). Contraceptive self-efficacy also predicts girls' use of contraceptives.

Addictive Behaviors

Self-efficacy to resist smoking temptations is related to the current smoking status of adolescents, together with intention to smoke, attitude toward smoking, impediments to smoking, and social norms (Hanson, Downing, Coyle, & Pederson, 2004). Social norms and self-efficacy together may predict whether adolescents ever smoked and whether they had smoked during the 30 days prior to the measurement. The more strongly they believed that they were able to refuse offered cigarettes, the less likely they were to have ever smoked. Students who perceived their peers as smokers were more likely to have smoked themselves (Zapata et al., 2004). The same associations were found for smoking during the 30 days prior to the time of measurement. Adolescents' self-efficacy for refusing to smoke or drink predicted cigarette, alcohol, and marijuana use measured 12 months later. The direct effect of self-efficacy was similar to the direct effect of past behavior (measured 18 months earlier) on smoking. Self-efficacy emerged as a mediator between social influence variables (such as perceived norms), substance offer, and past behavior on the one hand and smoking on the other (Li, Pentz, & Chou, 2002).

Some adolescents who are already involved in addictive behaviors try to overcome them. When asked to provide reasons for quitting smoking, young people spontaneously list athletic performance, health, and costs, as well as their self-efficacy (Aung, Hickman, & Moolchan, 2003). Although there are gender differences in the reasons that adolescents give for not smoking—such as health and athletic performance—self-efficacy leads to intention formation in both sexes. Recognizing the concerns that young people have is important for designing cessation interventions for young smokers.

Stage models such as the TTM offer useful heuristics for developing smoking cessation programs for adolescents. Such programs should take into account that stage distribution is different for adolescent smokers than for adults. Compared to adults, more adolescent smokers are in an early stage of health behavior change, that is, pre-contemplation. Smoking cessation programs should aim at moving adolescent smokers to later stages, that is, to the contemplation (of pros and cons of smoking), preparation, or action (quitting smoking) stage. Transition to more advanced stages is associated with increased self-efficacy (Coleman-Wallace, Lee, Montgomery, Blix, & Wang, 1999). The question remains, however, what is crucial for the health behavior change process? Do changes in self-efficacy facilitate behavior change and promote stage transition, or do behavior changes themselves (e.g., attempts to quit smoking) have side-effects, namely an increase of self-efficacy?

Self-efficacy may be indirectly related to changing a behavior, performing advocacy against tobacco use, via its effect on knowledge about anti-smoking campaigns. Awareness of anti-smoking policies in schools and in the mass media, as well as support for an anti-tobacco policy, is higher among self-efficacious adolescents. These adolescents, who believe that they can refuse a cigarette, know more about local anti-tobacco campaigns and policies restricting youth access to tobacco and smoking bans in schools, bars, and workplaces. In addition to higher awareness, self-efficacious adolescents have more favorable attitudes toward these campaigns (Unger et al., 1999). Knowledge about anti-tobacco campaigns and policies predict behavior, namely advocacy against tobacco use.

Results of longitudinal studies on adolescents' alcohol consumption have also shown that not all interventions designed to increase self-efficacy and to change addictive behaviors lead to expected changes in target health behaviors or cognitions. In one study, sense of community, self-efficacy, outcome expectancy, incentive value, policy control, and leadership competence were part of a program designed for teens from low-income neighborhoods. No reduction of alcohol consumption or use of tobacco and other psychoactive substances was observed after the program was completed. Post-treatment measurements, however, showed growth in the social-cognitive constructs (Winkleby, Feighery, Altman, Kole, & Tencati, 2001). Perry et al. (1996) reported that some changes in behavior were observed at the 2-year follow-up (lower alcohol consumption in an intervention group compared to controls). However, no differences in self-efficacy were found, both among baseline users and nonusers.

Health-Promoting Behaviors: Physical Exercise and Nutrition

Most adolescents do not meet moderate to vigorous physical activity criteria (Bungum, Pate, Dowda, & Vincent, 1999). Studies employing a motion detector to measure physical activity in preadolescents and adolescents showed that they spent 12.6 minutes daily (SD = 12.2) on vigorous physical activity (Strauss, Rodzilsky, Burack, & Colin, 2001). In addition to determinants of physical activity such as demographics, biological factors, physical environment factors, and physical activity characteristics, psychological determinants (such as self-efficacy, intention, and perceived barriers) play a crucial role in the adoption of an active lifestyle (Sallis & Owen, 1999). Although self-efficacy is expected to operate independent of ethnic and cultural background, optimistic self-beliefs are associated with moderate physical activity among White girls, but not among African American girls (Bungum et al., 1999).

Self-efficacy is related to current physical activity and is one of the strongest predictors of future activity among adolescents (Nahas, Goldfine, & Collins, 2003). Studies using objective measures of physical activity, such as a motion detector to monitor physical activity over a specified time period, have shown that self-efficacy is related to high level of physical activity of 10- to 16-year-old adolescents (Strauss et al., 2001). Moreover, across a set of psychosocial and environmental variables, perceived confidence in the ability to be active was the only variable that differentiated between active and low-active African American adolescents (Trost, Pate, Ward, Saunders, & Riner, 1999). For boys, involvement in sport organizations was the other predictor of activity levels. Girls who perceived more positive outcomes were also more active.

Some interventions that aim to increase self-efficacy and healthy nutrition employ computer games to facilitate mastery experience. In one such activity based on SCT, the educational activities in a game were aimed at increasing preference for healthy foods (Baranowski et al., 2003). Using multiple exposures, this approach increased mastery in asking for healthy food at home and when eating out. It also enhanced the skills in preparing healthy foods by means of virtual recipes and virtual food preparation. Compared to persons in control groups, preadolescents participating in such an intervention increased their consumption of fruits and vegetables (Baranowski et al., 2003).

Self-efficacy may mediate between other cognitions and adolescents' physical activity. Assessing self-efficacy in conjunction with constructs from the TPB, Motl et al. (2002) searched for predictors of moderate and vigorous physical activity among Black and White adolescent girls. Only self-efficacy predicted moderate physical activity. Self-efficacy and behavioral control predicted vigorous activity. Intentions, attitudes, and subjec-

tive norms were correlated and were related to self-efficacy, but they were only indirectly related to physical activity, mediated by self-efficacy. Self-efficacy may also mediate the relationship between physical activity and constructs such as parental support for the child's physical activity (Trost et al., 2003). Some studies provide evidence that self-efficacy is a stronger correlate of adolescents' physical activity than are cognitions such as perceived benefits, perceived barriers, and social norms (Wu, Pender, & Noureddine, 2003).

Interventions aimed at changing self-efficacy and other social-cognitive variables are effective in changing physical activity and nutrition. In a sample of over 6,000 children and adolescents, self-efficacy and intentions determined healthy food choices, and self-efficacy and perceived social support predicted physical activity three years later (Edmundson et al., 1996). Treatment based on SCT combined with an intervention aimed at increasing motivation predicts self-efficacy levels and fruit and vegetable intake among adolescents (Wilson et al., 2002).

Healthy Lifestyle and Perception of Health

Self-efficacy predicts intentions to engage in a healthy lifestyle. In one sample of adolescents, consistent effects of self-efficacy on intentions were found across behaviors such as nicotine abstinence, fat consumption, and physical exercise (Umeh, 2003). These effects were also significant after controlling for past behavior. Additionally, other cognitions such as perceived severity of disease, perceived vulnerability, or benefits did not produce a consistent effect on intentions to adopt behaviors promoting cardiovascular health.

Perceptions of good health are related moderately to general self-efficacy and weakly to risk-taking behaviors (Honig, 2002). General self-efficacy predicts an index of psychosomatic distress that includes headache, stomachache, backache, dizziness, irritability, and insomnia, especially if teenagers perceived low support from their teachers (Natvig, Albrektsen, Anderssen, & Qvarnstrøm, 1999). Relations between specific symptoms of psychosomatic distress and school-related self-efficacy are also found, particularly in girls. Girls who report increased backaches and an increase in school problems also report low school-related self-efficacy. But not all relations are in line with expectations. In some cases, high school-related self-efficacy is associated with higher levels of complaints (e.g., headaches in girls). However, this may be explained by a mismatch between the self-efficacy and outcome measures. School-related self-efficacy is associated with school achievement rather than with self-reported wellness. Perhaps self-efficacious girls are highly motivated to achieve good grades, and, if

their health-related self-efficacy is low, they will not engage in health-enhancing behaviors (e.g., physical activity).

Disease Management

When faced with a chronic disease, individuals should take action (such as taking medication, engaging in daily physical activity) to reduce the effects of the disease on their well-being. Self-efficacy predicts adherence to medication. In one study of adolescents with asthma, social norms, attitudes, and self-efficacy explained 21% of the variance in adherence to medication after a one-year follow-up (Es et al., 2002). In another study of adolescents with tuberculosis, self-efficacy predicted adherence to recommended treatment (Moriski et al., 2001). Youth infected with tuberculosis who participated in a self-efficacy-enhancing intervention acquired higher self-efficacy for medication taking, and self-efficacy for medication-taking was related to the completion of medication.

Self-efficacy predicts adherence to a recommended lifestyle by adolescents with chronic diseases as well as whether youths with trivial, mild, or moderate congenital cardiac malformations will adhere to recommended physical activity (Bar-Mor, Bar-Tal, Krulik, & Zeevi, 2000). In adolescents with chronic arthritis knowledge about the disease, self-efficacy (referring to physical activity and pain management) and social support are among the predictors of disease management (Andre, Hedengren, Hagelberg, & Stenstrom, 1999).

Interventions designed to enhance the self-efficacy of adolescents with type I diabetes mellitus to improve their adherence to a recommended lifestyle are successful in preventing weight gain in girls and improving their metabolic control and overall psychosocial well-being (Grey, Boland, Davidson, Li, & Tamborlane, 2000). Grey et al. (2004) tried to replicate these findings in a group of obese minority adolescents. Compared to control group participants (who took part in an education program on nutrition and physical activity), participants in the intervention group (who additionally received a self-efficacy treatment) demonstrated improved food choices one year later.

Behavior-specific self-efficacy and generalized self-efficacy improve adherence to complex medical recommendations in diabetic patients. Diabetes-related self-efficacy focusing on diet, physical activity, glucose control, and insulin injections is moderately related to general self-efficacy (Griva, Myers, & Newman, 2000). In a sample of diabetic adolescents and young adults, self-reported adherence to diet was correlated with general self-efficacy and with diabetic self-efficacy. However, when an objective measure of adherence to a diabetes regimen was used (levels of

glycosylated hemoglobin), it correlated better with diabetes-specific self-efficacy than with general self-efficacy. When age, diabetes duration, and self-reported adherence were controlled, diabetes-related self-efficacy continued to prove a significant predictor of glycosylated hemoglobin levels, whereas general self-efficacy did not.

Self-efficacy may also mediate the influence of parental behaviors on adolescents' disease management. For example, self-efficacy for blood glucose monitoring mediates the influence of parents' support regarding diabetes control on adolescents' adherence to blood glucose monitoring (Ott, Greening, Palardy, Holderby, & DeBell, 2000). Self-efficacious adolescents report higher adherence to the recommendations for diabetic diet, physical activity, insulin injections, and blood glucose monitoring. Among adolescents with trivial, mild, or moderate congenital cardiac malformations, self-efficacy is not only directly related to physical activity but also mediates the attitudes of their parents and the recommendations of their cardiologists (Bar-Mor et al., 2000).

DEVELOPMENTS: GENERAL, BEHAVIOR-SPECIFIC, AND PHASE-SPECIFIC SELF-EFFICACY

Bandura (1997) suggested that self-efficacy assessments should be particularized judgments that carefully correspond to the outcome with which they will be compared. Some researchers have proposed that optimistic self-beliefs may be more generally conceptualized or that they should be tailored to particular stages of behavior change. General optimistic beliefs refer to a global confidence in one's coping ability across a wide range of demanding or novel situations (Schwarzer & Jerusalem, 1995; Sherer et al., 1982). General self-efficacy assesses a broad and stable sense of personal competence to deal effectively with a variety of stressful situations. This approach is not in opposition to Bandura's (1997) suggestion that self-efficacy should be conceptualized in a situation-specific manner. Rather, general self-efficacy can be used to explain a complex set of adherence behaviors (e.g., in diabetes) or the perception of health or various symptoms.

General self-efficacy may be useful in predicting multiple health behaviors (rather than a single behavior). In a study by Luszczynska et al. (2004), general self-efficacy was related to more frequent physical activity in adolescents in Hungary, Poland, Turkey, and the United States. Coefficients were low, ranging from .17 to .18 (n = 539 to 662), and relations were similar across countries. Similar patterns were found for a healthy diet: Adolescents watched their diet more frequently if they had high general self-efficacy. Again, coefficients were low (.09 to .10) and similar

across countries. Although these relationships are weak, interventions designed to increase general self-efficacy may influence a wide range of health behaviors such as risk-taking, improvement of life skills, and health perception. Experimental studies are needed to test the benefits of increasing general self-efficacy versus behavior-specific self-efficacy (e.g., fiber intake self-efficacy).

Researchers have also argued that optimistic self-beliefs should be tailored to particular stages of the behavior change process. Endorsing a process approach to behavior change, Marlatt et al. (1995) proposed five categories of self-efficacy. They differentiated the kinds of self-efficacy crucial for primary and secondary prevention, namely resistance self-efficacy and harm-reduction self-efficacy. Action self-efficacy, coping self-efficacy, and recovery self-efficacy were advocated as making a difference in treatment adherence and relapse prevention.

Resistance self-efficacy refers to confidence in one's ability to avoid substance use. This includes resisting peer pressure to smoke, drink, or take drugs. It has repeatedly been found that the combination of peer pressure and low resistance self-efficacy predicts the onset of smoking and substance use in adolescents (Conrad, Flay, & Hill, 1992). Ellickson and Hays (1991) studied the determinants of future substance use of students in Grades 8 and 9. Social influence or exposure to drug users combined with low self-efficacy for drug resistance predicted experimentation with drugs nine months later. Resistance self-efficacy was not predictive for students already involved with drugs. In a study of smoking onset among high school students, resistance self-efficacy moderated the effect of peer pressure (Stacy, Sussman, Dent, Burton, & Flay, 1992). Many adolescents succumb to pro-smoking influences, but those high in resistance self-efficacy are less vulnerable. Interventions can increase smoking-resistance self-efficacy, and these increases lower smoking in students who participate in the interventions (De Vries et al., 2003). Interventions may vary across countries. De Vries et al. found that an intervention aimed at social influence processes and self-efficacy had short-term effects on smoking rates among Finnish and Spanish adolescents but not among youths from the UK and Denmark.

Harm-reduction self-efficacy refers to confidence to reduce known risks after becoming involved with alcohol, tobacco, or illegal drugs. Adolescents recognize that if they become involved in risky behaviors such as smoking, they risk a loss of autonomy (Johnson, Kalaw, Lovato, Baillie, & Chambers, 2004). They attempt to reduce the harm of losing this autonomy by rationing cigarettes or limiting situations for smoking. Once a risk behavior has commenced, the notion of resistance loses its significance, and it becomes more important to control further damage and strengthen the belief that one is capable of minimizing the risk of losing autonomy.

This is particularly useful because many young people experiment with cigarettes and alcohol during puberty, when adolescents face developmental tasks, including self-regulation in tempting situations. Substance use is thus regarded as normative rather than deviant, and it may reflect a healthy exploratory behavior and constructive learning process (Newcomb & Bentler, 1988). The conflict is between solving normative developmental tasks and initiating a risk behavior that may become a daily habit. Adolescents must acquire not only the competence and skills but also the optimistic belief in control of the impending risk.

Resistance self-efficacy and harm-reduction self-efficacy are related to prevention. The process requires self-regulatory skills that enable an individual to deal with barriers specific for initiation, maintenance, and recovery. The distinction proposed by Marlatt et al. (1995) was further developed to specify self-efficacy beliefs typical for a particular stage of health behavior change process (Luszczynska & Schwarzer, 2003; Schwarzer & Renner, 2000). This development refers to stages included in the HAPA (Schwarzer, 2001).

People initiate behavior change when a critical situation arises. For this, they need to believe firmly that they are capable of performing a particular action. *Pre-action self-efficacy* is an optimistic belief through which one develops an intention to change. People high in pre-action self-efficacy imagine success, anticipate potential outcomes of diverse strategies, and are more likely to initiate a new behavior. Pre-action self-efficacy refers to the first phase of a process in which one does not yet act but develops a motivation to do so. Later, a health-related behavior is maintained. *Maintenance self-efficacy* refers to optimistic beliefs about one's capability to deal with barriers that arise during the maintenance period. A new health behavior may turn out to be much more difficult to adhere to than expected, but a self-efficacious person responds confidently with better strategies, more effort, and prolonged persistence to overcome such hurdles. This kind of self-efficacy refers to mobilizing resources to continue with the successful adoption. *Recovery self-efficacy* refers to beliefs in one's ability to get back on track after being derailed and trusting in one's competence to regain control after a setback or failure.

Some studies show that pre-action, maintenance, and recovery self-efficacy act in a phase-specific way. Pre-action self-efficacy predicts intentions and planning, but it does not predict behavior. In a sample of 500 adolescents, pre-action self-efficacy was related to the intention to use a seat belt while driving (Luszczynska, 2004). Optimistic self-beliefs about one's ability to initiate the action were better related to developing plans (measured 6 months later) than was intention. Maintenance self-efficacy predicted precaution behavior, namely seat belt use (measured one month later), and this relation was stronger than the relation between planning and

behavior. Additionally, maintenance self-efficacy had an indirect effect on behavior mediated by planning. In a study of youths who smoked and who had experienced a relapse after attempting to quit, recovery self-efficacy predicted the seriousness of the lapse or relapse. Individuals with higher recovery self-efficacy (that is, beliefs about one's ability to resume the action) smoked fewer cigarettes during a relapse episode (Luszczynska, 2004).

Small long-term effects of some self-efficacy interventions (Barnett, O'Loughlin, & Paradis, 2002; Bungum et al., 1999; Grey et al., 2004; Perry et al., 1996; Winkleby et al., 2001) may be due to a mismatch between the wording of the self-efficacy measures or to the self-efficacy beliefs targeted during intervention and the stage within the behavior change process. High self-beliefs about the ability to use condoms properly, which are crucial in the maintenance phase, do not influence the intention to use condoms in the first place (see Christ et al., 1998).

A larger proportion of adolescents than of adults may be in early motivational stages of the health behavior change process rather than later volitional stages. This may be the case for such behaviors as smoking, risky driving, or drug use. Adolescents are also less likely to alter their smoking behavior (Coleman-Wallace et al, 1999). For individuals in the early motivation phase, an intervention should target pre-action self-efficacy, that is, optimistic self-beliefs about their ability to deal with barriers specific to this phase (e.g., how to develop plans and imagine success scenarios about initiating a healthy behavior). Interventions that enhance beliefs about the ability to maintain nicotine abstinence may have only a minor effect if adolescents are still in the initial motivation phase and do not intend to give up smoking at all.

If individuals are in a more advanced stage in the health behavior change process and have already engaged it, interventions should aim at maintenance self-efficacy (similar to "coping self-efficacy"; see Marlatt et al., 1995). For example, if adolescents try to adhere to a healthy diet, an intervention should address their ability to deal with specific barriers that arise during the maintenance phase, such as high-risk situations that impose temptations and may be a trap for relapse. Self-efficacy that refers to the maintenance of physical activity, however, is a poor predictor of the intensity of relapse to a sedentary lifestyle (Barnett et al., 2002). Adolescents who relapse to their old habits (e.g., not using condoms) should be treated in a manner that enhances their beliefs about their ability to regain control after a setback. It may not be sufficient for an intervention to raise optimistic beliefs about being able to maintain condom use. Instead, improved beliefs about the ability to renegotiate condom use may get adolescents who experienced a relapse back on track (recovery self-efficacy).

Future interventions for changing health behaviors and health perceptions should distinguish between three research perspectives. The one employed most often focuses on enhancing behavior-specific self-efficacy but does not take into account the stages within the health behavior change process. The second perspective may focus on general self-efficacy beliefs under the assumption that interventions aimed at more general beliefs will affect a wider range of behaviors and life skills. These, in turn, will generalize to other behaviors. The focus of the third approach could be on the distinct mindsets of those currently in the motivation, volition, or relapse stages. Here, the object would be to enhance the optimistic beliefs that are exclusive to a particular stage. Such a process strategy, as part of a more comprehensive health behavior theory, may increase the likelihood that adolescents will reduce their risk-taking and adhere to a healthier lifestyle.

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