Targeted communication about health behaviors seems to be more effective than mass communication in which undifferentiated audiences receive identical messages. Regulatory focus is a psychological variable that can be used to build two target groups: promotion-focused or prevention-focused people. It is hypothesized that targeting messages to an individual’s regulatory focus creates regulatory fit and is more successful to promote a physically active lifestyle than nonfit messages. Two different print messages promoting a physically active lifestyle derived from regulatory focus theory (promotion message vs. prevention message) were randomly assigned to \( N = 98 \) participants after measuring their regulatory focus. It was examined whether regulatory fit between the regulatory focus and the assigned print message would lead to more positive evaluations in the dependent variables inclination toward the message (preference for the message), intention to perform the behavior, prospective and retrospective feelings associated with the behavior (positive and negative), and perceived value of the behavior directly after reading the message. Hierarchical linear regression analyses revealed that regulatory fit led to stronger intentions in the prevention-message condition and more prospective positive and retrospective positive feelings associated with the behavior in the promotion-message condition in contrast to the nonfit conditions. Prospective positive feelings associated with the behavior mediated the effect of regulatory fit on intention. The results partly provided support for the regulatory fit concept. Matching print messages to the regulatory focus of individuals seems to be a useful approach to enhance physical activity motivation. Future studies should include an objective measure of physical activity behavior.

**Keywords:** regulatory focus, promotion focus, prevention focus, persuasion, targeted communication

Participating in regular physical activity can have positive effects on physical health and well-being. However, only a small proportion of the population in western industrialized countries participates in sufficient physical activity to achieve those benefits (European Commission, 2010). Changes in lifestyle are a major goal in preventing widespread illnesses, such as cardiovascular disease or diabetes. One of the greatest public health challenges is to develop effective health behavior change programs (Glanz, Rimer, & Lewis, 2002; Noar, Benac, & Harris, 2007).

Health communication is an important aspect of health behavior change because it can provide relevant health information, produce a desire for behavior change, and can reach a big audience with manageable resources (Hawkins, Kreuter, Resnicow, Fishbein, & Dijkstra, 2008; Noar et al., 2007). Targeted health communication refers to messages that are developed with a certain segment of the population in mind (Noar et al., 2007). It is assumed that targeted communication is more effective than general communication because it fits with the unique needs, interests and concerns of the individual. However, research is needed to clarify the mechanisms (potential mediators) underlying this congruency effect (Updegraff, Sherman, Luyster, & Mann, 2007). To examine these potential mechanisms was the primary goal of the current study. Audience segments are often built based upon demographic categories (Hawkins et al., 2008). However, target groups can also be built based upon psychological factors (e.g., personality traits), such as an individual’s regulatory focus.

Regulatory focus is an extension of the basic hedonic principle of approach and avoidance and includes distinct needs and self-regulatory strategies (Lee, Aaker, & Gardner, 2000). Regulatory focus theory distinguishes between promotion and prevention focus as a disposition that is a lasting effect of different learning styles and standard values in the course of socialization (Higgins, 1998, 2000; Lee, Aaker, & Gardner, 2000). A promotion focus is concerned with advancement and accomplishment and with the presence and absence of positive outcomes (gains and nongains), whereas the prevention focus is concerned with safety and responsibility and with the absence and presence of negative outcomes (nonlosses and losses). To achieve a goal, different self-regulatory systems are postulated. Eagerness (approach) means fit with a promotion orientation, and vigilance (avoidance) means fit with a prevention orientation, which is proposed...
as regulatory fit (Higgins, 2000). Regulatory fit makes people *feel right* about what they do and intensifies their motivation (Avnet & Higgins, 2006; Higgins, 2000; Hong & Lee, 2008).

Regulatory focus theory is a useful framework to develop health communication. Regarding physical activity behavior, messages could emphasize the pursuit of gains achieved with compliance (e.g., “A physically active lifestyle leads to improved sport performance and energy”) and therefore induce the use of goal means to ensure positive outcomes (ideal goals or approach goals) that inspire achievement and accomplishment. In contrast, messages could emphasize the avoidance of losses associated with compliance (e.g., “A physically active lifestyle helps you to prevent coronary heart disease and bad mood”) and induce the use of goal means to avoid negative outcomes (ought goals or avoidance goals) and the fulfillment of duties, obligations, and security needs.

In general, gain-framed messages (focusing on gains and nonlosses) often have been suggested to be more successful than loss-framed messages (focusing on losses and nongains) as they emphasize the advantages of compliance. O’Keefe and Jensen (2007) presented a meta-analytic review about the relative persuasiveness of gain-framed versus loss-framed messages for encouraging disease prevention behaviors. The results for the eight studies conducted in the context of physical activity behavior that were included in the review revealed no significant difference between gain-framed and loss-framed messages on measured outcome variables like attitude, postcommunication agreement, behavioral intention, or behavior. Even though statistical power for the physical activity behavior analyses was low (.59), the authors conclude that using a gain-framed appeal rather than a loss-framed appeal will not make much difference to the success of such messages in the context of physical activity behavior. In contrast, Idson, Liberman, and Higgins (2000) have shown against the background of regulatory focus theory that participants’ ratings of how good it would feel to pay what they would like for a book were higher when it was a prevention-focus gain than when it was a prevention-focus nonloss and participants’ ratings of how bad they would feel to pay more than they would like for a book were higher when it was a prevention-focus loss than when it was a promotion-focus nongain.

In the context of physical activity behavior, only a few studies have concentrated on the effect of health communication based on regulatory focus theory and the regulatory fit hypothesis. Latimer, Rivers, Rench, et al. (2008) used a telephone-based experimental study design to examine regulatory fit hypothesis within the context of physical activity. The authors postulate five indirect indicators that reflect the value derived from regulatory fit: (1) intention to engage in the behavior (motivation), (2) inclination toward the message (preference for the message), (3) prospective feelings associated with the behavior (imagining feeling good or bad about engaging in the behavior in the future) and (4) retrospective feelings associated with the behavior (feeling good or bad after engaging in the behavior in the past), and (5) the value assigned to the behavior (perceiving the behavior as worthwhile). Regression analyses revealed that regulatory fit had a significant effect on inclination toward the message, prospective feelings, and retrospective feelings. For physical activity level 2 weeks later, the results revealed a significant interaction effect: promotion messages led to an increased physical activity level in participants with a predominant promotion focus. There was no significant relationship between participants’ prevention focus and prevention message and the physical activity level 2 weeks later. The authors explain this lack with the prevention-message framing. They used a message that underlines the costs associated with failing to engage in the target behavior (e.g., “Inactivity increases the risk of cancer”) instead of a message highlighting the costs avoided from activity (e.g., “Physical activity reduces the risk of cancer”). The authors propose that the use of prevention messages that highlight the costs avoided from being physically active would have strengthened the design of their experiment and would have created a stronger feeling of fit. Daryanto, de Ruyter, Wetzel, and Patterson (2010) report comparable results for a customer loyalty program in a health club setting. Regulatory fit between the regulatory focus and the type of an offered reward had a positive impact on value perception and exercise intention in contrast to nonfit conditions.

In the current study, two print messages focusing on possible gains from being physically active (promotion message) on one hand and, in contrast to Latimer et al. (2008), focusing on costs avoided when complying with the recommendations (prevention message) on the other hand are examined regarding the regulatory fit hypothesis. It is assumed that the regulatory focus of a person will moderate the effect of the type of message on the value derived from fit variables through regulatory fit or nonfit. The focus of the current study lies on the potential mediators (mechanisms) that can explain the regulatory fit effect on behavior. The first goal of the study was to test if regulatory fit leads to the experience of *feeling right*, which is transferred to indirect indicators that reflect the value derived from regulatory fit. Hypothesis 1 states that the effect of the type of the message is moderated by the regulatory focus of a person and that regulatory fit between the type of the message and the regulatory focus of a person leads to more positive evaluations of *intention* to be physically active, *inclination* toward the message, *prospective* and *retrospective* feelings associated with engaging in physical activity, and *perceived goal value* (Figure 1). These dependent variables are postulated to be mediators between regulatory fit and physical activity behavior.

Intention to perform the behavior was of primary interest in the current study. It can be assumed that intention to perform the behavior is significantly related to physical activity behavior as motivational theories as well as empirical evidence has shown this association repeatedly (Hagger, Chatzisarantis, & Biddle, 2002). Latimer et al. (2008) could show that the regulatory fit...
Regulatory Fit Messages and Physical Activity

between the appropriate arguments used in a message and the regulatory focus of a person produced more positive prospective and retrospective feelings associated with the behavior than nonfit messages. Baumeister, Vohs, DeWall, and Zhang (2007) presume that emotions and feelings associated with the behavior do not directly cause behavior but result in cognitive processing and affect behavior through the intention to perform the behavior (Wang, 2011). Prospective feelings associated with the behavior are comparable with the construct of the anticipatory affect that reflects how respondents feel about performing the behavior (affective component of attitude; French, Sutton, Hennings, et al., 2005; Loewenstein, Weber, Hsee, & Welch, 2001). Anticipatory affect was shown to be significantly related to intention (Lowe, Eves, & Carroll, 2002). Therefore, it is assumed that the effect of regulatory fit on behavior can not only be seen as a single-step multiple mediator model as proposed by Latimer et al. (2008; Hayes, 2009), but that intention can also be influenced indirectly through prospective and retrospective feelings associated with the behavior. According to Hayes (2009), a multiple-step multiple-mediator model is proposed as research model for the current study (Figure 1). As behavioral beliefs will be experimentally manipulated, it is not possible to examine how emotions or feelings associated with the behavior guide behavioral beliefs (Frazier, Tix, & Barron, 2004). Therefore, the second goal of the study was to test the proposed multiple-step multiple-mediator model, and Hypothesis 2 assumes that prospective and retrospective feelings associated with the behavior are mediators of the regulatory fit effect on intention.

Figure 1 — Research model of the study “Regulatory fit messages and physical activity motivation.” Note. Broken pathways and variables are not examined in the current study. Abbreviations: Prospect. Feelings = prospective feelings; Retrospect. Feelings = retrospective feelings; Inclination = inclination toward the message; Goal Value = perceived goal value.

Method

Participants

A total of 98 adults (54 males, 44 females) with a mean age of 41.2 years (SD = 10.18; range: 20–65) participated voluntarily in the study. Of the sample, 53.1% had at least a university-entrance diploma and only 46.9% reported a lower education. Sixty-nine participants (n = 69; 70.4%) indicated they were physically active regularly. Physical activity level for the whole sample was high with $M = 157.20$ min/week ($SD = 162.30$).

Preliminary Study

In a preliminary study, participants (N = 104; 39 males and 65 females, age $M = 35.83$, $SD = 12.64$) were asked to indicate for different physical activity goals and outcomes if they are perceived as promotion goals, prevention goals, or neither (e.g., “Physical activity gives you more energy” or “Physical activity helps to become more resistant toward stress”). The basic tenets of the regulatory focus theory were explained in a short instruction. Furthermore, participants were asked how convincing they perceived these exercise goals or outcomes. Subsequently, two experts in the area of sport and exercise motivation (one with an expertise in regulatory focus theory) were asked to check the answers of the participants and to exclude items that did not theoretically fit to the assigned focus. Based on these assessments, 13 promotion goals and 13 prevention goals were selected to create the messages for the two conditions (see Appendix.
A for the promotion message and Appendix B for the prevention message). The two texts had the same structure but included either promotion goals or prevention goals. Messages included the recommendations for a physically active lifestyle published by the American College of Sports Medicine (ACSM, 2007). It is suggested to accomplish moderate physical activities for at least 30 min almost every day of the week. The t test revealed that the goals used in both messages were comparably convincing with $M = 5.86$ for the promotion message and $M = 5.69$ for the prevention message, $t(103) = -1.95, p > .05$, rated on a scale from 1 (not at all convincing) to 7 (totally convincing).

**Procedure**

Participants were recruited at the University of Leipzig from October to December 2011 and were contacted and tested by trained assistants. Participants were called by telephone and asked if they would voluntarily participate in a study about physical activity motivation. If they agreed, an appointment was arranged at the participant’s home or in an office of the University. The experiment was run in face-to-face situations and took 20 min. The experimenter explained that he/she was interested in how adults perceive messages to promote a physically active lifestyle and informed consent was obtained. An inclusion criterion was being at least 20 years old because physical activity behavior decreases during adulthood (European Commission, 2010). After school attendance, people have to self-organize their physical activity as they are not involved in physical education classes anymore. Furthermore, participants had to be physically and mentally able to participate in regular physical activity. Therefore, they were asked if there was any known contraindication to being physically active in a regular way. None of the participants indicated any reason for not being allowed to be physically active.

Participants had to answer questions regarding sociodemographic aspects (e.g., age, gender, education, exercise behavior) and regulatory focus. Physical activity behavior was measured with one question: “In general, how many minutes per week are you physically active with moderate intensity?” As physical activity was used as control variable in the current study, it was decided to use an economical but reliable and valid measurement to assess physical activity behavior. Milton, Bull and Baumann (2011; Gill, Jones, Zou, & Speechley, 2012) show that a single-item measure of physical activity performed as well as other short physical activity tools in terms of reliability and concurrent validity. Afterward, participants were allocated at random to one of the two conditions on the basis of a draw. Forty-seven participants were assigned to the promotion goal condition and $n = 51$ to the prevention goal condition. Participants were asked to read the respective message and to fill in a standardized questionnaire including manipulation checks and measuring dependent variables. No monetary compensation was given for participation.

**Measures**

**Independent Variable.** Regulatory focus was measured with a German version of the Lockwood scale by Lockwood, Jordan, and Kunda (2002; Keller & Bless, 2006). The questionnaire included two scales assessing promotion focus (e.g., “I frequently imagine how I will achieve my hopes and aspirations”) and prevention focus (e.g., “In general, I’m focused on preventing negative events in my life”) with nine items each. All items were measured on a 7-point scale ranging from 1 (not at all true of me) to 7 (very true of me). Internal consistency was reported with $\alpha = .81$ for promotion and $\alpha = .75$ for prevention scale (Lockwood et al., 2002). In the current study, Cronbach’s alphas for the promotion ($\alpha = .80$) and the prevention measure ($\alpha = .74$) were satisfactory and comparable with those of the English version. Even though promotion focus and prevention focus are postulated to be independent of each other, the scales were slightly correlated, $r = .29, p < .01$. Predominant regulatory focus was calculated as the difference between the promotion scale and the prevention scale. Higher values on this scale represent a predominant promotion focus, whereas lower values represent a predominant prevention focus. For descriptive statistics see Table 1.

### Table 1  Descriptive Statistics for Age, Physical Activity, Promotion Focus, Prevention Focus and the Predominant Regulatory Focus ($n = 98$)

<table>
<thead>
<tr>
<th>Scale</th>
<th>$M$</th>
<th>$SD$</th>
<th>Min</th>
<th>Max</th>
<th>Median</th>
<th>SE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>41.17</td>
<td>10.18</td>
<td>20</td>
<td>65</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Physical Activity (min/week)</td>
<td>157.20</td>
<td>162.30</td>
<td>0.00</td>
<td>900.00</td>
<td>120.00</td>
<td>16.39</td>
</tr>
<tr>
<td>Promotion Focus</td>
<td>4.49</td>
<td>0.99</td>
<td>1.22</td>
<td>6.78</td>
<td>4.56</td>
<td>0.10</td>
</tr>
<tr>
<td>Prevention Focus</td>
<td>3.40</td>
<td>0.95</td>
<td>1.44</td>
<td>6.56</td>
<td>3.28</td>
<td>0.10</td>
</tr>
<tr>
<td>Predominant Regulatory Focus</td>
<td>1.09</td>
<td>1.15</td>
<td>-2.11</td>
<td>4.11</td>
<td>1.00</td>
<td>0.12</td>
</tr>
</tbody>
</table>

*Note.* 7-point scale from 1 (not at all true of me) to 7 (very true of me); predominant regulatory focus was calculated as the difference between the promotion focus scale and the prevention focus scale. Higher values on the scale predominant regulatory focus represent a predominant promotion focus whereas lower values represent a predominant prevention focus.
Dependent Variables. As dependent variables, the value derived from fit variables proposed by Latimer et al. (2008) were assessed. Intention was assessed using two items: “I intend / I plan to be physically active for at least 30 minutes almost every day of the week with moderate intensity during the next weeks.” The items were rated on a scale ranging from 1 (not at all true) to 7 (absolutely true), Cronbach’s α = .95. Inclination toward the message was measured with three items evaluating how believable, informative, and interesting participants perceived the message using a 1 (not at all) to 7 (extremely) scale, Cronbach’s α = .82 (Latimer et al., 2008; Brug, Steenhuis, van Assema, & de Vries, 1996). In contrast to the study of Latimer et al. (2008) that used semantic differential scales for measuring prospective feelings associated with the behavior, positive and negative feelings were measured separately in the current study to be able to detect the separate effects of regulatory fit on positive and negative feelings. Mohiyeddini and Bauer (2007) developed a measurement to assess emotions associated with physical activity behavior. Prospective feelings were measured with four items that were preceded by the sentence, “Please indicate how you feel when you are thinking about being physically active for at least 30 minutes almost every day of the week with moderate intensity during the next weeks.” Two items representing positive feelings were happy and cheerful, Cronbach’s α = .78, and the two items representing negative feelings were sad and uncomfortable, Cronbach’s α = .71. The items were answered on a 7-point scale from 1 (not at all) to 7 (very much). The same items were used to assess retrospective feelings associated with past physical activity behavior preceded by the sentence, “Please indicate how you felt in the past about being physically active.” Cronbach’s alpha for the retrospective positive feelings was .76, and for retrospective negative feelings, α = .74 (Mohiyeddini & Bauer, 2007). Perceived goal value was measured with the item “How valuable is it for you to be physically active for at least 30 minutes almost every day of the week with moderate intensity during the next weeks?” The scale ranged from 1 (worthless) to 7 (valuable) (Latimer et al., 2008).

Data Analyses

The study of Latimer et al. (2008) revealed an overall effect for predicting physical activity behavior of $f^2 = .07$. Effect sizes for the value derived from fit variables were between $f^2 = .05$ and $f^2 = .13$. Therefore, we expected small effect sizes for the current study. A priori power calculation for linear multiple regression analysis revealed a total sample size of $N = 90$ based on an expected effect size of $f^2 = .07$, given a statistical power of $(1 – β) = .80$ and a level of significance of α = .05 (G*Power 3.1; Faul, Erdfelder, Lang, & Buchner, 2007).

The program SPSS was used for data screening and data analyses. Hierarchical multiple regression analyses were carried out to test Hypothesis 1. In all analyses, the predictor variables were standardized ($z$ transformed) in the case of continuous variables and dummy coded in the case of dichotomous variables. In the first step, physical activity (minutes per week) was entered as control variable. Experimental condition and predominant regulatory focus (difference between the promotion scale and the prevention scale) were entered in a second step. The two-way interaction term Condition × Regulatory Focus, which was the predictor of interest, was entered in the third step. Separate analyses for intention, inclination toward the message, prospective positive/negative feelings, retrospective positive/negative feelings, and goal value as dependent variables were conducted. To specify the Condition × Regulatory Focus interaction effects, separate regression equations were conducted for each experimental condition with predominant regulatory focus as predictor controlling for physical activity (Latimer et al., 2008).

Effect sizes for the relevant steps calculated are proposed by Aiken and West (1991): $f^2$ is the proportion of systematic variance accounted for by the interaction relative to the unexplained variance of the criterion. Effect sizes were categorized by convention by Cohen (1988): $f^2 = .02$ is categorized as small effect, $f^2 = .15$ as medium effect, and $f^2 = .35$ as a large effect.

To test Hypothesis 2, mediational analysis are conducted. Although SEM procedures are considered to be the preferred method to perform a mediational analysis, Quintana and Maxwell (1999; Frazier, Tix, & Barron, 2004) state that the sample size should be at least 200 to perform SEM analysis, which is not given in the current study. Hence, following the suggestions of Baron and Kenny (1986), which is one the most conservative tests of mediation (Cerin & MacKinnon, 2008; Frazier et al., 2004), Hypothesis 2 was examined in four steps using regression analyses. In addition, Sobel Z tests were conducted (MacKinnon, Ward, & Dwyer, 1995) to test the significance of the indirect effects. Significance was set at $p < .05$ for all analyses.

Results

Preliminary Analyses

Analyses of variance revealed no significant differences between the participants in the promotion-message and prevention-message conditions in age, $F(1,96) = 0.25$, $p > .05$; physical activity (min/week), $F(1,96) = 0.19$, $p > .05$; promotion scale, $F(1,96) = 0.03$, $p > .05$; prevention scale, $F(1,96) = 0.50$, $p > .05$; and gender, $\chi^2(1, N = 98) = 3.99$, $p > .05$.

Manipulation Check

To check whether manipulation was successful and the texts were interpreted by the participants in the intended way, participants were asked to indicate in relation to the text they read on two items: (1) how strongly regular physical activity is perceived as a means to prevent negative outcomes (means of vigilance) and (2) how strongly...
regular physical activity is perceived as a means to reach advancement and accomplishment (means of eagerness). The items were answered on a 7-point scale from 1 (not at all) to 7 (very much). A multivariate analysis of variance revealed a significant main effect for the factor text, \( F(1,96) = 4.77, p < .01; \eta^2 = .09 \) (\( \eta^2 \) is the explained variance). As expected, the mean for the promotion message on Item 1 was \( M = 5.32 (SD = 1.40) \) and on Item 2 \( M = 5.81 (SD = 1.04) \), and for the prevention message was \( M = 5.86 (SD = 1.40) \) for Item 1 and \( M = 5.47 (SD = 1.04) \) for Item 2. These results imply that the manipulation was successful.

**Main Analyses**

**The Impact of Condition and Regulatory Focus on Value Derived From Fit Variables.** Hierarchical multiple regression analyses were conducted to examine Hypothesis 1. The collinearity diagnostics did not reveal any problems for all analyses described below. The results are shown in Table 2.

**Intention.** In Step 1, physical activity significantly predicted intention, \( \Delta R^2 = .123, \Delta F(1,96) = 13.50, \beta = .35, p = .000, f^2 = .14 \) (\( \Delta R^2 \) is the change of \( R^2 \) in the respective step). The more active the participants were, the higher was their intention to be physically active during the next weeks. Step 2 variables did not add a significant increase in explained variance, \( \Delta R^2 = .006, \Delta F(2,94) = 0.33, p = .721 \). However, Step 3 interaction added a significant increase in explained variance, \( \Delta R^2 = .043, \Delta F(1,93) = 4.81, p = .031, f^2 = .04 \). In line with hypothesis, the interaction term Condition \( \times \) Regulatory Focus was significant (\( \beta = -.21, p = .031 \)). Regulatory focus moderated the effect of condition on intention. In the promotion-message condition, regulatory focus was positively but not significantly correlated with intention, \( \Delta R^2 = .008, \beta = .10, p = .484 \). In the prevention-message condition, regulatory focus was negatively related to intention but the effect was only marginally significant, \( \Delta R^2 = .058, \beta = -.24, p = .085, f^2 = .06 \). Figure 2 shows the interaction using mean values after conducting median split procedure for the predominant regulatory focus scale.

**Inclination Toward the Message.** Physical activity did not predict inclination toward the message in the first step, \( \Delta R^2 = .003, \Delta F(1,96) = 0.32, p = .574 \). Step 2 also did not reveal a significant amount of explained variance, \( \Delta R^2 = .021, \Delta F(2,94) = 1.02, p = .363 \). Furthermore, Step 3 did not reveal a significant result, \( \Delta R^2 = .009, \Delta F(1,93) = 0.09, p = .349 \).

**Prospective Positive Feelings.** In Step 1, physical activity significantly predicted prospective positive feelings associated with the behavior, \( \Delta R^2 = .19, \Delta F(1,96) = 18.14, \beta = .40, p = .000, f^2 = .19 \). The more active the

### Table 2  Hierarchical Multiple Regression Analyses With Condition, Regulatory Focus, and Their Interaction as Predictors of Value Derived From Fit Variables Controlling for Physical Activity

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>( B )</td>
<td>( R^2_{corr} )</td>
<td>( \Delta R^2 )</td>
<td>( B )</td>
<td>( R^2_{corr} )</td>
<td>( \Delta R^2 )</td>
<td>( B )</td>
</tr>
<tr>
<td>Step 1</td>
<td>( .11*** )</td>
<td>.114***</td>
<td>.001</td>
<td>( .15*** )</td>
<td>.16***</td>
<td>-.01</td>
<td>.000</td>
</tr>
<tr>
<td>PA</td>
<td>( .65*** )</td>
<td>.00</td>
<td>.021</td>
<td>( .14 )</td>
<td>.15</td>
<td>-.15</td>
<td>.16</td>
</tr>
<tr>
<td>Step 2</td>
<td>( .10** )</td>
<td>.006</td>
<td>.012</td>
<td>( .10** )</td>
<td>.053†</td>
<td>.02</td>
<td>.053†</td>
</tr>
<tr>
<td>C</td>
<td>-.08</td>
<td>.15</td>
<td>.14</td>
<td>-.25†</td>
<td>.02</td>
<td>.010</td>
<td></td>
</tr>
<tr>
<td>RF</td>
<td>-.14</td>
<td>-.14</td>
<td>.13</td>
<td>-.19</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Step 3</td>
<td>( .14** )</td>
<td>.043*</td>
<td>.009</td>
<td>( .20** )</td>
<td>.06**</td>
<td>.02</td>
<td>.16</td>
</tr>
<tr>
<td>C ( \times ) RF</td>
<td>-.44*</td>
<td>-.15</td>
<td>-.25**</td>
<td>.6</td>
<td>.48</td>
<td>.02</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Retro. Pos. Feelings</td>
<td>( B )</td>
<td>( R^2_{corr} )</td>
<td>( \Delta R^2 )</td>
<td>( B )</td>
<td>( R^2_{corr} )</td>
<td>( \Delta R^2 )</td>
<td>( B )</td>
</tr>
<tr>
<td>Step 1</td>
<td>( .14*** )</td>
<td>.146***</td>
<td>.00</td>
<td>( .03* )</td>
<td>.04*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PA</td>
<td>( .53*** )</td>
<td>.10</td>
<td>.012</td>
<td>.03</td>
<td>.02</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Step 2</td>
<td>( .18*** )</td>
<td>.059*</td>
<td>.026</td>
<td>.03</td>
<td>.02</td>
<td></td>
<td></td>
</tr>
<tr>
<td>C</td>
<td>.30*</td>
<td>-.07</td>
<td>.03</td>
<td>.27</td>
<td>.04</td>
<td>.02</td>
<td></td>
</tr>
<tr>
<td>RF</td>
<td>.15</td>
<td>-.15</td>
<td>.27</td>
<td>.04</td>
<td>.02</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Step 3</td>
<td>( .22*** )</td>
<td>.043*</td>
<td>-.00</td>
<td>-.13</td>
<td>.04</td>
<td>.02</td>
<td></td>
</tr>
</tbody>
</table>

**Note.** *\( B \) in respective step; PA = physical activity; C = condition; RF = regulatory focus; Prosop. Pos./Neg. = prospective positive/negative; Retro. Pos./Neg. = retrospective positive/negative; \( \dagger p < .10; \ast p < .05; \ast \ast p < .01; \ast \ast \ast p < .001 \).
participants were, the more prospective positive feelings they reported. Step 2 did not reveal a significant effect, $\Delta R^2 = .015, \Delta F(2,94) = 0.85, p > .05$. However, Step 3 interaction added a significant increase in explained variance, $\Delta R^2 = .061, \Delta F(1,93) = 7.45, p = .008; f^2 = .06$. The interaction term Condition × Regulatory Focus was significant ($\beta = -.25; p = .008$). In the promotion-message condition, regulatory focus was correlated positively with prospective positive feelings, $\Delta R^2 = .123, \beta = .38, p = .009, f^2 = .14$, and in the prevention-message condition, regulatory focus was not significantly related to prospective positive feelings, $\Delta R^2 = .022, \beta = -.15, p = .270$. Figure 3 illustrates this interaction effect.

**Prospective Negative Feelings.** In the first step, physical activity did not predict prospective negative feelings associated with the behavior, $\Delta R^2 = .000, \Delta F(1,96) = 0.01, p = .931$. Step 2 revealed a marginally significant amount of explained variance, $\Delta R^2 = .053, \Delta F(2,94) = 2.63, p = .077, f^2 = .06$. However, Step 3 did not increase the explained variance significantly, $\Delta R^2 = .010, \Delta F(1,93) = 1.04, p = .311$.

---

**Figure 2** — Two-way interaction Text × Regulatory Focus for the dependent variable intention.

---

**Figure 3** — Two-way interaction Text × Regulatory Focus for the dependent variable prospective positive feelings.
**Retrospective Positive Feelings.** In Step 1, physical activity significantly predicted retrospective positive feelings, $\Delta R^2 = .146$, $\Delta F(1,96) = 16.47$, $\beta = .38$, $p = .000$, $f^2 = .17$. The higher the activity level of the participants, the more retrospective positive feelings were indicated. Step 2 added a significant amount of explained variance, $\Delta R^2 = .059$, $\Delta F(2,94) = 3.50$, $p = .034$, $f^2 = .06$. The beta-weight for the factor condition is significant ($\beta = .22$, $p = .019$). The prevention-message condition is associated with more retrospective positive feelings than the promotion-message condition. As hypothesized, the Step 3 interaction added a significant increase in explained variance, $\Delta R^2 = .043$, $\Delta F(1,93) = 5.32$, $p = .023$, $f^2 = .05$. The beta-weight for the interaction Condition $\times$ Regulatory Focus was significant ($\beta = –.21$, $p = .023$). In the promotion-message condition, regulatory focus was positively related to retrospective positive feelings, $\Delta R^2 = .066$, $\beta = .28$, $p = .055$, $f^2 = .07$, and in the prevention-message condition, negatively but not significantly, $\Delta R^2 = .012$, $\beta = -.11$, $p = .419$ (Figure 4).

**Mediational Analyses**

Hypothesis 2 was examined in four steps using regression analyses (Baron & Kenny, 1986; Cerin & MacKinnon, 2008; Frazier et al., 2004). First, it was shown that the interaction term Condition $\times$ Regulatory Focus was a significant predictor of intention. Second, it was shown that prospective positive and retrospective positive feelings also were affected by the interaction Condition $\times$ Regulatory Focus. Third, in two separate regression analyses controlling for physical activity and adjusting for the independent variable (Condition $\times$ Regulatory Focus), it was shown that prospective positive feelings, $\Delta R^2 = .12$, $\beta = .39$, $p = .000$, and retrospective positive feelings, $\Delta R^2 = .03$, $\beta = .21$, $p < .047$, were significant predictors of intention. In the final step, prospective positive and retrospective positive feelings were examined as mediators. Perfect mediation exists if the independent variable (interaction Condition $\times$ Regulatory Focus) has no effect on the dependent variable (intention) when the mediator (prospective and retrospective positive feelings) is controlled (Baron & Kenny, 1986; Cerin & MacKinnon, 2008; Frazier et al., 2004). Therefore, separate hierarchical regression analyses for intention as dependent variable were conducted controlling for physical activity, prospective positive feelings, and retrospective positive feelings respectively in the first step. Condition and regulatory focus were entered in the second step and the interaction Condition $\times$ Regulatory Focus in the third step. The model for prospective positive feelings was significant, $R^2_{corr} = .27$, $F(5,92) = 8.00$, $p = .000$, but the interaction term (Step 3) was no longer significant, $\Delta R^2 = .01$, $\beta = -.11$, $p = .250$. The Sobel Z test (MacKinnon, Warsi, & Dwyer, 1995) revealed a significant indirect effect for prospective positive feelings, $Z = –2.260$, $p = .024$.

**Perceived Goal Value.** Step 1 revealed a significant effect for physical activity, $\Delta R^2 = .041$, $\Delta F(1,96) = 4.06$, $\beta = .20$, $p = .047$, $f^2 = .04$. Higher physical activity levels were associated with a higher perceived goal value. No significant effects were found in Step 2, $\Delta R^2 = .023$, $\Delta F(2,94) = 1.14$, $p = .326$ and in Step 3, $\Delta R^2 = .015$, $\Delta F(1,93) = 1.55$, $p = .216$.

**Figure 4** — Two-way interaction Text $\times$ Regulatory Focus for the dependent variable retrospective positive feelings.
SE = 0.092, \( p = .024 \). The model for retrospective positive feelings was also significant, \( R^2_{\text{onw}} = .17, F(5,92) = 5.06, p = .000 \), and the interaction effect Condition \( \times \) Regulatory Focus disappeared. \( \Delta R^2 = .02, \beta = -.16, p = .101 \). The Sobel Z test did not reveal a significant indirect effect for retrospective positive feelings, \( Z = -1.516, SE = 0.060, p = .130 \). The results of the Sobel tests imply that only prospective positive feelings mediated the effect of regulatory fit on intention.

Discussion

The current study aimed to examine the regulatory fit effect of print messages to promote a physically active lifestyle. The focus of the project was to study the potential mechanisms (mediators) underlying the regulatory fit effect on behavior. Therefore it was hypothesized that the fit between the regulatory focus of a person and a physical activity message (promotion vs. prevention message) would lead to more positive evaluations of the proposed value derived from fit variables. With the results, Hypotheses 1 could only partly be confirmed. The analyses revealed that intention to engage in the behavior as well as prospective and retrospective positive feelings were significantly affected by regulatory fit. No effect was found for inclination toward the message, perceived goal value, and prospective and retrospective negative feelings. In the promotion-message condition, prospective and retrospective positive feelings were correlated with predominant regulatory focus, as feelings became more positive with increasing promotion focus. In the prevention-message condition, no significant association between regulatory focus and feelings associated with the behavior was found. However, in the prevention-message condition, regulatory focus was marginally related to intention and with increasing prevention focus intention to participate in regular physical activity became stronger. These results are in line with other studies that have shown that the regulatory fit between a message and the regulatory focus of a person created values derived from fit that were reflected in different fit indices (Aaker & Lee, 2001; Cesario, Grant, and Higgins, 2004; Latimer et al., 2008). In contrast to our results, Latimer et al. (2008) did not find an effect of regulatory fit on intention to perform the behavior. However, both studies point out the effects of regulatory fit on feelings associated with the behavior in the promotion-message condition.

In contrast to Latimer et al. (2008), we could show that regulatory fit between the prevention message and the regulatory focus had at least a marginally significant effect on intention. This may be due to the fact that in the current study we used a message focusing on costs avoided from being active in contrast to a message focusing on costs resulting from failing to engage in physical activity behavior in the prevention-message condition. Although regulatory focus theory suggests that prevention messages should be framed in terms of costs, laboratory studies have shown that nonloss messages could significantly affect behavior as well (Idson et al., 2000). Our results indicate that messages focusing on nonlosses might be more successful than messages focusing on losses in the context of prevention message framing.

Hypothesis 2 assumed that the effect of regulatory fit on intention is mediated through prospective and retrospective feelings associated with the behavior. This hypothesis was partly confirmed. Prospective and retrospective negative feelings were not affected by regulatory fit and could therefore not be tested as mediators. Although retrospective positive feelings were affected by regulatory fit, only prospective positive feelings mediated the effect of regulatory fit on intention. The results highlight the impact of regulatory fit messages on prospective positive feelings associated with the behavior and their role as a mediator to build an intention to perform the behavior. In earlier studies, feelings associated with a behavior (anticipatory affect) have been shown to be a strong predictor of physical activity intentions (Baumeister, Vohs, DeWall, & Zhang, 2007; French, Sutton, Hennings, et al., 2005; Lowe, Eves, & Carroll, 2002; Wang, 2011). Latimer et al. (2008) found that retrospective feelings were the only relevant mediator between regulatory fit and physical activity behavior. However, they did not find an effect of regulatory fit on intention and did not analyze feelings associated with the behavior as mediator between regulatory fit and intention.

The current study provides evidence for the effectiveness of tailoring health behavior change messages to personality traits of the recipients. The results imply that tailoring health messages is an effective health behavior change practice. The study made a relevant contribution to the knowledge about the mechanisms underlying this tailoring effect. Although behavior was not measured in a follow-up, the results highlight that positive feelings associated with the behavior play an important role as a mediator to explain increases in intention (motivation) to perform the behavior. It can be presumed that intention to perform the behavior is significantly related to physical activity behavior as motivational theories as well as empirical evidence have shown this association repeatedly (Hagger, Chatzisarantis, & Biddle, 2002). The single-step multiple-mediator model of the value derived from fit variables proposed by Latimer et al. (2008) fails to explain the associations between these variables. The multiple-step multiple-mediator model (Figure 1) proposed in this study seems to be more suitable to explain the mechanisms between regulatory fit and behavior.

Limitations and Future Directions

In the current study the effects of two different messages on physical activity motivation were tested regarding the regulatory fit hypothesis: a promotion message focusing on the gains by complying with the recommended behavior and a prevention message focusing on the costs avoided from being active. Further studies should include all four conditions regarding message framing proposed by Higgins (1997; Cesario et al., 2004): gain-framed
messages focusing on (1) gains (attainment of positive outcomes) and (2) nonlosses (failure to attain negative outcomes) and loss-framed messages focusing on (3) nongains (failure to attain positive outcomes) and (4) losses (attainment of negative outcomes). It is important to understand the effects of the four proposed framing conditions against the background of regulatory fit to learn more about the mechanisms of regulatory fit on physical activity behavior and to become able to create relevant and persuasive health messages (Daryanto et al., 2010).

A limitation of the study is the well-educated sample. The results are primarily valid for people with higher education, as 53% of the participants indicated a university-entrance diploma, whereas in the whole German population only 25% complete a qualification for university entrance. In general, individuals with higher education are more likely to be physically active than individuals with lower education (Kamphuis, van Lenthe, Giskes, Huisman, Brug, & Mackenbach, 2008; Marshall, Jones, Ainsworth, Reis, Levy, & Macera, 2007). The external validity of the study would have been strengthened by examining a sample that is representative for the general population.

The results of the current study have shown that promoters seem to be motivated by other physical activity goals than preventers. However, we only measured reactions of the participants subsequently after reading a physical activity promotion message. A longitudinal study design with an additional objective measurement of physical activity behavior in a follow-up would be helpful to learn more about the mechanisms underlying the regulatory fit effect on behavior and the process of physical activity behavior change.

According to Rothman (2000; Rothman, Baldwin, & Hertel, 2004), regulatory focus is associated with physical activity behavior change. Behavioral initiation is predicated on perceptions of the positive outcomes (predicted utility) of the new behavior and is conceptualized as an approach-based self-regulatory process (movement toward a desired goal). In behavioral maintenance, people attempt to preserve favorable outcomes and avoid undesired outcomes (e.g., avoid lapses in exercise). Maintenance therefore is seen as an avoidance-based self-regulatory process. The study of Fuglestad, Rothman, and Jeffrey (2008) has shown in the context of health behavior change interventions (smoking cessation and weight loss) that a promotion focus predicted a more successful initiation of quit attempts and weight loss whereas a prevention focus was the better predictor for the maintenance of the behavior. This study highlights the importance to extend research on regulatory focus theory beyond the message framing for a better understanding of successful health behavior change.

Furthermore, studies should examine how regulatory focus affects emotional experience with the physical activity behavior. Individuals in the promotion focus who adopt a physically active lifestyle will be pleased if they reach their goals, which increases satisfaction, enthusiasm, and motivation. They will be disappointed and sad if they don’t reach their goals, tension decreases and consequently motivation abates. In contrast, individuals in the prevention focus will be relieved and calm if they reach their goals, which decreases motivation. They will be anxious and tense if they fail to reach their goals, which stimulates physical activity motivation (Higgins, Grant, & Shah, 1999; Werth & Förster, 2007). Different emotional experiences may influence the nature of an individual’s satisfaction with the behavior (Aaker & Lee, 2001). To study the emotional experience of physical activity behavior in the light of regulatory focus theory would help to understand more about the role of emotions in relation to physical activity initiation and maintenance.

In general, future research should seek to find out how health messages should be created to produce a strong feeling of regulatory fit to facilitate physical activity motivation. When regulatory fit is higher, an increase in processing capacity can be observed and people are more strongly motivated (Higgins, 2000). It still is important to find out which arguments create the strongest experience of regulatory fit and, hence, will have the greatest effect on value derived from fit variables and behavior, particularly for people with a predominant prevention focus. It seems to be crucial to design health messages for preventers that induce positive feelings associated with the behavior, as people prospectively and retrospectively enjoy goal pursuit more when it has higher regulatory fit (Higgins, 2000).

**Practical Implications**

People with a promotion focus are more convinced by promotion-oriented information whereas people with a prevention focus are more strongly convinced by prevention-oriented information (Aaker & Lee, 2001). Prospective positive feelings associated with the recommended behavior seem to play an important role between the regulatory fit message and the intention to perform the behavior and should therefore be a central variable to be addressed by health messages, particularly for people with a predominant promotion focus. The results of the current study imply that health messages in the physical activity context should aim to produce a strong experience of regulatory fit, which induces the feeling right and therefore enhances prospective positive feelings associated with the behavior and intention.

The results of the studies examining the regulatory fit hypothesis in the physical activity context are in line with results emerging from general consumer behavior research. Different aspects of one and the same product/behavior can have the final convincing effect if it is advertised in a manner compatible with the consumer’s regulatory focus (Werth & Foerster, 2007). In terms of practical implications for physical activity promotion, the results show that knowledge about the regulatory focus of a person or a target group might help health professionals to create communication that fits the needs and goals of the audience. If a health promotion professional wants
to cover both target groups, he or she should implement two different types of messages for the same behavior to cover both foci preferences (Werth & Foerster, 2007). Although the only affected variable was intention to perform the behavior in the current study, it is suggested to address nonloss instead of loss messages for people with a predominant prevention focus. By this means, health communication will be more effective and motivation for physical activity behavior change can be enhanced.

References


*Manuscript submitted: February 23, 2012
Revision accepted: November 23, 2012*
Appendix A: Promotion Message (Gains from Being Physically Active)

Research has shown that being physically active for at least half an hour per day almost every day of the week will improve your physical performance. Regular physical activity makes your body fit and gives you more energy throughout the day. Moreover, physical training improves your sleep quality and cognitive functioning which helps you to become more focused and concentrated to accomplish the daily tasks. Even lifestyle activities like cycling or walking can trigger these effects when they lead to sweating and breathing harder and last for at least 10 min each bout. A physically active life-style enhances your self-esteem and raises your mood. Be active and take the chance to experience fun and enjoyment! Half an hour of physical activity each day does not only make you attractive but gives you a good feeling. You can improve your vitality with your behavior!

Appendix B: Prevention Message (Costs Avoided When Being Physically Active)

Research has shown that being physically active for at least half an hour per day almost every day of the week prevents you from chronic heart diseases or chronic back pain. Regular physical activity counteracts the decrease of physical performance. It helps you to cope better with daily hassles and reduces mental stress. Even lifestyle activities like cycling or walking can trigger these effects when they lead to sweating and breathing harder and last for at least 10 min each bout. A physically active life-style can diminish the occurrence of depressive symptoms and anxiety. Moreover, tiredness is reduced and you’ll become more resistant toward infections. Stay healthy and avoid being physically inactive. Half an hour of physical activity each day does not keep you only healthy but prevents you from many diseases. Through avoiding risk behavior everybody can prevent discomfort and ill being. With your behavior you can avoid the development of lifestyle diseases!