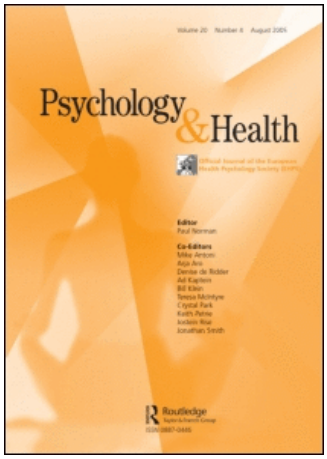

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Regulatory fit and health behavior

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Regulatory fit and health behavior

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Abstract
Everyone prefers health to ill-health, though some worry more about ill health than others and for others abstract health concerns seem to pale compared with the prospect of immediate hedonic pleasures. Two studies ($n = 90$, $n = 70$) utilized a 'fit' in self-regulatory focus approach (Higgins, 2000) to describe when and how worrying about health (*versus* focus on hedonic pleasure) is likely to lead to distinct health behaviors. According to this model, individuals differ in their self-regulatory focus – some focus on reaching safety and security through vigilant and careful action (prevention focus) and others focus on opportunities to eagerly approach hopes and aspirations (promotion focus). We proposed that likelihood of engaging in health care-taking behaviors is higher among individuals who experience 'prevention fit' – who are prevention-focused and are chronically or temporarily worried about health – whereas likelihood of engaging in eagerness-related behaviors that may be detrimental to health is higher among individuals who experience 'promotion fit' – who are promotion-focused and chronically or temporarily experience thrill seeking. Prevention fit correlated with health care-taking behaviors (Study 1) and with readiness to engage in cancer detection behaviors (Study 2). Promotion fit correlated with using stimulants to overcome physical weakness (Study 1).

Keywords: *Health behavior, prevention, promotion, regulatory focus, regulatory fit*

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As the sayings go 'Health is wealth' and 'Without health, life is not life; it is only a state of languor and suffering – an image of death' (Buddha). For some being healthy is a necessity, for others, being healthy is like being rich, important in part as a tool to attaining other goals. If health is a necessity, ill-health must be avoided; if health is good but not the only goal, one may be willing to risk one's health in the service of attaining other important goals. Approach and avoidance motivation models often focus on approaching a goal like health and avoiding an antigoal like ill-health (cf. Atkinson, 1964; Bandura, 1986; Carver & Scheier, 1981, 1990; McClelland, Atkinson, Clark, & Lowell, 1953). While approach and avoidance terminology is clearly relevant, in the current study we argue that health motivation may be better conceptualized in terms of different styles of approaching health and other goals – eager pursuit of various goals, including health, or vigilant pursuit of health as a necessary goal, as described within Higgins' *self-regulatory focus* (SRF, 1997, 1998) theory, particularly in terms of the strength of SRF when other features of the self or of the context fit with one's SRF (Higgins, 2000).

Seemingly, a goal of good health can be eagerly pursued as well as vigilantly monitored so should be attainable through either self-regulatory style. Yet even when good health is a goal, health can be set aside in eager pursuit of other goals. Thus, when a student drinks coffee all night to pull an all night long study session or takes cold medicine and goes to class rather than taking it easy in bed for the day, an academic success goal, not a health goal, is taking center stage. This interplay between health as a goal and control of the body to attain other goals complicates simple associations between self-regulatory focus and health in general. In the current paper, we focus on engagement in health care-taking behaviors on the one hand and willingness to engage in risky health behaviors in pursuit of other goals on the other hand. Some people worry about health and illness a lot, others don't. Some people find thrilling activities pleasurable, others don't. We propose that engagement in health care-taking behaviors is most likely among vigilant health worriers, and that willingness to engage in risky health behaviors in pursuit of other eagerness-related goals is most likely among those with a promotion-focused style of goal pursuit. Thus, the research reported below was designed to test the idea that a 'fit' between regulatory focus and other self-characteristics matters for health-related behaviors. First, we briefly describe self-regulatory theory and other work examining the potentiating effects of 'fit' and outline the rationale behind the hypothesized effects of 'fit' on distinct health-related behaviors.

Self-Regulatory Focus (SRF) theory

Self-regulation involves controlling the self in pursuit of one's goals. According to SRF theory (Higgins, 1997, 1998), self-regulation can be prevention- or promotion-focused (Higgins, 1997, 1998). Prevention-focused self-regulation is guided by a desire to carry out one's duties and obligations; promotion-focused self-regulation is guided by a desire to do what one wants and desires. Given that

duties and obligations are ongoing, one can fail to attain them by lack of ongoing vigilance; any prior success can be undone by current carelessness to one's obligations. Thus, prevention-focused self-regulation requires constant attention to potential threats and willingness to control oneself to reduce danger. Given that attaining one's ideals requires pursuit of accomplishments and successes, promotion-focused self-regulation involves attention to opportunities and chances for success and the willingness to open oneself to taking action as needed.

In signal detection terminology, prevention-focused self-regulation involves a focus on avoiding risks and not making mistakes, making prevention-focused self-regulation intolerant of errors of commission. Conversely, promotion-focused self-regulation involves focus on hits and on not missing chances, making promotion-focused self-regulation intolerant of errors of omission (for reviews of research evidence, see Higgins, 1998; Higgins & Spiegel, 2004). Individual differences in both self-regulatory styles have been assessed with various scales and the two styles are theoretically orthogonal (Higgins et al., 2001; Lockwood, Jordan, & Kunda, 2002).

Regulatory-fit and willingness to engage in distinct health behaviors

An individuals' self-regulatory focus can be congruent or incongruent with other self-attributes. This congruence or 'fit' has been shown to increase tendency to engage in fit-relevant behaviors (Higgins, 2000; for a review, see Higgins and Spiegel, 2004; Shah, Higgins, & Friedman, 1998). Effects of fit have been shown in the academic domain: motivation to engage in academic activities increases, when negative academic role models and prevention focus are matched and when positive academic role models and promotion focus are matched (Lockwood et al., 2002). Presumably, a salient model of failure is motivating for those with an avoiding failure style and a salient model of success is motivating for those with an eager pursuit of success style. In terms of health-related behavior, prior studies focused on fit between an individual's regulatory style and content of persuasive health messages, showing that combining prevention-focused self-regulation with information highlighting the potential *costs* associated with failing to adopt healthy eating (Spiegel, Grant-Pillow, & Higgins, 2004) or information on the *safety* benefits of health (Cesario, Grant, & Higgins, 2004) resulted in increased consumption or intention to consume fruits and vegetables.

Following the fit conceptualization, we propose that self-regulatory style will be most likely to influence willingness to engage in distinct health behaviors among individuals who also have other style-congruent traits. We primarily focus on fit between prevention focus and tendency to worry about ill health and fit between promotion focus and tendency to perceive thrilling activities as pleasurable and the impact of these two different kinds of fit on two different types of health-related behaviors: vigilant health care-taking and eager disregard of health in pursuit of other goals. We hypothesize a regulatory 'fit' effect such that those who are high in both worry about ill health and prevention-focus should be especially likely to engage in health-care taking behaviors. Worry about ill health

is assessed as a habitual tendency in Study 1 and as temporarily experienced feeling triggered by health information in Study 2. Health-care taking is assessed by self-report in Study 1 and by willingness to engage in various forms of cancer detection behaviors in Study 2. Similarly, we hypothesize that those who are high in both willingness to engage in thrilling behaviors and promotion focus should be willing to disregard health in pursuit of other goals. Willingness to engage in thrilling behaviors is assessed as a habitual tendency in Study 1 and as temporarily experienced feeling triggered by information on risky activities in Study 2. The disregard of health is assessed in Study 1 as using stimulants to keep one's body going under demanding situations and in Study 2 as willingness to engage in thrilling but risky leisure pursuits.

Study 1

Method

Participants and procedure. As part of a larger study on motivation, personality, and physical health, 90 undergraduate students (51 men, 39 women) at the University of Mannheim, Germany ($M_{age} = 23.38$, SD = 4.45) completed the German paper–pencil format measures described below in small groups. For each measure, higher scores correspond to greater endorsement.

Measures

Self-regulatory focus. The instrument developed by Lockwood et al. (2002; German version by Keller and Bless, 2006) was used to assess SRF on 7-point rating scales (1 = *not at all true for me*, 7 = *true for me*). The instrument includes Promotion SRF ($M = 5.27$, $SD = 0.84$, $\alpha = 0.79$) and Prevention SRF ($M = 4.00$, SD = 1.06, $\alpha = 0.76$) subscales. Example items are: (prevention) ''I am anxious that I will fall short of my responsibilities and obligations'', (promotion) ''I frequently imagine how I will achieve my hopes and aspirations.'' Scores were orthogonal, $r = 0.05$, $p = 0.62$.

Engaging in health care-taking behaviors. A 12-item 7-point (1 = *not at all true for me*, 7 = *true for me)* Engaging in Health Care-Taking scale ($M = 4.56$, $SD = 0.97$, $\alpha = 0.71$) was developed to assess health care-taking behaviors such as monitoring physical well-being, engaging in healthy eating habits, and avoiding risks that might lead to poor physical health. Most items focused on preventing ill health (e.g., ''I don't engage in sexual intercourse without protecting myself against potential sexually transmitted diseases'') and protecting good health (e.g.,''I make sure to have a certain amount of vegetables and fruits every day'') (see Appendix for all scale items). Bivariate correlations showed both SRF scales are correlated with the Engaging in Health Care-Taking scale (Prevention SRF: $r = 0.23$, $p = 0.04$, Promotion SRF: $r = 0.24$, $p = 0.02$).

Using stimulants to control body functions. A 6-item 7-point (1 = *not at all true for me*, 7 = *true for me*) Controlling the Body scale ($M = 4.82$, $SD = 1.47$, $\alpha = 0.81$) was developed to assess willingness to control body functions with stimulants to afford goal pursuit even under conditions where the body signals need to rest. Items focused on use of caffeine (coffee, NoDoz®, and similar prescription medications) (e.g., "When I have to study a lot, I consume large amounts of coffee or caffeinated drinks to keep myself awake.") and use of energizing cold remedies like DayQuil® (e.g., "When I realize any signs of a flu or cold I immediately take daytime medications to avoid having to stay in bed and rest."), to keep oneself going under physically taxing situations or at times when the body might show signs of a need for regeneration (see Appendix for all scale items). Bivariate correlations showed that Controlling the Body is uncorrelated with Engaging in Health Care-Taking ($r = -0.17$, $p = 11$), and with Prevention SRF and Promotion SRF (both $rs \leq 0.04$, $p > 0.71$).

Pleasure in sensation seeking. Beauducel, Strobel, and Brocke's (2003) 20-item forced-choice Sensation Seeking Scale – Form V (from Zuckerman, 1994) was used. The items asked respondents to choose between seeking (coded as '1') and not seeking (coded as '0') to engage in risky yet thrilling activities (e.g.,"I would like to try parachute jumping" *versus* "I would never want to try jumping out of a plane, with or without a parachute."), with possible scores ranging between 0 and 20 ($M = 11.29$, $SD = 4.30$, $\alpha = 0.88$). Bivariate correlations revealed that Sensation Seeking is negatively correlated with Prevention SRF ($r = -0.22$, $p = 0.04$) and uncorrelated with Promotion SRF ($r = -0.04$, $p = 0.73$).

Worry about ill health. Lucock and Morley's (1996) 7-item 7-point (1 = *very infrequently*, 7 = *very frequently*) Fear of Illness and Death subscale of the Health Anxiety Questionnaire ($M = 3.18$, $SD = 1.41$, $\alpha = 0.88$) (German version by Keller, 2005) was used to assess the extent to which participants worried about having a serious illness and dying (e.g., "Do you ever feel afraid that you may die soon?","Are you ever worried that you may get a serious illness in the future?"). The Worry about Ill Health and Sensation Seeking scales were moderately correlated ($r = -0.23$, $p < 0.05$). The worry about Ill Health is negatively correlated with Prevention SRF ($r = 0.54$, $p < 0.001$) and uncorrelated with Promotion SRF ($r = -0.05$, $p = 0.67$).

Results

Analysis plan. To examine the fit effects on engagement in health behavior, we conducted a two-step analysis. First we conducted regression analyses with engagement in health behavior (using stimulants and health caretaking) as the criterion variable. We created a dummy variable, Valence of Behavior (using stimulants reflecting negative health behavior and health care-taking reflecting positive behavior), as a predictor in addition to other predictors (Prevention SRF,

Promotion SRF, Worry about ill Health, Pleasure in Sensation Seeking, and the relevant interaction terms). In one equation, we tested the predicted fit between prevention SRF and Worry about Ill Health and in the other the predicted fit between promotion SRF and Sensation Seeking. Subsequently, we first report the results of this regression analysis conducted with engagement in health behavior as the criterion variable. To unpack the results of this composite analysis and ensure simplicity in presentation, we then report the results from two separate multiple regression analyses, one predicting engaging in health care-taking as a goal in itself and the other predicting using stimulants to control the body in pursuit of other goals. In all analyses, each predictor was standardized and interaction terms were established by multiplying pairs of centered variables (Aiken & West, 1991). Gender effects were not posited and not found in preliminary analyses, so gender is not included as a factor.

Engaging in health behavior – composite construct analyses. Composite construct analyses showed the expected effects. In the regression analysis that included as predictors Prevention SRF, Promotion SRF, Worry about Ill health, Valence of Behavior, and the relevant two- and three-way interactions, the three-way interaction of interest (Prevention SRF $\times$ Worry about Ill Health $\times$ Behavior Valence) was a significant predictor [$\beta = -0.39$, $t(165) = -5.29$, $p < 0.001$], overall $F(11, 165) = 3.47$, $p < 0.001$. In the regression analysis that included as predictors Prevention SRF, Promotion SRF, Sensation Seeking, Valence of Behavior, and the relevant two- and three-way interactions, the three-way interaction of interest (Promotion SRF $\times$ Sensation Seeking $\times$ Behavior Valence) was a significant predictor [$\beta = 0.12$, $t(165) = 2.07$, $p = 0.04$], overall $F(11, 165) = 12.91$, $p < 0.001$.

Engaging in health care-taking. As presented in the top panel of Table I, Prevention SRF, Promotion SRF, Worry about Ill Health, and the relevant interaction terms significantly predicted Engaging in Health Care-Taking [$F(5, 82) = 3.68$, $p = 0.005$], accounting for 18.3% of the variance. Participants high in Promotion SRF ($\beta = 0.21$) and (as displayed graphically in Figure 1a) high in both Prevention SRF and Worry about Ill Health ($\beta = 0.25$ for the two-way interaction), reported engaging in more health-care related activities. Decomposing this interaction following Aiken and West (1991) showed that the positive effect of worrying on engaging in health-care was found for high prevention-focused participants [$\beta = 0.36$, $t(82) = 2.46$, $p = 0.016$], not for low prevention-focused participants [$\beta = -0.22$, $t(83) = 1.58$, $p = 0.12$]. Indeed, although not reaching statistical significance, the effect in this latter case was in the opposite direction – worrying about health in the absence of prevention focus reduced chances of engaging in health-care related activities.

Using stimulants to control the body. As presented in the bottom panel of Table I, Prevention SRF, Promotion SRF, Sensation Seeking, and the relevant interaction terms marginally predicted Controlling the Body [$F(5, 83) = 2.09$, $p = 0.075$],

Table I. Study 1: Predicting engaging in health and controlling the body multiple regression results.

Criterion	Predictor	F	R^2	B	SE B	β
Engaging in health care-taking		3.68**	0.18			
	Prevention SRF			0.13	0.11	0.14
	Promotion SRF			0.24	0.12	0.21*
	Worry about ill health			0.07	0.09	0.10
	Prevention SRF × worry about ill health			0.17	0.07	0.25*
	Promotion SRF × worry about ill health			−0.08	0.08	−0.12
Controlling the body		2.09^{+}	0.11			
	Prevention SRF			0.15	0.15	0.11
	Promotion SRF			0.07	0.18	0.04
	Sensation seeking			0.08	0.04	0.23*
	Prevention SRF × sensation seeking			0.00	0.03	0.00
	Promotion SRF × sensation seeking			0.09	0.04	0.23*

*$p < 0.05$; **$p < 0.01$; $^{+}p = 0.075$.

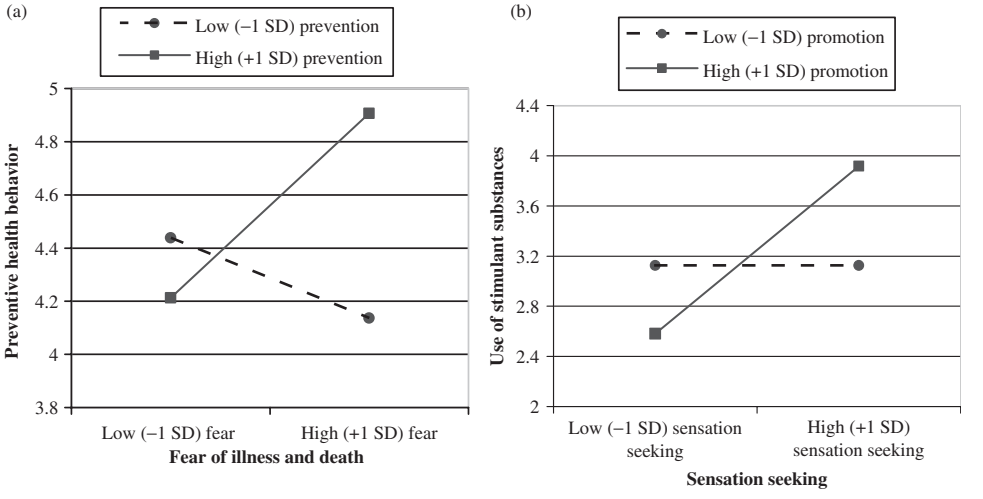

Figure 1. (a) Study 1: Engaging in healthy lifestyle behaviors as a function of fear of ill health and prevention SRF. (b)Study 1: Use of stimulant substances to control body as a function of sensation seeking and promaotion SRF.

accounting for 11.2% of the variance. Specifically, a main effect of Sensation Seeking ($\beta = 0.23$) was moderated by the hypothesized Promotion SRF by Sensation Seeking interaction ($\beta = 0.23$). As displayed in Figure 1b, Sensation Seeking was not associated with using stimulants to control the body among participants low in promotion focus ($\beta = 0.01$, $t(83) = 0.06$, $p = 0.95$), but was significantly associated with using stimulants to control the body among participants high in promotion focus [$\beta = 0.46$, $t(83) = 3.15$, $p = 0.002$].

Discussion

The purpose of Study 1 was to investigate how the 'fit' experienced between self-regulatory mechanisms proposed in regulatory focus theory and other personal characteristics relate to adoption of distinct health-related behaviors. We tested the hypotheses that prevention–focused self-regulation characterized by careful vigilance in conjunction with worries about health is associated with increased willingness to engage in healthy care-taking behaviors, and that promotion-focused self-regulation characterized by eager and tenacious goal pursuit in conjunction with willingness to engage in thrilling activities is associated with an increased tendency to engage in eagerness-related behaviors at potential cost to health. The results are consistent with prior research in domains other than health, which demonstrated that prevention-focused individuals who are inclined toward vigilant means are motivated by inputs that are related to safety, security, and the avoidance of negative outcomes and losses, whereas promotion-focused individuals who are inclined toward eagerness means are motivated by inputs that

are related to eagerness-related aspects (such as maximal goals and gains; cf. Freitas & Higgins, 2002; Lockwood et al., 2002; Shah et al., 1998).

Study 1 extends previous work on the regulatory fit effect in several respects. First, previous research on regulatory fit has typically focused on the fit between individual's habitual regulatory focus and *situational* cues related to self-regulatory orientations or strategic inclinations (cf. Shah et al., 1998) or on the fit resulting from combinations of several situational self-regulatory cues (cf. Freitas & Higgins, 2002). The current study extends previous research on regulatory fit by providing evidence for the regulatory fit effect involving habitual self-regulatory focus and *habitual* strategic inclinations or concerns related to self-regulatory orientations. Second, current findings suggest that regulatory fit does not necessarily result in positive behavioral outcomes, but in certain cases can lead to an increased tendency to engage in negative and detrimental behaviors. As shown here, a regulatory fit reflecting the combination of a habitual tendency to engage in thrilling activities and a chronic promotion focus was associated with the adoption of eagerness-related behaviors – the use of stimulants to control the body that may compromise health in the long-run. Third, our findings reveal a higher-order regulatory fit effect such that we observed fit effects with respect to the willingness to engage in *distinct types* of behaviors. That is, we found that the interplay of habitual self-regulatory orientations and other related habitual tendencies is specifically related to behaviors that fit in terms of their strategic inclinations (eagerness versus vigilance). This is an intriguing extension of previous findings and speaks to the fact that it seems necessary to consider the interplay not only of habitual tendencies but also of the congruence (or incongruence) of this interplay with the self-regulatory connotation of the behaviors that are relevant in the situation.

Current findings also contribute to the general health literature by testing the interplay of self-regulatory orientations and trait-level characteristics. Our strategy to test the *interplay* of habitual orientations with respect to health behavior extends previous research on the correlates of health behaviors which has primarily focused on the test of simple associations between personality characteristics and health behaviors (for a discussion of traits and health behavior, see Smith and Gallo, 2001).

In the next study, we attempted to replicate the initial findings and to extend the analysis of regulatory fit using the kinds of materials individuals often face in the real world: information designed to afford engagement in certain types of health-related behaviors. That is, our goal was to examine the influence of media messages that relate to prevention- and promotion-focused mechanisms of self-regulation within the regulatory fit framework. Specifically, we put the assumption to the test that information designed to encourage the adoption of care-taking health behaviors (cancer detection) is particularly powerful in eliciting willingness to engage in the respective behaviors, when a prevention-focused self-regulatory orientation is combined with worry about health (triggered while

reading the respective information). In addition, we tested whether information designed to encourage the adoption of thrilling and sensation seeking behaviors (diving, surf-boarding, partying) is particularly powerful in eliciting the willingness to engage in the respective behaviors, when a promotion-focused self-regulatory orientation is combined with feelings of thrill and sensation seeking (triggered while reading the respective information).

Thus, in Study 2, we move beyond the interplay of SRF with chronic generalized tendencies to worry about health or to find pleasure in sensation seeking to examine the interplay between SRF and *temporary* feelings of health worry and pleasure in sensation seeking triggered in the moment on the willingness to engage in specific health-related behaviors. Whereas Study 1 focused on general categories of health engagement, in Study 2 we focused on the effects of regulatory fit on willingness to engage in specific behaviors that may have health-promoting or preserving impact (i.e., cancer detection) or health or injury-risking impact (diving, surfboarding, or partying).

Study 2

In keeping with the general logic underlying Study 1, in Study 2 we assessed the motivational impact of two types of health-related information: leaflets designed to encourage adoption of care-taking health behaviors and articles designed to promote eagerness-related thrill and sensation seeking behaviors. We used health materials distributed by Cancer Research UK – to our knowledge the first assessment of the effectiveness of these materials using a SRF fit perspective and the first assessment of the SRF fit model using real-world materials. Health messages typically trigger feelings of worry, anxiety, and fear (e.g., Ruiter, Abraham, & Kok, 2001; Witte & Allen, 2000), while media messages promoting risky sports and leisure activities focus on thrill and excitement (e.g., Celsi, Rose, & Leigh, 1993). In addition to the fit that occurs between different self-regulatory orientations and habitual characteristics such as worry about ill health or pleasure in sensation seeking, another possibility for fit is between self-regulatory focus and the emotions cued by the context.

In light of the fit findings observed in Study 1, we hypothesized that health message leaflets will motivate care-taking behavior, particularly among prevention-focused self-regulators to the extent that they trigger feelings of worry, anxiety, and fear that can be addressed by engaging in the health care-taking behavior. Since promotion-focused self-regulation is associated with eager rather than anxious emotions, we did not expect the leaflets to produce these feelings among promotion-focused individuals. Similarly, we hypothesized that sport and leisure activity leaflets will motivate engagement in these behaviors, particularly among promotion-focused self-regulators to the extent that they trigger feelings of eagerness and excitement that can be enhanced by engaging in the respective leisure and sports activity. Since prevention-focused self-regulation is not associated with eager emotions, we did not expect the leaflets to produce these feelings among prevention-focused participants.

Method

Participants and procedure. Participants were 70 undergraduates (57 women) at the University of Essex, UK ($M_{age} = 22.13$, $SD = 5.15$), who were invited to the lab to take part in a study that was ostensibly designed to assess the relation between personality and the evaluation of print media. They first completed the self-regulatory focus scale and then were asked to carefully read five samples of print media (each containing text and pictures). The samples (two health leaflets describing different kinds of cancer and three magazine ads depicting thrilling activities) were presented in counter-balanced order in a within-subjects design so that either the health leaflets or the leisure activities leaflets were read first. To enhance the credibility of the cover story, participants were asked to evaluate the material in terms of stylistic qualities (e.g., clarity of design, suitability of pictures, and volume of text). The present material was chosen based on pretest ratings of a larger selection of health leaflets and media material depicting health-related and thrilling activities. The health material chosen was rated as triggering the highest level of anxiety and worry regarding one's health and thoughts around death, and the selected leisure activities leaflets were rated as triggering the highest level of thrill and sensation seeking feelings.

Measures and study material

Self-regulatory focus. The same SRF measure as in Study 1 was used in its original English version (Lockwood et al., 2002) with promotion ($M = 5.16$, $SD = 0.99$, $\alpha = 0.90$) and prevention ($M = 4.09$, $SD = 1.02$, $\alpha = 0.81$) SRF scales. As in Study 1, scores were orthogonal, $r = 0.08$, $p = 0.52$.

Health material. Participants read two cancer awareness leaflets published by Cancer Research UK. Women read about breast cancer and skin cancer; men read about testicular cancer and skin cancer. Leaflets briefly described facts (e.g., prevalence) and relevant detection and prevention strategies (e.g., for skin cancer, checking melanoma for their asymmetry, border, color, diameter; for testicular cancer, checking the size and weight of testicles; and for breast cancer, checking breasts for any irregularity by means of breast self-examination).

Thrill and sensation seeking leisure material. Participants read three articles depicting thrilling sensation seeking activities – surfboarding, diving, and partying (attending the Berlin Love Parade), taken from various magazines. All articles focused on the excitement involved in participating.

Readiness to engage. After reading each leaflet or article, participants rated readiness to engage in the respective behaviors on a 6-item 7-point scale assessing perceived relevance and importance of the presented information and level of motivation for and likelihood of engagement in the depicted activity. Sample items are "How relevant is the topic addressed in the article to you personally?" (1 = *not relevant at all*, 7 = *very relevant*), "Please indicate the extent to which you

feel motivated to engage in (e.g., skin cancer detection behaviors/in thrilling and adventurous leisure activities like surfboarding) as discussed in the leaflet/article you have just read.'' (1 = *not at all motivated*, 7 = *very motivated*), ''How likely is it that you would actually engage in (e.g., the skin cancer detection behaviors/in thrilling and adventurous leisure activities like surfboarding) discussed in the leaflet/article in the future?'' (1 = *very unlikely*, 7 = *very likely*). Item responses were highly correlated for each detection behavior, so were averaged to calculate a detection readiness score for breast cancer ($M = 5.83$, $SD = 0.87$, $\alpha = 0.87$), testicular cancer ($M = 5.06$, $SD = 1.30$, $\alpha = 0.91$), and skin cancer ($M = 5.24$, $SD = 1.24$, $\alpha = 0.90$). Readiness to engage in detection behaviors described in each leaflet was moderately correlated with Prevention SRF and Promotion SRF (rs ranging from 0.21 to 0.40 with ps ranging from 0.12 to 0.002).

Similarly, for each type of thrilling behavior, these items were highly correlated and thus were averaged to calculate a readiness score to engage in diving ($M = 3.00$, $SD = 1.19$, $\alpha = 0.87$), surfboarding ($M = 2.67$, $SD = 1.10$, $\alpha = 0.87$), and partying ($M = 2.82$, $SD = 1.36$, $\alpha = 0.92$). These readiness scores did not correlate significantly with either Prevention SRF or Promotion SRF (r's ranging from -0.16 to 0.05 with p's ranging from 0.20 to 0.93).

Triggered feelings of fear and thrill. Participants were asked to what extent (1 = *not at all*, 7 = *very much so*) they experienced ''fear of illness'' and ''fear of death'' while reading the health material and a ''feeling of thrill'' while reading the leisure activity material. A single item triggered thrill measure and a two item triggered fear measure was used (the fear items were highly correlated, $0.63 < r < 0.75$, $\alpha = 0.87$ for breast cancer, $\alpha = 0.90$ for skin cancer, and $\alpha = 0.91$ for testicular cancer). Bivariate correlations showed that Prevention SRF correlated with triggered fear (r's ranging from 0.33 to 0.48 with ps ranging from < 0.001 to 0.10), not with triggered thrill (r's ranging from -0.06 to 0.10 ps ranging from 0.41 to 0.98) and Promotion SRF was uncorrelated with both triggered fear and triggered thrill (r's ranging from 0.48 to 0.99).

Results

Analyses plan. Six multiple regression equations were constructed, one for each readiness to engage hypothesis. Predictors were the standardized prevention and promotion SRF scores, the scores of triggered fear (or thrill) by each message, and relevant interaction terms [established by multiplying pairs of centered variables and interpreted using the Aiken and West (1991) method]. Preliminary analyses did not reveal an effect of order of leaflet presentation or an effect of gender, so neither was included as a factor in the analyses reported below. Given the large preponderance of women in the sample, sample size was small for analyses of the testicular cancer message.

Readiness to engage in cancer detection. As presented in Table II, each regression model accounted for significant amount of variance and the posited interaction

Table II. Study 2: Regressing healthy behaviors and use of stimulant substances onto prevention SRF, promotion SRF, triggered fear, and interaction terms.

	Criterion									
	Breast cancer					Skin cancer				
Predictor	F	R^2	B	SE B	β	F	R^2	B	SE B	β
	3.83**	0.27				11.79***	0.48			
Prevention SRF			0.15	0.13	0.17			0.33	0.12	0.27**
Promotion SRF			0.11	0.12	0.13			0.24	0.14	0.19
Triggered fear (TF)			0.20	0.12	0.23			0.62	0.13	0.50***
Prevention × TF			0.21	0.10	0.31*			0.21	0.11	0.19^{+}
Promotion × TF			−0.01	0.12	−0.01			−0.02	0.12	−0.02
	Testicular cancer									
	4.95*	0.78								
Prevention SRF			0.53	0.27	0.48					
Promotion SRF			0.37	0.49	0.20					
Triggered fear (TF)			0.04	0.34	0.034					
Prevention × TF			0.78	0.29	0.69*					
Promotion × TF			0.46	0.58	0.23					

$^{+}p = 0.059$; *$p < 0.05$; **$p < 0.01$; $p > 0.001$.

between prevention SRF and triggered worry about ill health was always significant (breast cancer, $\beta = 0.31$; testicular cancer, $\beta = 0.69$) or marginally significant (skin cancer, $\beta = 0.19$). Indeed, this interaction was the only significant effect in the model for breast cancer, [$F(5, 51) = 3.83$, $p < 0.01$] and the model for testicular cancer, [$F(5, 7) = 4.95$, $p < 0.05$]. In the model for skin cancer, [$F(5, 64) = 11.79$, $p < 0.01$], this interaction moderated the main effects of prevention SRF ($\beta = 0.27$) and level of triggered worry ($\beta = 0.50$). Decomposing these interactions (following Aiken & West, 1991) showed that the positive effect of triggered fear and worry was found for participants high in prevention SRF ($\beta_{\text{breast}} = 0.24$, $t(51) = 2.01$, $p = 0.05$; $\beta_{\text{skin}} = 0.44$, $t(64) = 2.19$, $p = 0.03$; $\beta_{\text{testicular}} = 1.31$, $t(7) = 2.85$, $p = 0.02$), not for participants low in prevention SRF ($\beta_{\text{breast}} = -0.06$, $p = 0.77$; $\beta_{\text{skin}} = 0.03$, $p = 0.85$; $\beta_{\text{testicular}} = -0.26$, $p = 0.44$). These effects are displayed graphically in Figures 2(a)–(c).

Readiness to engage in thrilling behaviors. The regression models explained a significant amount of variance in readiness to engage in diving ($R^2 = F(5, 64) = 7.46$, $p < 0.001$), surfboarding ($R^2 = F(5, 64) = 5.53$, $p < 0.001$), and partying ($R^2 = F(5, 64) = 19.81$, $p < 0.001$). However, the sole significant predictor was triggered feelings of thrill ($\beta_{\text{diving}} = 0.58$, $t(64) = 5.84$, $p < 0.001$; $\beta_{\text{surfboarding}} = 0.49$, $t(64) = 4.67$, $p < 0.001$; $\beta_{\text{partying}} = 0.79$, $t(64) = 9.77$, $p < 0.001$). Neither promotion SRF nor the interaction between triggered thrill and Promotion SRF predicted engagement in these behaviors.

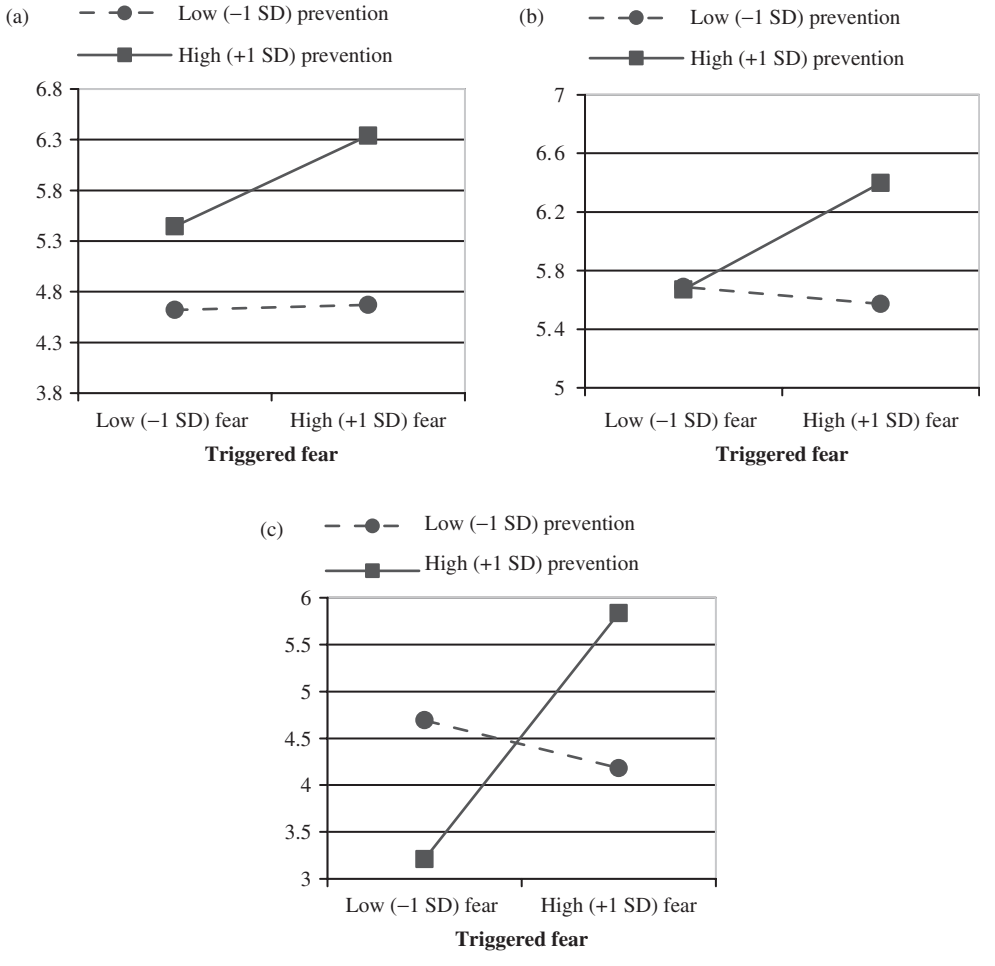

Figure 2. Study 2: Readiness to engage in skin cancer detection behaviors (a), breast cancer detection behaviors (b), and testicular cancer detection behaviors (c) as a function of fear triggered by health information and prevention SRF.

Discussion

The purpose of Study 2 was to extend Study 1 findings into a real-life domain by using a regulatory fit model to test the impact of health information leaflets advocating specific health behavior on the motivation to engage in these behaviors and the impact of media articles advocating specific thrilling behaviors on the motivation to engage in these behaviors. Specifically, we tested the hypotheses that prevention SRF in conjunction with leaflet-triggered feelings of worry and fear would increase readiness to engage in leaflet-advocated health behaviors and that promotion SRF in conjunction with media-triggered feelings of thrill would increase readiness to engage in media-advocated sensation-seeking behaviors. The obtained findings support the first hypothesis, not the second. Readiness to

engage in breast, testicular, and skin cancer detection behaviors was consistently higher among individuals who strongly endorsed prevention-focused self-regulation and experienced high levels of fear triggered by the information presented on each type of cancer – suggesting an effect of prevention fit. Promotion fit was not associated with willingness to engage in the thrilling yet risky leisure pursuits.

Prevention-fit findings are consistent across Study 1 (interaction of chronic health worry and prevention SRF) and Study 2 (interaction of triggered health worry and prevention SRF). In combination, these findings strongly support the regulatory fit assumption in the domain of health care-taking behaviors. Study 2 results are particularly important given that we employed health information leaflets used in everyday contexts meant to increase engagement in performance of important preventive health behaviors (e.g., breast and testicular self-examination). Current findings shed light on the conditions under which this type of health information is likely to increase readiness to perform such behaviors.

The current findings also contribute to the literature on fear appeals in the health domain. Overall, fear appeals appear to have a relatively weak effect on attitudes, intentions, and behaviors (e.g., Witte & Allen, 2000). Level of fear was not manipulated in the current design and the health leaflets did not use direct fear-evoking language. However, the evidence for higher readiness to engage in the behavior encouraged in the leaflets among those who strongly endorsed prevention SRF and for whom the leaflets triggered feelings of fear about illness and death suggests that the effect of fear appeals may be augmented when they are combined with prevention SRF. Overall, our findings suggest that a dose of anxiety regarding potential negative outcomes for one's health might prove useful to motivate predominantly prevention-focused individuals to engage in beneficial health behaviors. Future research explicitly manipulating level of fear induced in consumers of health messages can help test this prediction.

The lack of support for the hypothesized interaction effect between promotion focus and triggered thrill may be attributed to a number of features of the material used in Study 2. While in Study 1 focus was on controlling the body in pursuit of academic goals, in Study 2, we focused on using the body to pursue thrilling but risky leisure goals. Although our materials were effective in triggering thrill and willingness to engage in these activities was a function of triggered thrill, we found neither a main effect of promotion SRF on the use of the body to facilitate these leisure goals nor a promotion-focus by triggered thrill interaction effect. It is possible that effects would have been found if risky behaviors (e.g., excessive alcohol use) were linked to other goals (e.g., popularity). Moreover, future research should examine the interaction between promotion-focus, pleasure in sensation seeking and less extreme risky health behaviors that are more similar to drinking coffee to keep going – such as perhaps eating junk food or forgoing one's exercise routine, in eager pursuit of other normative goals such as getting ahead on the job or at school.

General discussion

In the current article, we tested the hypothesis that willingness to engage in distinct health behaviors may be evoked by experienced 'fit' between habitual self-regulatory orientation and relevant chronic or triggered tendencies or feelings. Specifically, in Study 1 we hypothesized and found increased engagement in care-taking behaviors among individuals high in prevention focus who are also high in worry about health. In the same study, while promotion focus was also associated with engagement in care-taking behaviors, we also hypothesized and found increased willingness to use stimulants to control the body in pursuit of academic goals among promotion-focused individuals who report pleasure in sensation seeking. In Study 2, we moved beyond the interplay of SRF with chronic generalized tendencies to examine the interplay between SRF and *temporary* feelings of health worry and pleasure in sensation seeking triggered in the moment on the willingness to engage in specific health-related behaviors. Specifically, in Study 2 we hypothesized and found an effect of fit between prevention SRF and momentary feelings of health worry triggered by real cancer leaflets on readiness to engage in cancer detection behaviors. We also hypothesized fit effects between promotion SRF and momentary feelings of thrill triggered by magazine articles that focus on specific thrilling activities on readiness to engage in potentially pleasurable activities that may result in injuries or other detrimental health outcomes. Findings did not support this fit hypothesis; the sole predictor of such readiness was the momentary feelings of thrill triggered by the articles. Thus in two studies, we established that likelihood to engage in health care-taking behaviors was higher among those that endorsed a prevention SRF and who are also high in worry about health (Study 1) or who have had worry about health triggered in the moment (Study 2).

Current findings contribute to the existing literature on self-regulatory fit by providing initial evidence that fit between habitual chronic SRF and personal tendencies (i.e., worry about health and pleasure in sensation seeking) impact distinct health behaviors. Neither worrying about health nor being prevention-focused alone was sufficient to increase engagement in health care-taking, but the combination of worry and prevention focus had the desired effect. Importantly, this interaction effect was replicated with real cancer leaflets, where temporarily triggered feelings of health worry were measured. Current findings also contribute to the existing health literature by increasing understanding of when fear appeals are likely to have effects and by providing evidence of interaction effects of different habitual tendencies on health behavior. Overall, our findings suggest that self-regulatory fit theory illuminates how motivational styles interact with habitual tendencies and concerns and feelings evoked by situational features to produce health-related outcomes.

The current studies measured the regulatory fit effects on self-reported engagement and self-reported readiness to engage in certain health behaviors. How these effects translate into actual behavior remains to be tested. It also remains to be tested whether findings observed in Study 1 with respect to the

regulatory fit effects based on the interaction between promotion SRF and sensation seeking on engagement of risky health behaviors can be replicated with other behaviors that might help one pursue a goal in the short run but may jeopardize health in the long run. Finally, the currently observed effects need to be replicated in different samples employing different age and cultural groups.

Applied implications and future directions

The current studies focused on fit effects on health care-taking and willingness to engage in cancer detection behaviors. We assume that the observed fit effects are generalizable to other kinds of health behaviors (e.g., sticking to daily exercise or diet regimes) and may help understanding the processes underlying well-established links between personality (e.g., hostility, conscientiousness), and chronic diseases such as diabetes and cardiovascular disease (Smith & Gallo, 2001). Although we did not yet document the connection between fit effects and actual behavior, our findings already have clear implications for health intervention and highlight the need for a number of next steps to clarify the process. While Study 2 did examine situationally triggered worry and fear about illness and death, we did not attempt to manipulate *amount* of worry or whether promotion or prevention focus was made salient in the moment. Manipulating amount of worry would allow for a more precise exploration of fit (e.g., prevention and worry), allowing for estimate of the level of worry most effective for various messages with which level of prevention (or promotion) SRF. Prior research demonstrates that prevention and promotion focus can be situationally cued – everyone is capable of both (e.g., Freitas, Liberman, & Higgins, 2002; Shah et al., 1998). By experimentally manipulating both worry and SRF and using varying health outcomes, it will be possible to have a more precise sense of the range of levels of worry and levels of prevention SRF that are effective in cuing various health behaviors.

Our findings highlight the importance of prevention fit. Certainly health interventions sometimes do employ reminders of the negative consequences of risky health-related behaviors. This tactic is commonly used in efforts to reduce smoking (including for example, cigarette packages with text detailing health risk or visual images of cancerous lungs). By asking for whom and under what circumstances these reminders are effective within a fit model, it may be possible to understand when interactive effects of worry and fear work. Our findings suggest that negative consequence reminders are particularly useful when both prevention and worry are cued. With regard to promotion fit, the media is replete with images and messages promoting the thrilling aspects of risky activities (e.g., engaging in unprotected sexual intercourse, drinking in excess, taking drugs). These messages may be particularly influential when they fit with a promotion SRF. Our results also suggest a useful integration between the regulatory fit and other self-regulatory models. For example research with adolescents on their possible or imagined future selves central to their self-regulation have documented the behavioral consequences of salient possible selves using

nonself-report measures such as school records of attendance, teacher-report of behavior, and standardized test scores (e.g., Oyserman, Bybee, & Terry, 2006). The evidence shows that positive possible selves focused on becoming popular are associated with negative consequences such as increased risk of initiation of substance use and negative possible selves focused on becoming 'off-track' (e.g., a drug-user, pregnant) predict positive consequences such as better school attendance (for a review, see Oyserman & Fryberg, 2006). Translating regulatory fit effects reported in the current paper into interventions may require effectively engaging these future images.

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Appendix

Health care-taking items (7-point scale: 1 = not at all true for me, 7 = true for me)

1. I always wear a seat belt when driving in a car.
2. I do not drive a car or other vehicle when I had been drinking alcohol.
3. I do not ride in a car or other vehicle driven by someone who had been drinking alcohol.
4. I do not use drugs even when I feel that this might lead to being left out of a social group.

5. I make a point of eating vegetables and fruits to keep myself healthy.
6. When I'm approaching a traffic light that is about to switch to the red light, I often drive on with constant speed. (reverse-coded)
7. I don't engage in sexual intercourse without protecting myself against potential sexually transmitted diseases.
8. If I have a minor physical symptom, I immediately make an appointment with my physician.
9. I always make sure to get at least 7–8 h of sleep each night.
10. I make sure to have regular meals even at times where I'm heavily under time pressure and work load.
11. I resist from grabbing fast food to save time even when I'm very busy and have little leisure time.
12. If I physically feel down, I take some time off to rest and to recover.

Risky health behaviour/substance use items (7-point scale: 1 = not at all true for me, 7 = true for me)

1. In order to stay awake during times I have to study hard, I consume lots of coffee.
2. I am open to using stimulants that help me decrease my sleepiness and improve my alertness during the times I need to stay awake.
3. I am open to using medication that helps me increase my achievement potential.
4. If I feel like I have flu, I immediately start taking flu medication to keep myself going.
5. Even if my body feels like needing to rest, I consume coffee or take alerting medication to keep myself going.
6. I consider taking pharmaceutical substances to increase my sexual performance.