Using Images to Increase Exercise Behavior: Prototypes Versus Possible Selves

Judith A. Ouellette
State University of New York College–Cortland

Robert Hessling
University of Wisconsin–Milwaukee

Frederick X. Gibbons
Monica Reis-Bergan
Meg Gerrard
Iowa State University

This study investigated the impact of health-related prototypes and possible selves on exercise behavior. In addition, this study examined if these effects might be moderated by individual differences—specifically social comparison (SC) and consideration of future consequences (CFC). One hundred and fifty-two students participated in all three waves of the study—premanipulation, manipulation, and follow-up. As expected, results indicated that individuals who were high on SC and exposed to a prototype manipulation increased their exercise behavior at follow-up. Furthermore, individuals who were future-oriented and exposed to a possible selves manipulation increased their exercise behavior at follow-up. Overall, results revealed that health images have an important impact on health behavior. Implications for behavior change are discussed.

Keywords: *prototypes; possible selves; social comparison; consideration of future consequences; exercise behavior*

Throughout the past two decades, research on antecedents of health behavior has become increasingly concerned with how cognitive factors, such as risk perceptions (Weinstein, 1987), expectancies (Brown, Goldman, & Christiansen, 1985), intentions, and perceived control (Ajzen, 1991) guide health behaviors. Recent work on health-risk behavior has focused on another cognitive factor—risk images. When people think about engaging in a behavior, they often do so by imagining a person engaging in that behavior; this image may be of themselves or other people. Thus, health psychologists have focused on two types of images. One is the image that people have of others, or prototypes (Gibbons & Gerrard, 1997), and the other is an image of oneself in the future, referred to as possible selves (Markus & Nurius, 1986). These images are important because they are thought to influence health decisions and behavior.

Prototypes

A prototype is an individual's image of the typical person who belongs to a group or engages in a certain behavior (Barton, Chassin, Presson, & Sherman, 1982; Cantor & Mischel, 1979; Chassin, Presson, Sherman, Corty, & Olshavsky, 1981; Gibbons & Gerrard, 1995). These images are usually distinct and have a number of different attributes associated with them, some positive and some negative. For example, most adolescents and college students can describe the typical smoker or typical drinker their age, even if they do not have personal experience with the behavior itself. Research investigating the antecedents of risky behavior has revealed that individuals are more likely to engage in unhealthy (or

Authors' Note: This research was supported by Grant AA102208 from the National Institute on Alcohol Abuse and Alcoholism. Monica Reis-Bergan is now at the Department of Psychology, James Madison University. We would like to thank Heather Berg, David Lane, and numerous undergraduate research assistants for their help with coding and data entry. We also thank Elizabeth Meinz and four anonymous reviewers for their helpful comments on earlier drafts of this article. Correspondence should be addressed to Judith A. Ouellette, Department of Psychology, P.O. Box 2000, SUNY Cortland, Cortland, NY 13045; e-mail: jao@cortland.edu.

PSPB, Vol. 31 No. 5, May 2005 610-620
DOI: 10.1177/0146167204271589

socially undesirable) behaviors if they hold relatively favorable images or prototypes of the type of person who typically engages in these actions (Gerrard, Gibbons, Gano, Vande Lune, & Cleveland, in press; Gerrard, Gibbons, Zhao, Russell, & Reis-Bergan, 1999; Gibbons & Gerrard, 1995; Gibbons, Gerrard, Lando, & McGovern, 1991). Originally, it was believed that these findings suggested that individuals adopted the unhealthy behavior to acquire what they consider to be positive characteristics associated with the behavior (e.g., smokers are cool; Barton et al., 1982; Chassin et al., 1981; Leventhal & Cleary, 1980). Recent empirical evidence, however, suggests that people are more motivated to avoid the characteristics associated with unhealthy behavior than to acquire the characteristics associated with healthy behavior (Blanton et al., 2001; Ogilvie, 1987).

Much of the research on prototypes is longitudinal and provides evidence of a prospective association of images with health behavior. In this paradigm, an individual's risk image and risk behavior are assessed and then sometime later, they are again asked to report the frequency with which they engaged in the behavior. Extensive research has in fact supported the general notion that these social images can predict change in behaviors, such as smoking, drinking, and unprotected sexual intercourse (Blanton et al., 2001; Chassin et al., 1981; Gerrard et al., in press; Gibbons & Gerrard, 1995; Gibbons, Gerrard, & Boney-McCoy, 1995; Gibbons, Gerrard, Ouellette, & Burzette, 1998; Ouellette, Gerrard, Gibbons, & Reis-Bergan, 1999; see Gibbons & Gerrard, 1997; Gibbons, Gerrard, & Lane 2003, for reviews).

It should be noted that most of this research has investigated the impact of prototypes of people who engage in unhealthy or undesirable behaviors. Very few studies have investigated how prototypes might be related to desirable behaviors (e.g., exercise, eating healthy). In one of these studies, the favorability of images associated with condom use and nonuse was manipulated in persuasive communications about safe sex (Blanton et al., 2001, Study 4). Positive characteristics of people who use condoms (e.g., responsible) or negative characteristics of people who do not use condoms (e.g., irresponsible) were presented in the communication. Results revealed that communications that included a negative prototype of nonusers were associated with a decrease in participants' willingness to have unprotected sex; positive images of condom users had no effect, however. Similarly, a study by Gibbons et al. (2004) found that presenting participants with negative descriptions of a person who engages in casual sex (i.e., a prototype) led to a significant reduction in willingness to engage in casual sex. Finally, a prospective study investigated the impact of images of people "your age" who "drink frequently" and people who "do not drink" on adolescents' willingness to drink and subsequent alcohol consumption (Gerrard et al., 2002a). This study found that favorable drinker images facilitated drinking 1 year later and favorable nondrinker images inhibited willingness to drink and drinking behavior over the same period of time.

In sum, the three studies suggest that risk images can be used to reduce participants' willingness to engage in risky behaviors (thus, an increase in healthy choices), with the Gerrard et al. (2002a) study also indicating that specific images can inhibit future risk behavior. The evidence of the impact of favorability of the image is varied. Two studies indicated that unfavorable, but not favorable, prototypes lead to a reduction in willingness to engage in a risky behavior. One study, Gerrard et al. (2002a), found that both types of images affected behavior; specifically, unhealthy images (drinker) facilitated drinking, whereas healthy (nondrinker) images inhibited future drinking. Thus, although the evidence for the impact of favorability (i.e., valence) of the prototype is somewhat mixed, evidence does suggest that unfavorable (i.e., unhealthy) images consistently affect behavior.

Finally, most research that has focused on the impact of prototypes on risk behaviors or risk willingness has addressed the impact of these images on unhealthy behavioral choices. In the current study, however, we were interested in using images to try to effect change in participants' healthy behavior. Moreover, most of the previous studies (with the exception of Gerrard et al., 2002a) have investigated the impact of images on willingness to engage in risky behavior rather than actual behavior. Thus, another important distinction of the current study was the measurement of actual behavior, specifically, exercise.

Possible Selves

Another type of image that may affect an individual's decisions about health behavior is an image one has of oneself in the future—termed a possible self. A possible self is an individual's idea of what they might become, including what they want to become as well as what they fear becoming (Markus & Nurius, 1986; Markus & Ruvolo, 1989; cf. temporal self, Albert, 1977; cf. temporal-future self, Wilson & Ross, 2000). Possible selves can be viewed as the future-oriented components of the self-system—they are the manifestations of one's goals, aspirations, motives, fears, and threats (Markus & Ruvolo, 1989). As Markus and Ruvolo (1989) suggest,

> Possible selves that are hoped for might include the successful self, the creative self, the rich self or the thin self . . . whereas the dreaded possible selves could be the

> alone self, the depressed self, the incompetent self . . . or the bag lady self. (p. 954)

It is argued that possible selves are important because, among other things, they function as motives for future behavior—in effect, they are images of the self to be approached or avoided.

The theoretical assumption is that the more a possible self is valued or the more important it is to an individual, the more likely it will be related to the individual's behavior. In the typical paradigm, participants are first asked to read a description of possible selves and then asked to list their hoped-for and/or feared possible selves (e.g., Hooker & Kaus, 1992). Only a handful of studies have investigated the relation between health-related possible selves and health behavior. In one such study, Hooker and Kaus (1992) asked older participants to list their hoped-for and feared possible selves and then they categorized individuals into three groups based on their responses. The first group included individuals who listed hoped or feared health-related possible selves and who rated either as the most important possible self. The second group included those who listed a health-related possible self but did not rate it as most important; the third group consisted of those who did not list a health-related possible self. Results revealed that current health behavior was predicted by group categorization. Specifically, individuals who listed a health-related possible self and rated it most important were engaging in more health-related behaviors than individuals categorized in the other two groups. Of interest, the third group of participants (no health-relevant possible self) was slightly but significantly younger than the first two groups. Another study by Hooker (1992) found that older adults were more likely to report health-related possible selves than were college students. Taken together, the research by Hooker and her colleagues suggests that health-related possible selves may be more important for older individuals than they are for younger ones. Finally, recent research suggests that individuals' possible selves are positively related to the processing of future-orientated, health-related messages (Freeman, Hennessy, & Marzullo, 2001).

In addition, researchers investigating the impact of possible selves have been interested in whether positive possible selves are more motivating than feared or negative possible selves. A study by Ogilvie (1987) found that participants were more motivated to distance themselves from their feared selves than to strive for their ideal selves. Oyserman and Markus (1990) have proposed, however, that a possible self will have the greatest motivational effect when individuals have both feared-for selves and hoped-for selves in the same domain, that is, when individuals have balanced possible selves (e.g., I don't want to be a couch potato and I do want to be active and fit).

To our knowledge, only one (non-health-related) study has looked at the impact of possible selves via an intervention (Oyserman, Terry, & Bybee, 2002). In this study, young students received a possible selves intervention or not (control). At posttest, the intervention group had a significant increase in various academic outcomes, for example, youths reported greater bonding to and concern with school. In addition to describing the future image, however, this intervention involved having students describe strategies to implement the image and guidance was provided to further enhance the strategies if necessary; thus, the intervention actually involved exposure to an image as well as facilitated thought processes.

In sum, research findings clearly indicate that images of possible selves are related to behavior. With the exception of Oyserman et al. (2002), all of the findings come from concurrent or prospective designs. The Oyserman et al. intervention, however, involved more than a simple exposure to an image. Thus, as with the prototype image, we were particularly interested in examining the potential impact of possible selves on behavior in an experimental laboratory investigation.

How Do Images Affect Behavior?

Prototypes and possible selves are distinct images. Prototypes are interpersonal—they represent images we have of the typical other (e.g., the typical smoker). Possible selves, on the other hand, are intrapersonal—they represent images we have of ourselves in the future (e.g., what I will be like if I smoke). Thus, they differ on both a temporal and interpersonal level. That is, prototypes are images of others in the here and now, whereas possible selves are images of the self in the future. It is likely, then, that these images are not equally influential on behavior for everyone. We believe that individuals might differ in respect to an orientation toward comparisons with others versus an orientation toward temporal, or future, comparisons and that these individual differences might be useful for understanding the impact of images on behavior.

Social comparison. The risk prototype construct is a focal part of the prototype/willingness model of health behavior (Gibbons et al., 2003; Gibbons & Gerrard, 1995, 1997). The model suggests that more favorable images of a person who engages in a risky behavior are associated with greater willingness to engage in that behavior. Because prototypes are interpersonal, a core assumption of the prototype/willingness model is that prototypes influence behavior via a social comparison process—comparing the self to the image of others (Gibbons & Gerrard, 1997). Basically, then, social

comparison tendencies should moderate the impact of images on behavior, and that does appear to be the case. Gibbons and Gerrard (1995), for example, found that prototypes were predictive of change in smoking behavior, reckless driving, and contraceptive use, more so for those who where high in social comparison (assessed by a three-item ad hoc scale). A second study replicated these findings in two separate samples, as dispositional social comparison moderated the impact of prototypes, this time on drinking, smoking, and drug use (Gerrard et al., 2002b). In the current study, we expected prototypes to once again have more of an impact on people who frequently engage in social comparison than on those who do not. Furthermore, the prototype/willingness model asserts that the impact of favorable risk images, or prototypes, on risk behavior is mediated by willingness to engage in the risk behavior rather than through deliberate intentions. Consistent with this, we did not expect the impact of prototypes or social comparison to be mediated by intentions. Finally, because possible selves are intrapersonal and therefore not dependent on self-other comparisons, social comparison tendencies were not expected to moderate the impact of possible selves on health behavior.

Consideration of future consequences. Because possible selves are future-oriented self-images, we did not expect social comparison to moderate the possible self-behavior link; we did expect, however, that another individual difference might. Much like the prototype, the effect of possible selves hinges on a comparison, but in this case, the person is comparing his or her current self with a future self—a temporal-future comparison (Wilson & Ross, 2000). Possible selves should have a stronger impact on individuals who would find comparisons with a future self important and meaningful. Thus, we expected that the impact of possible selves on behavior would be moderated by a tendency to consider (or not consider) future consequences (Freeman et al., 2001; Strathman, Gleicher, Boninger, & Edwards, 1994). Individuals who are high on consideration of future consequences tend to consider how their current decisions and behaviors affect future consequences and they are guided by these considerations. Those low on consideration of future consequences, on the other hand, are more likely to consider the immediate impact of their behavior or decision and not speculate on the possible future consequences of their current actions. For example, compared to low consideration of future consequences individuals, those high on consideration of future consequences are more likely to engage in recycling behavior (Lindsay & Strathman, 1997). In addition, scores on consideration of future consequences have discriminated between individuals who are engaged in activism and those who are not (Strathman et al., 1994). Thus, differences in consideration of future consequences are most important in predicting behaviors that have minimal immediate impact but higher distal impact. Because the major benefits of exercise are usually achieved after an individual exercises consistently over some period of time, we expected that those high on consideration of future consequences would respond to the (future) possible self-image more than would those low on consideration of future consequences.

Exercise Behavior

We chose exercise as our behavioral outcome for several reasons. First, exercise is a desirable health behavior that has a wide range of mental and physical benefits (Baranowski, Anderson, & Carmack, 1998; Corwyn & Benda, 1999; Sullum, Clark, & King, 2000). Even low levels of activity can reduce cardiovascular problems (Corwyn & Benda, 1999). For these and other reasons, the Federal Government's 10-year national health objectives have included physical activity as an area of focus (U.S. Department of Health and Human Services, 2000). Second, we assumed that there are clear and distinct positive and negative images associated with this behavior; this assumption was assessed in a preliminary study (see below). Third, given the availability of facilities on college campuses, we assumed that if willingness to exercise increased, participants would have the resources to fulfill this desire. Finally, unlike clinic-based programs, which often use special samples of participants (e.g., those with cardiovascular disease), our interest was in a lab-based intervention with a nonclinical sample of young adults. We believe that our lab-based intervention provides an opportunity for theoretical advances in behavior modification and also has practical implications for a range of individuals.

The Current Study

Previous research has clearly indicated that images can affect antecedents to behavior, as well as behavior. With notable exceptions (Study 4 in Blanton et al., 2001; Oyserman et al., 2002), all of the prototype and possible self-research has examined the relation between images and behavior. That is, participants have been asked either to rate the favorability of a prototype or list possible selves in a certain domain, and then these assessments are correlated with their current or future behavior. The current study differed from these previous studies in a number of ways. First, we were interested in investigating whether focusing individuals' attention (i.e., an image exposure manipulation) on either health-related prototypes or a health-related possible self in an experimental laboratory setting would result in a subsequent change in behavior. In addition, we were inter-

ested in whether these effects might be moderated by individual differences. Our primary prediction was that social comparison would moderate the effect of prototypes, but not possible selves, on behavior, whereas the opposite would occur for consideration of future consequences tendencies. We did not expect these two individual difference variables to interact. Third, we were interested in comparing the effects of healthy versus unhealthy images on behavior. Based on previous work, we expected unhealthy images to be more motivating (i.e., lead to more exercise behavior) than healthy images. Finally, we were interested in investigating the impact of these images on a healthy (as opposed to an unhealthy) behavior, specifically, exercise. Thus, the current study employed an Image Type (prototype vs. possible self) × Image Description (regular exerciser vs. nonexerciser) × Social Comparison (high vs. low) × Consideration of Future Consequences (high vs. low) between-subjects design with time (behavior at Time 1 and Time 3; i.e., T1 and T3) as a repeated factor.

Preliminary Study

Because no previous studies have examined exerciser and nonexerciser images, it was necessary to test our assumptions about these images; specifically, whether these two images are distinct in college students' minds and, if so, how vivid they are compared with other health images. To do that, a different sample of 447 students from a large midwestern university were presented with a brief questionnaire that first described what a prototype is and then asked them how "clear or vivid" their image was for each of eight health-relevant prototypes: "the typical person your age who . . . exercises regularly, rarely exercises, smokes cigarettes, drinks frequently, uses condoms regularly, engages in sexual behavior, drinks and then drives, doesn't drink at all." Responses were provided on a 9-point scale from 1 (*not at all clear or vivid*) to 9 (*very clear or vivid*). A repeated-measures ANOVA indicated that the exerciser image was evaluated as the most vivid image (M = 6.87, SD = 2.10), followed by the nonexerciser image (M = 6.25, SD = 1.77). Both of these were rated significantly more vivid than each of the other images (all Ms ≤ 6.00), Fs(1, 446) > 44.03, ps < .001, for exerciser comparisons, and Fs(1, 446) > 3.55, ps < .06, for nonexerciser comparisons. Thus, the assumption that college students have clear and distinct images of the exerciser and the nonexerciser prototype was supported.

METHOD

Participants

A total of 197 undergraduate students (M_{age} = 20.00) participated in the study (T1 and T2) for partial course credit in two successive semesters. Forty-five students were unable to be contacted for assessment of follow-up behavior (T3). Thus, the final sample of individuals who participated in all three waves consisted of 152 students (92 women, 59 men, and 1 unspecified gender), which represented a 77% retention rate. There were no significant differences in T1 exercise behavior, social comparison, or consideration of future consequences between those who took part in all three waves and those who were only in waves 1 and 2 (all ps > .20).

Materials

Behavior. At T1, participants were asked three questions regarding their exercise behavior: "How many times a week do you go to the campus recreation center or other fitness facility to engage in non-sport aerobic exercise (e.g., walking, stationary cycling)?" "How many times a week do you take part in sports that include aerobic exercise (e.g., basketball and soccer)?" and "How many times a week do you engage in aerobic exercise for at least 30 minutes?"; each followed by an 8-point scale from 0 (*never*) to 7 (*7 or more times a week*). Aerobic exercise was defined as any exercise that elevates the heart rate for at least 30 min. These three questions were averaged and this index was used as the measure of weekly T1 exercise behavior (α = .71). At follow-up (T3), behavior was measured by the same three questions. Unlike the T1 questions, however, participants were asked how often they had exercised in the last 4 weeks (the month after T2). Also, unlike the T1 questions, participants gave an open-ended response (not a scale response) reporting the actual number of times in the last 4 weeks they had participated in the three activities listed above. To facilitate comparison with T1 exercise behavior, we first converted the three T3 exercise behavior scores to a weekly average. Next, we created a single T3 exercise behavior index by combining and averaging the weekly estimates of the three exercise behavior assessments (α = .81).

Individual differences. Social comparison was measured at T1 by the 11-item Iowa-Netherlands Comparison Orientation Measure (INCOM; Gibbons & Buunk, 1999). The INCOM assesses a general orientation to compare oneself with others (e.g., "I often compare myself with others with respect to what I have accomplished in life"). Each statement was followed by a 7-point scale from 1 (*strongly disagree*) to 7 (*strongly agree*). The 11 items were combined and the average was used as a measure of general social comparison (α = .82). Consideration of future consequences was measured at T1 by the 13-item consideration of future consequences scale (Strathman et al., 1994; e.g., "Often, I engage in a particular behavior in order to achieve outcomes that may not result for many years"). Each statement was followed by a 5-point scale

from 1 (*extremely uncharacteristic*) to 5 (*extremely characteristic*). The 12 items were combined and the average was computed as an index of consideration of future consequences ($\alpha = .78$).

Intention. Intention to exercise in the 4 weeks following the manipulation was assessed at T2 by two items: "In the next month, do you intend to exercise regularly?" followed by a 7-point scale from 1 (*definitely not*) to 7 (*definitely yes*) and "How likely is it that you will exercise regularly in the next month?" followed by a 7-point scale from 1 (*not at all likely*) to 7 (*very likely*). Regular exercise was defined as any exercise that raises the heart rate and that occurs at least 3 times a week for at least 30 min at a time. These two items were combined and the average was computed as the measure of intention to exercise ($\alpha = .92$).

Procedure

At T1, participants were told that because there were a large number of questionnaires to fill out, they would complete some of them on that day and then come back a week later to finish the study. During the first session, participants' T1 behavior and social comparison level were assessed along with several filler items. At T2, they were randomly assigned to one of four conditions in a 2 (image type: prototype vs. possible self) × 2 (image description: regular exerciser vs. nonexerciser) between-subjects factorial design. Participants were told that the purpose of the study was to gather information about their impressions of certain types of people. The only differences in the information participants read were whether they would write about an image of an exerciser or a nonexerciser and if they were writing about others (prototype) or themselves in the future (possible self). Participants read the following:

> We are interested in what you think of people who fail to exercise regularly (or who exercise regularly). Exercise is an important part of health and wellness promotion and having a better understanding of people's impressions of people who exercise will help us develop materials and messages to promote exercise. In this case, we are interested in your impression of *other* people [prototype] or . . . *yourself* 10 to 20 years from now [possible self]. We would like you to think about the typical person [or yourself in the future] who fails to exercise regularly (or who exercises regularly). When you think about this person (or yourself), what is your impression of them (or you)? What images come to mind?

The participants then read a description of what is considered regular exercise and further read, "We would like to know more about your impression of this image. Please think carefully about it. On the following pages, we will ask you to write a description of different characteristics of this image."

To ensure careful consideration of an image, participants were asked to imagine and think about the image for a few minutes before they wrote about it; they then answered eight questions about the image beginning with an overall open-ended question: "What was the first thing that came to mind when you thought of this image?" They were encouraged to describe the image with as much detail as possible and were given approximately 10 min to answer the first question. This was followed by seven other questions asking for the specific details about the image, that is, appearance, general health, energy level, attitude toward life, achievements, relationships of the person they imagined, and finally, anything else that came to mind about the image.[1] It is important to note that these questions were given separately from the first. After describing the image, participants were given a short break and then answered another, separate questionnaire that included filler items and the intention questions, followed by debriefing and dismissal.

Follow-up behavior (T3). Four weeks after T2, participants received a call asking if they would mind volunteering for a phone survey ostensibly about exercise on campus and the use of the recreation facilities (the researchers did not identify themselves with the initial session of the study). They were told the call would take approximately 3 min. All participants who were contacted agreed to answer the questions. After assessing their exercise behavior, all participants were told the true purpose for the call and were then given the full debriefing. No participant expressed any dismay at having been deceived about the call and no participant indicated they had thought the call was related to the previous study.

RESULTS

Exercise Behavior Descriptives

The mean T1 exercise behavior was 2.00 ($SD = 1.43$), and the mode was 1.33, on scale from 0 (*no weekly exercise*) to 7 (*exercising 7 or more times a week*); thus, most people were exercising between once and twice a week. Overall, 93% reported some exercise. At follow-up, people were exercising about the same, on average, as at T1 ($M = 2.00$, $SD = 1.63$); this time, 91% reported some exercise. To determine if there were any significant differences in exercise behavior at T1, an Image Type (prototype vs. possible self) × Image Description (exerciser vs. nonexerciser) × Social Comparison (SC; high vs. low via median split) × Consideration of Future Consequences (CFC; high vs. low via median split) ANOVA[2] was conducted. Results revealed a main effect of CFC, such that

those who were more future oriented (the high CFC group) had a higher baseline level of exercise behavior prior to the manipulation than those with low consideration of future consequences (*M*s 2.24 vs. 1.71), $F(1, 136) = 4.92$, $p = .03$.[3] There were no other interpretable main effects or interactions in T1 exercise behavior across the groups, *p*s > .08. Finally, there was no significant association between social comparison and consideration of future consequences ($r = .00$, $p = .97$), thus indicating that in the current sample, these individual differences are distinct.

Manipulation Check of Image Generation

First, separate coders assessed the degree to which participants described the image they were asked to describe (prototype vs. possible self and exerciser vs. nonexerciser). There was no disagreement among coders (thus, $r = 1.00$). To ensure that participants' valence of the image they generated was consistent with the image they were asked to generate (i.e., exerciser vs. nonexerciser), the valence of each image question was coded, by two separate coders, on a 7-point scale ranging from –3 (*extremely negative*) to 3 (*extremely positive*), with zero as a neutral point. Coders had a high level of agreement ($r = .95$). An Image Type × Image Description × SC × CFC ANOVA was then conducted on the average valence of all the image questions. Results revealed the expected main effect for image description such that exercise images were significantly more positive ($M = 2.22$, $SD = .54$) than nonexerciser images ($M = -1.45$, $SD = .98$), $F(1, 132) = 696.73$, $p = .00$;[4] there were no other significant main effects or interactions (*p*s > .07). Thus, consistent with the pilot study (see Note 1), participants had no problems generating the assigned image. Finally, independent coders recorded the number of content words participants used to describe each image. Disagreements were resolved by discussion. We then conducted an Image Type × Image Description × SC × CFC ANOVA on the number of words generated. Results revealed that there were no significant differences in the number of words generated by image type (prototype vs. possible selves), image description (exerciser vs. nonexerciser), or the interaction of these variables with social comparison or consideration of future consequences (all *F*s < 1.40, all *p*s > .23).

Follow-Up Exercise Behavior

Image Type × Image Description × SC × CFC × Time. An overall 2 (image type) × 2 (image description) × 2 (SC) × 2 (CFC) × Time repeated-measures ANOVA was conducted to assess the effects of the various factors on T3 exercise behavior. This analysis revealed the two expected interactions: Image Type × SC × Time, $F(1, 136) = 5.87$, $p = .02$, $r_{\text{effect size}} = .20$,[5] and Image Type × CFC × Time, $F(1, 136) = 3.69$, $p = .057$, $r_{\text{effect size}} = .16$. Also, as expected, SC and CFC did not interact with each other (*p* > .31), and there were no significant main effects of Image Type, Image Description, SC, or CFC across time. There also were no interactions involving the type of image description (i.e., exerciser vs. nonexerciser), *p*s > .18. Consequently, we collapsed across this factor in subsequent analyses and included it as a covariate.[6] Finally, gender was initially included in all analyses and produced no significant effects; thus, it will not be discussed.

TABLE 1: Means for Image Type × Social Comparison × Time Repeated-Measures ANCOVA on Exercise Behavior

	Prototype		*Possible Self*	
	Social Comparison		*Social Comparison*	
	High	*Low*	*High*	*Low*
Time 1	1.99	2.23	2.10	1.66
Time 2	2.53	1.95	1.91	1.61
Change	+0.54	–0.28	–0.19	–0.05
t paired	2.57**	–1.34	<1.00	<1.00
n	38	39	38	37

NOTE: $N = 152$. Means reported are adjusted for the image description covariate.
**$p = .01$.

Image Type × SC. To explore the Image Type × SC interaction on T3 behavior, we conducted an Image Type × SC × Time repeated-measures ANCOVA (with image description as a covariate). Results again revealed the anticipated Image Type × SC × Time interaction, $F(1, 147) = 5.18$, $p = .02$, $r_{\text{effect size}} = .18$, the pattern of which was in the predicted direction (see Table 1). A paired *t* test was conducted to assess the change in exercise behavior from T1 to T3. This test revealed, as expected, that the prototype/high SC group was the only one to report a significant increase in behavior ($p = .01$, see Table 1). Next, an Image Type × SC ANCOVA was conducted on T3 exercise behavior, with T1 behavior and image description as covariates. This analysis revealed a marginal interaction, $F(1, 146) = 3.61$, $p = .06$, $r_{\text{effect size}} = .16$, and the post hoc tests and pattern of T3 adjusted means (adjusted for T1 behavior and image description) mirrored the repeated-measures analysis. Specifically, high social comparison individuals who were in the prototype condition reported exercising more at the T3 follow-up than did low social comparison/prototype participants (adjusted *M*s = 2.54 vs. 1.78), $t(146) = 2.69$, $p = .00$. Consistent with the prototype/willingness model, social comparison did not moderate the impact of possible selves on exercise behavior, $t < 1.00$. Finally, a repeated-measures ANCOVA revealed that the Image Type × SC interaction was still significant when intention to exercise was entered into the analysis, $F(1, 146) = 5.71$, $p = .02$. Thus, again consistent with the prototype/willingness

TABLE 2: Means for Image Type × Consideration of Future Consequences (CFC) × Time Repeated-Measures ANCOVA on Exercise Behavior

	Prototype		*Possible Self*	
	CFC		*CFC*	
	High	*Low*	*High*	*Low*
Time 1	2.34	1.84	1.92	1.85
Time 2	2.15	2.34	2.34	1.63
Change	–0.19	+0.50	+0.42	–0.22
t paired	<1.00	2.27**	1.98*	–1.03
n	42	35	38	37

NOTE: $N = 152$. Means reported are adjusted for the image description covariate.
*$p = .05$. **$p = .01$.

model, intention to exercise was not a significant mediator of the Image Type × SC effect on exercise behavior.

Image Type × CFC. To explore the extent to which consideration of future consequences moderated the impact of possible selves on T3 exercise behavior, an Image Type × CFC × Time repeated-measures ANCOVA, with image description as a covariate, was conducted, which again produced a significant interaction, $F(1, 147) = 4.11$, $p = .05$, $r_{\text{effect size}} = .16$. With one exception, the pattern of means was as anticipated (see Table 2). Again, paired *t* tests were used to assess change in exercise behavior and results indicated a significant increase in behavior from T1 to T3 in the focal group: high CFC/possible selves ($p = .05$, see Table 2). Unexpectedly, a significant increase in exercise behavior also was seen in the low CFC/prototype group ($p < .05$). As before, we also conducted an Image Type × CFC ANCOVA on T3 exercise behavior, controlling for T1 behavior and image description. The Image Type × CFC interaction was marginally significant, $F(1, 146) = 3.35$, $p < .07$, $r_{\text{effect size}} = .15$.[7] Post hoc tests on T3 adjusted means (adjusted for T1 behavior and valence) showed a similar pattern to the repeated-measures results. Specifically, participants high on consideration of future consequences and exposed to a possible self-image exercised more at follow-up ($M = 1.94$) than their low CFC/possible self counterparts ($M = 1.74$), although this difference did not reach significance in this analysis, $t < 1.00$. As in the previous analysis, individuals low on consideration of future consequences exposed to a prototype image also were exercising more ($M = 2.46$) than their high CFC/prototype counterparts ($M = 1.90$), $t(146) = 1.96$, $p = .05$. It appears, then, that low consideration of future consequences participants, who are focused on the "here and now," reacted to the consideration of current (i.e., prototype) images.

DISCUSSION

Previous studies have demonstrated that relative favorability of risk images can lead to a change in risk willingness and risk behavior (Blanton et al., 2001; Gerrard et al., 2002a). Images we have of those who engage or do not engage in certain health behaviors are important because these images are social-psychological representations of characteristics associated with the risk behavior. Of importance, past research has revealed that these representations work through a social comparison process—that of comparing oneself to the image. Moreover, it has been suggested that young adulthood is a period of time in which individuals are preoccupied with their social image (Gerrard et al., 2002a; Oyserman & Markus, 1990). Other studies have suggested that images of the future self—or possible self—also are an important predictor of current health behavior (Hooker & Kaus, 1992) and of responses to health messages (Freeman et al., 2001). The current study attempted to further investigate the effects of images on health behavior in a controlled laboratory setting by making a particular image salient to participants.

Our findings suggest that images are not only related to willingness and behavior (as past research has suggested) but that systematic contemplation of images can produce changes in behavior. Moreover, as the prototype/willingness model would predict, the prototype effect was moderated by social comparison tendencies. Specifically, among participants who were instructed to seriously contemplate an image of the typical exerciser/nonexerciser (i.e., a prototype), only those with a tendency to socially compare significantly increased their exercise behavior from T1 to T3. This behavior change was not mediated by participants' intentions to engage in exercise (Gibbons et al., 2003). Also, as expected, social comparison tendencies did not interact with possible selves to affect behavior, whereas consideration of future consequences did. As we suggest for those who were future oriented, that is, who have a tendency to make current behavioral choices based on distal consequences (high CFC), contemplation of a possible self image, whether exerciser/nonexerciser, led to a significant increase in exercise behavior, whereas prototype contemplation did not. Those, however, who were low in future orientation appeared to react to the prototype image. Although not predicted, this pattern makes sense. Low consideration of future consequences people are focused on the here and now and prototypes are very much based in the present (i.e., the typical person who [currently] . . .). In contrast, possible selves are futuristic images of the self (i.e., temporal-future comparisons; cf. Wilson & Ross, 2000). Thus, researchers developing interventions or prevention efforts should recognize that programs intended to alter or prevent certain

behaviors may need to be tailored to account for individual differences in temporal and interpersonal orientation.

The idea that images of the self or others are related to and can often guide behavioral choices is not a new one (e.g., Chassin et al., 1981; Gibbons et al., 1995; Gibbons & Gerrard, 1995; Markus & Nurius, 1986; Sutterlund & Niedenthal, 1993). What is novel about the current study is that a one-time lab manipulation affected behavior 4 weeks later. Although uncommon, other researchers have been able to change behavior with a single-session laboratory manipulation. For example, Banks, Salovey, Greener, and Rothman (1995) encouraged women to get a mammogram via a single exposure to a gain- or loss-framed message presented through video. Results revealed that the loss-framed message led to greater likelihood of obtaining a mammogram 12 months later than the gain-framed message.

In addition, our image manipulation may be similar to strategies used in clinical and sports psychology that have been found to be effective performance enhancers. For example, sport psychologists use positive imagery and visualizing of positive outcomes—both cognitive behavioral techniques—to help athletes achieve their desired goals (e.g., sinking a putt; Beauchamp, Halliwell, Fournier, & Koestner, 1996; Jones & Stuth, 1997). Similarly, these types of techniques have been used in conjunction with cognitive restructuring to decrease the prevalence of relapse into addictive behaviors (Marlatt & George, 1990).

Image description (i.e., an image of an exerciser vs. nonexerciser) was not a determining factor in this study. This is somewhat surprising given that most research has shown that images of those engaging in negative health behaviors (e.g., smoking) are more predictive of later behavior than images of those engaging in positive health behaviors (e.g., nonsmoking; Blanton et al., 2001; Ogilvie, 1987). One reason given for this difference is that images of unhealthy behavior are usually more vivid than images of healthy behavior (e.g., drinker vs. nondrinker; Blanton et al., 2001; Fazio, Sherman, & Herr, 1982; Skowronski & Carlston, 1989). As indicated by our preliminary study, however, the exerciser and nonexerciser images were both easily generated and were more vivid than all of the other active images. Specifically, images of the person who works out and is in shape *and* the couch potato were both more vivid than those of the smoker, drinker, condom user, and so forth. Thus, the relatively high vividness of both the exerciser and nonexerciser images may explain why these images were equally impactful in the current study, unlike previous finding regarding healthy versus nonhealthy images.

Implications and Future Directions

It is unclear whether this type of intervention will work for images that are not so vivid—that is, images that are less well defined (e.g., a healthy eater). Future research should replicate this study with a variety of other health-behavior images to determine which ones are most effective and whether image vividness is a determining factor. Future research also should investigate how long the impact of exposure to an image manipulation might last. Although we have no long-term data to answer this question, we can look at results from a similar area of research—the area of mental practice—for a recommendation. Mental practice is similar to the cognitive-behavior techniques described earlier in which individuals visualize the positive outcome and rehearse the steps needed to successfully reach their goal. A review of this literature suggests that mental rehearsals affect performance up to 3 weeks later; the authors report, however, that the effects of this imagery are lessened by 50% at that time. They suggest that to sustain change, the individual must reinforce the imagery by further mental practices every 1 to 2 weeks (Driskell, Copper, & Moran, 1994). Presumably, the same would apply to the images and technique used in this study.

Given that individual differences played a key role in moderating the effects of images on behavior, future investigations or interventions also should consider other individual difference factors that might moderate or mediate the impact of images or message processing. For example, research by Sutterlund and Niedenthal (1993) has revealed that individuals high on self-esteem generally used prototype-matching as a way to guide their decisions, whereas individuals with low self-esteem generally did not use this strategy. Similarly, a study by Davidson and Prkachin (1997) found that individuals high on both optimism and unrealistic optimism benefited the least from a preventative lecture. Thus, researchers and practitioners interested in using interventions similar to the current study should be mindful to tailor interventions to account for individual orientations and perspectives of their recipients (Gerrard, Gibbons, & Reis-Bergan, 1999).

Moreover, similar studies should be conducted with older adults. Not only is this of theoretical importance but also of a practical one—older adults are the least likely to engage in and most in need of physical activity (U.S. Department of Health and Human Services, 2000). We suspect that the results would look different for older persons. Specifically, we would expect that social comparison and the prototype image would not be as important as possible selves would be for this age group because as individuals mature they engage in less social comparison (Gibbons & Buunk, 1999; Suls & Mullen, 1982) and more actual—versus ideal (or intra-)—

self comparisons (cf. Hooker, 1999). Interventions using possible selves manipulations, then, may prove to have more of an impact in an older population.

Finally, future research may want to consider the possible underlying mechanisms of these images in a framework of recent research on embedded knowledge and situated action (Barsalou, 2002; Barsalou, Niedenthal, Barbey, & Ruppert, in press). This line of research suggests that when events or knowledge are originally experienced and stored in memory, they are not stored as events or knowledge in a vacuum but also stored with information about the situation in which the event/knowledge occurred (as well as stored with sensory, motor, and emotional states; Barsalou, 2002). Thus, when one recalls the event/knowledge, other sensory information, as well as the situation of the original event, can be recalled in addition to the knowledge of the event itself. During this recollection, individuals may experience elements of motivation or emotion that may be embodied in these memories. Experiencing these motivations/emotions during recall can serve to direct, or inhibit, current or future action, just as these elements could when the original event occurred. Applying this notion to the current study, then, contemplation of or thinking about an image could bring to mind not only the knowledge of the image itself but possibly the image in specific situated action (i.e., the image embedded in the situation; cf. Barsalou, 2002); the contemplation of or thinking about an image also can call up the motivation or emotion embedded within the memory. Thus, it is possible that images direct current or future behavior by motivational elements embodied in the memory of the image.

NOTES

1. A pilot study one semester prior to the main study confirmed that participants not only understood the instructions but also generated the image they were asked to provide (positive or negative possible self or prototype).

2. All ANOVA and subsequent ANCOVAs are conducted using General Linear Model (GLM) analyses to account for the unequal sample sizes.

3. It should be noted that the high/low social comparison and consideration of future consequences groups were created post hoc (i.e., after random assignment to groups), and although researchers rely on random assignment to equally distribute all differences across groups, it is not always perfect. This error appears to have occurred for the distribution of T1 behavior across the consideration of future consequences groups.

4. Four individuals' responses to these questions were lost. Thus, the final sample included in this analysis was 148.

5. We reported the effect size *r* (Rosenthal, Rosnow, & Rubin, 2000) for primary analysis as suggested by Wilkinson and Task Force on Statistical Inference (1999).

6. Results are virtually identical if the image description covariate is not included in the analyses.

7. We also conducted multiple regression analysis to examine the Image Type × Social Comparison (SC) and Image Type × Consideration of Future Consequences (CFC) interaction (cf. Aiken & West, 1991). Results revealed a significant Image Type × SC interaction and the means are in the predicted direction; that is, the means mirror those of the ANCOVA. The Image Type × CFC interaction, however, failed to reach significance. The fact that the ANCOVA revealed the predicted results for Image Type × CFC and the regression did not suggest that the relation here is less linear and more of a step-function, that is, high CFC individuals differ from low CFC individuals, but within each of these two categories, the relations are not linear. In this case, then, the categorical approach (via median split) may more accurately reflect the differences of the high versus low CFC individuals.

REFERENCES

Aiken, L. S., & West, S. G. (1991). *Multiple regression: Testing and interpreting interactions*. Newbury Park: Sage.

Ajzen, I. (1991). The theory of planned behavior. *Organizational Behavior and Human Decision Process, 50*, 179-211.

Albert, S. (1977). Temporal comparison theory. *Psychological Review, 84*, 485-503.

Banks, S., Salovey, P., Greener, S., & Rothman, A. (1995). The effects of message framing on mammography utilization. *Health Psychology, 14*, 178-184.

Baranowski, T., Anderson, C., & Carmack C. (1998). Mediating variable framework in physical activity interventions: How are we doing? How might we do better? *American Journal of Preventive Medicine, 15*, 266-297.

Barsalou, L. W. (2002). Being there conceptually: Simulating categories in preparation for situated action. In N. L. Stein, P. J. Bauer, & M. Rabinowitz (Eds.), *Representations, memory, and development: Essays in honor of Jean Mandler*. Mahwah, NJ: Lawrence Erlbaum.

Barsalou, L. W., Niedenthal, P. M., Barbey, A. K., & Ruppert, J. A. (in press). Social embodiment. In B. H. Ross (Ed.), *The psychology of learning and motivation* (Vol. 43). San Diego, CA: Academic Press.

Barton, J., Chassin, L., Presson, C. C., & Sherman, S. J. (1982). Social image factors as motivators of smoking initiation in early and middle adolescence. *Child Development, 53*, 1499-1511.

Beauchamp, P. H., Halliwell, W. R., Fournier, J. F., & Koestner, R. (1996). Effects of cognitive-behavioral psychological skills training on the motivation, preparation, and putting performance of novice golfers. *Sport Psychologist, 10*(2), 157-170.

Blanton, H., Vanden Eijnden, R. J., Buunk, B. P., Gibbons, F. X., Gerrard, M., & Bakker, A. (2001). Accentuate the negative: Social images in the prediction and promotion of condom use. *Journal of Applied Social Psychology, 31*, 274-295.

Brown, S. A., Goldman, M. S., & Christiansen, B. A. (1985). Do alcohol expectancies mediate drinking patterns of adults? *Journal of Consulting and Clinical Psychology, 53*, 512-519.

Cantor, N., & Mischel, W. (1979). Prototypicality and personality: Effects on free recall and personality impressions. *Journal of Research in Personality, 13*, 187-205.

Chassin, L., Presson, C. C., Sherman, S. J., Corty, E., & Olshavsky, R. W. (1981). Self-images and cigarette smoking in adolescence. *Personality and Social Psychology Bulletin, 7*, 670-676.

Corwyn, R. F., & Benda, B. B. (1999). Examination of an integrated theoretical model of exercise behavior. *American Journal of Health Behavior, 23*, 381-392.

Davidson, K., & Prkachin, K. (1997). Optimism and unrealistic optimism have an interacting impact on health-promoting behavior and knowledge changes. *Personality and Social Psychology Bulletin, 23*, 617-625.

Driskell, J. E., Copper, C., & Moran A. (1994). Does mental practice enhance performance? *Journal of Applied Psychology, 79*, 481-491.

Fazio, R. H., Sherman, S. J., & Herr, P. M. (1982). The feature-positive effect in the self-perception process: Does not doing matter as much as doing? *Journal of Personality and Social Psychology, 42*, 404-411.

Freeman, M. A., Hennessy, E. V., & Marzullo, D. M. (2001). Defensive evaluation of antismoking messages among college-age smokers: The role of possible selves. *Health Psychology, 20*, 424-433.

Gerrard, M., Gibbons, F. X., Gano, M. L., Vande Lune, L. S., & Cleveland, M. J. (in press). Images of smokers and willingness to smoke

among African American pre-adolescents: An application of the prototype/willingness model of adolescent health risk behavior to smoking initiation. *Pediatric Psychology.*

Gerrard, M., Gibbons, F. X., & Reis-Bergan, M. (1999). What do we know about the effect of risk communication on risk behavior? *Journal of the National Cancer Institute Monographs, 25*, 94-100.

Gerrard, M., Gibbons, F. X., Reis-Bergan, M., Trudeau, L., Vande Lune, L. S., & Buunk, B. (2002a). Inhibitory effects of drinker and non-drinker prototypes on adolescent alcohol consumption. *Health Psychology, 21*, 601-609.

Gerrard, M., Gibbons, F. X., Reis-Bergan, M., Trudeau, L., Vande Lune, L. S., & Buunk, B. (2002b). *Social comparison as a moderator of the prototype-behavioral willingness relation.* Unpublished manuscript.

Gerrard, M., Gibbons, F. X., Zhao, L., Russell, D. W., & Reis-Bergan, M. (1999). The effects of peers' alcohol consumption on parental influence: A cognitive mediation model. *Journal of Studies on Alcohol, 13*, 32-44.

Gibbons, F. X., & Buunk, B. P. (1999). Individual differences in social comparison: Development of a scale of social comparison orientation. *Journal of Personality and Social Psychology, 76*, 129-142.

Gibbons, F. X., & Gerrard, M. (1995). Predicting young adults' health-risk behavior. *Journal of Personality and Social Psychology, 74*, 1164-1180.

Gibbons, F. X., & Gerrard, M. (1997). Health images and their effects on health behavior. In B. P. Buunk & F. X. Gibbons (Eds.), *Health, coping and well-being: Perspectives from social comparison theory* (pp. 63-94). Mahwah, NJ: Lawrence Erlbaum.

Gibbons, F. X., Gerrard, M., & Boney-McCoy, S. (1995). Prototype perception predicts (lack of) pregnancy prevention. *Personality and Social Psychology Bulletin, 21*, 85-93.

Gibbons, F. X., Gerrard, M., Lando, H. A., & McGovern, P. G. (1991). Social comparison and smoking cessation: The role of the "typical smoker." *Journal of Experimental Social Psychology, 27*, 239-258.

Gibbons, F. X., Gerrard, M., & Lane, D. (2003). A social-reaction model of adolescent health risk. In J. Suls & K. A. Wallston (Eds.), *Social psychological foundations of health and illness* (pp. 107-136). Oxford, UK: Blackwell.

Gibbons, F. X., Gerrard, M., Ouellette, J. A., & Burzette, R. (1998). Cognitive antecedents to adolescent health risk: Discriminating between behavioral intention and behavioral willingness. *Psychology and Health, 13*, 319-339.

Gibbons, F. X., Stock, M. L., Gerrard, M., Eggleston, T. J., Dykstra, J., Kulik, J. A., et al. (2004). *Reactance as heuristic: Self-esteem and responses to health persuasion.* Manuscript submitted for publication.

Hooker, K. (1992). Possible selves and perceived health in older adults and college students. *Journal of Gerontology: Psychological Sciences, 47*, 85-95.

Hooker, K. (1999). Possible selves in adulthood: Incorporating teleonomic relevance into studies of the self. In T. M. Hess & F. Blanchard-Fields (Eds.), *Social cognition and aging* (pp. 97-122). San Diego, CA: Academic Press.

Hooker, K., & Kaus, C. R. (1992). Possible selves and health behaviors in later life. *Journal of Aging and Health, 4*(3), 390-411.

Jones, L., & Stuth, G. (1997). The uses of mental imagery in athletics: An overview. *Applied & Preventive Psychology, 6*, 101-115.

Leventhal, H., & Cleary, P. D. (1980). The smoking problem: A review of the research and theory in behavioral risk modification. *Psychological Bulletin, 88*, 370-405.

Lindsay, J. J., & Strathman, A. (1997). Predictors of recycling behavior: An application of a modified health belief model. *Journal of Applied Social Psychology, 27*, 1799-1823.

Markus, H., & Nurius, P. (1986). Possible selves. *American Psychologist, 41*, 954-969.

Markus, H., & Ruvolo, A. (1989). Possible selves: Personalized representations of goals. In L. A. Pervin (Ed.), *Goal concepts in personality and social psychology* (pp. 211-241). Hillsdale, NJ: Lawrence Erlbaum.

Marlatt, G. A., & George, W. H. (1990). Relapse prevention and the maintenance of optimal health. In S. A. Shumaker, E. B. Schron, & J. K. Ockene (Eds.), *The handbook of health behavior change* (pp. 44-63). New York: Springer.

Ogilvie, D. M. (1987). Life satisfaction and identity structure in later middle-aged men and women. *Psychology and Aging, 2*, 217-224.

Ouellette, J. A., Gerrard, M., Gibbons, F. X., & Reis-Bergan, M. (1999). Parents, peers, and prototypes: Antecedents of adolescent alcohol expectancies, alcohol consumption, and alcohol-related life problems. *Psychology of Addictive Behaviors, 13*, 187-197.

Oyserman, D., & Markus, H. (1990). Possible selves and delinquency. *Journal of Personality and Social Psychology, 59*, 112-125.

Oyserman, D., Terry, K., & Bybee, D. (2002). A possible selves intervention to enhance school involvement. *Journal of Adolescence, 25*, 313-326.

Rosenthal, R., Rosnow, R. L., & Rubin, D. B. (2000). *Contrasts and effect sizes in behavioral research: A correlational approach.* Cambridge, UK: Cambridge University Press.

Skowronski, J. J., & Carlston, D. E. (1989). Negativity and extremity biases in impression formation: A review of explanations. *Psychological Bulletin, 105*, 131-142.

Strathman, A., Gleicher, F., Boninger, D. S., & Edwards, C. S. (1994). The consideration of future consequences: Weighing immediate and distal outcomes of behavior. *Journal of Personality and Social Psychology, 66*, 742-752.

Sullum, J., Clark, M. M., & King, T. K. (2000). Predictors of exercise relapse in college population. *Journal of American College Health, 48*, 175-180.

Suls, J., & Mullen, M. (1982). From the cradle to the grave: Comparison and self-evaluation across the life span. In J. Suls (Ed.), *Psychological perspectives on the self* (Vol. 1, pp. 97-125). Hillsdale, NJ: Lawrence Erlbaum.

Sutterlund, M. B., & Niedenthal, P. M. (1993). "Who am I? Why am I here?" Self-esteem, self-clarity, and prototype matching, *Journal of Personality and Social Psychology, 65*, 769-780.

U. S. Department of Health and Human Services. (2000). *Healthy people 2010: Focus areas and objectives.* Retrieved January 5, 2001, from http://www.health.gov/healthypeople/prevagenda/ focus.htm

Weinstein, N. D. (1987). Unrealistic optimism about susceptibility to health problems: Conclusions from a community-wide sample. *Journal of Behavioral Medicine, 10*, 481-500.

Wilkinson and Task Force on Statistical Inference. (1999). Statistical methods in psychology journals: Guidelines and explanations. *American Psychologist, 54*, 594-604.

Wilson, A. E., & Ross, M. (2000). The frequency of temporal-self and social comparisons in people's personal appraisals. *Journal of Personality and Social Psychology, 78*, 928-942.

Received September 15, 2003
Revision accepted August 10, 2004