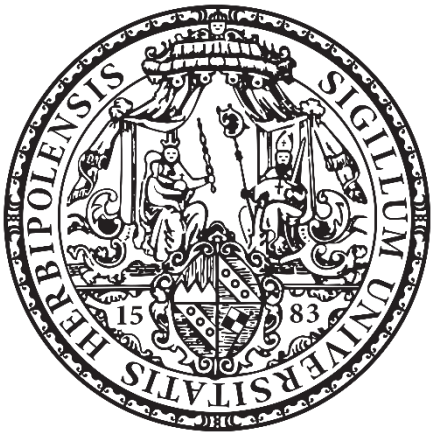
Regulatory Focus Theory and Information Processing – A Series of Exploratory Studies



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Abstract

Regulatory focus (RF) theory (Higgins, 1997) states that individuals follow different strategic concerns when focusing on gains (promotion) rather than losses (prevention). Applying the Reflective-Impulsive Model (RIM, Strack & Deutsch, 2004), this dissertation investigates RF's influence on basic information processing, specifically semantic processing (Study 1), semantic (Study 2) and affective (Study 3) associative priming, and basic reflective operations (Studies 4-7). Study 1 showed no effect of RF on pre-activation of RF-related semantic concepts in a lexical decision task (LDT). Study 2 indicated that primes fitting a promotion focus improve performance in a LDT for chronically promotion-focused individuals, but not chronically prevention-focused individuals. However, the latter performed better when targets fit their focus. Stronger affect and arousal after processing valent words fitting an RF may explain this pattern. Study 3 showed some evidence for stronger priming effects for negative primes in a bona-fide pipeline task (Fazio et al., 1995) for chronically prevention-focused participants, while also providing evidence that situational prevention focus insulates individuals from misattributing the valence of simple primes. Studies 4-7 showed that a strong chronic prevention focus leads to greater negation effects for valent primes in an Affect Misattribution Procedure (Payne et al., 2005), especially when it fits the situation. Furthermore, Study 6 showed that these effects result from stronger weighting of negated valence rather than greater ease in negation. Study 7 showed that the increased negation

effect is independent of time pressure. Broad implications are discussed, including how RF effects on basic processing may explain higher-order RF effects.

Regulatory Focus Theory as a Motivational Theory

The Hedonic Principle and Its Limits

Imagine a pleasant, sunny day in a pristine forest clearing. Chances are that you spontaneously felt like you wanted to be there and even considered how best to get to such a place. Now imagine a bitterly cold, dark winter evening with wet clothes. This time, your spontaneous feelings were likely negative and you may have been glad to be currently avoiding such a situation. This example illustrates a broad principle of psychology: organisms tend to behave in ways that lead to a pleasurable outcome while at the same time avoiding painful outcomes. This *hedonic principle* has been identified by various disciplines. Economic utility theory, for example, assumes that humans strive to maximize their utility (pleasure) by optimally utilizing their resources (Neumann & Morgenstern, 1947), whereas psychoanalytic theory posits that the so-called "pleasure-pain" principle is the main driving force of unconscious mental operations (Freud, 1951). Biological models of appetitive and defensive systems describe discrete biological organizations within the organism that are responsible for the two modes of behavior that deal with pleasure and pain (Gray & McNaughton, 2000; Konorski, 1967; Lang, 1995). Models from social and personality

psychology have differentiated between motives to move towards desired end states and motives to move away from undesired end states (e.g. Carver & Scheier, 1982, 1990; Lewin, 1951; McClelland, Atkinson, Clark & Lowell, 1953).

Often in such models, the concepts of pleasure and pain are reduced to simple affective feelings. Experiencing positive affect is considered the key aspect of pleasure in a psychological sense, whereas experiencing negative affect is correspondingly the key aspect of pain (Katz, 2016; Russell, 1991, 2003; Russell & Barrett, 1999; Watson, 2000). It is difficult to conceive of any type of motivated behavior that does not somehow increase pleasure or decrease pain, given a sufficiently wide definition of pleasure and pain. However, it is equally clear that the hedonic principle alone cannot account for the great variability of human behavior and motivation. To predict human behavior accurately therefore requires more than just an understanding of what is pleasurable and what is painful. A more precise specification of the psychological mechanisms behind this evaluation is necessary.

Regulatory Focus Theory

One theory that specifically attempts to address this question of behavioral strategy choice is *regulatory focus theory* (Higgins, 1997). Instead of addressing the question of quantifying pleasure or pain, regulatory focus theory instead focuses on how individuals approach

pleasure and how they avoid pain. In general, regulatory focus theory conceptualizes pleasure and pain in terms of psychological end states, but instead of relying solely on affect to define these end states, Higgins introduces a new dimension to delineate them. Based on self-discrepancy theory (Higgins, 1987), regulatory focus theory distinguishes between *ideal self-guides* and *ought self-guides* as positive end states. According to Higgins (1998), ideal self-guides are "individuals' representations of the attributes that someone (themselves or another person) would like them ideally to possess, someone's hopes, wishes, or aspirations for them", whereas ought self-guides are "individuals' representations of the attributes that someone believes they should or ought to possess, someone's beliefs about their duties, obligations, or responsibilities" (p.3). When pursuing these end states, individuals will attempt to reduce their current discrepancies to the desired end state. However, depending on whether the end state is an ideal or an ought self-guide, the strategies chosen will vary. In particular, ideal self-guides will be pursued with predominantly approach-oriented strategies (centering on approaching a match to the end state), whereas ought self-guides will be pursued with predominantly avoidance-oriented strategies (centering on avoiding a mismatch to the end state).

The reasoning behind this proposal is that ideal self-guides are generally associated with rewards for achieving the end state (or their absence for failing to

achieve it), whereas ought self-guides are typically associated with punishments for failing to achieve the end state (or their absence for achieving it). For example, achieving an excellent score in an exam (typically an ideal self-guide) is generally associated with being praised, so that the consequence for not achieving this grade is a lack of praise. Failing an exam, however, is associated with being scolded and, conversely, passing it (typically an ought-self guide) is associated with not being scolded. According to Higgins (1998), the motivational characteristics of the reward/punishment structures unique to the two self-guides imply that individuals should concentrate on approaching an ideal self-guide and its reward, but on avoiding a mismatch to an ought self-guide and its punishment. In addition, the different self-guides are linked to separate emotional responses. Achieving an ideal self-guide is linked to cheerfulness-related emotions (such as happiness and satisfaction), but failing to achieve it is linked to dejection-related emotions (such as disappointment and sadness). Conversely, achieving an ought self-guide is linked to quiescence-related emotions (such as calm and relaxation), whereas failing to achieve it is linked to agitation-related emotions (such as tenseness and unease; Higgins, Shah, & Friedman, 1997; Higgins, 2001).

In addition to the emotional consequences of self-guide matching or mismatching, Higgins (1998) also formulates a moderator of the strength of these responses: *regulatory focus* (RF). RF is described as a procedural

state that is primarily evoked by the accessibility of a self-guide, whereby the state associated with accessibility of an ideal self-guide is called *promotion focus* and the state associated with the accessibility of an ought self-guide is called *prevention focus*. These different foci are considered independent of one another, in that an individual may have highly accessible ideal and ought self-guides at the same time. The stronger an individual's RF, the greater the emotional responses associated with a match or mismatch of the relevant self-guide will be (Higgins et al., 1997). In line with foundational research on attitude accessibility (e.g. Fazio, Sanbonmatsu, Powell, & Kardes, 1986; Fazio, Chen, McDonel, & Sherman, 1982), RF can be seen as a dispositional variable that describes the chronic accessibility of self-guides. Thus, an individual whose ideal self-guide to excel in academics is chronically active due to high accessibility in memory has a strong dispositional promotion focus. Such differences in dispositional RF are attributed to specific long-term interactions with caretakers during early development. If a caretaker conditions an individual to act according to ideals by rewarding correct behavior and removing rewards for incorrect behavior, that individual's dispositional promotion focus will be strong. In the same way, if a caretaker conditions an individual to act according to certain standards by punishing them for deviation from these standards and removing punishment for adherence to the standards, this will inculcate a strong dispositional

prevention focus (Keller, 2008; Manian, Papadakis, Strauman, & Essex, 2006). Importantly, these two styles of interactions are not mutually exclusive, leading to individuals with both strong promotion and prevention foci.

However, RF is not a stable variable in the same way as personality traits are. It is possible to activate a particular RF situationally. This can be achieved by activating specific self-guides via priming or by framing of a task structure in terms of possible rewards or of possible punishments. For example, individuals who have recently considered their ought self-guides should be in a state of heightened prevention focus compared to individuals who considered ideal self-guides or no self-guides at all. Furthermore, individuals who are threatened with punishment for failing to achieve a certain standard in a task should also be in a state of heightened prevention focus compared to individuals who are incentivized with rewards for achieving a standard, even if the given standard and the consequences resulting from its achievement or nonachievement are formally identical.

The RF an individual is currently experiencing has consequences for their behavior. A promotion focus is linked to a state of eagerness, whereas a prevention focus is linked to a state of vigilance. The effects of these states can be explained in terms of signal detection theory (Crowe & Higgins, 1997). Eagerness leads to an increased focus on *hits* (correct identification of a signal) and

avoidance of *errors of omission* (failing to identify a signal when it was in fact there). Vigilance, conversely, leads to an increased focus on *correct rejections* (correct identification of the lack of a signal) and avoidance of *errors of commission* (falsely identifying noise as a signal). Based on this premise, further predictions can be generated about effects on motivation and behavioral strategy depending on the task structure. For example, if the goal of a task is framed as finding hits (such as finding possible words from anagrams), individuals in a promotion focus should be more persistent in performing that task compared to a task framed as finding correct rejections (such as finding nonword combinations from anagrams), whereas individuals in a prevention focus should show the opposite pattern (Higgins, 1998). Furthermore, if given the task to generate strategies to achieve a certain end (e.g. arriving on time), individuals in a promotion focus should focus more on strategies that promote achieving that end (e.g. leaving early, choosing fast routes), whereas individuals in a prevention focus should focus on strategies that avoid failing to achieve that end (e.g. not forgetting the time, avoiding roads with heavy traffic).

RF theory has several important differences from *approach/avoidance* focused theories (e.g. Gray & McNaughton, 2000; Schneirla, 1959; for a discussion, see Elliot & Covington, 2001). The latter propose that positive (negative) stimuli are associated directly with tendencies to approach (avoid) the stimulus. Although RF

theory also concerns itself with approach and avoidance strategies, the driving force behind the resulting behavior is not simple elicitation by the stimulus, but rather the activation of a RF. Although the stimulus may activate a RF depending on its valence, it is not the only determinant of such activation. Chronic activation due to developmental experiences and incidental activation due to priming or situational demands also play a role. As an example, a negative stimulus should activate avoidance tendencies according to approach/avoidance theories. According to RF theory, the same stimulus would be associated with punishment and therefore likely activate a prevention focus. However, an individual might still respond with a promotion focus if the general task context was one of promotion or if the individual were particularly predisposed to a promotion focus. Of course, this would not mean that the individual would seek to approach the negative stimulus; instead, they would focus on approaching an end state that was pleasant (i.e. free of negative stimuli). In this way, RF theory proposes RF as a moderator of approach/avoidance strength (see Förster, Higgins, & Idson, 1998). In addition, approach/avoidance theories posit an extremely basic role of approach/avoidance tendencies due to their relative automaticity and correlates with specific neural structures (e.g. Elliot & Covington, 2001). Although dispositional RF is acquired at a young age, it is not anchored in specific neural structures. Furthermore, the mechanisms of its acquisition (conditioning) and effect (accessibility

of self-guides) are different from the respective mechanisms in approach/avoidance theories. As such, RF theory makes a distinct contribution to psychological research.

Research on Regulatory Focus Theory

RF theory has been applied to a wide variety of fields, including organizational behavior (Brockner & Higgins, 2001; Burmeister-Lamp, Lévesque, & Schade, 2012; de Lange, Bal, Van der Heijden, de Jong & Schaufeli, 2011; Dewett & Denisi, 2007; Gino & Margolis, 2011; Gorman et al., 2012; Hamstra, Sassenberg, Van Yperen, & Wisse, 2014; Johnson, Chang, & Yang, 2010; Johnson, Shull, & Wallace, 2011; Markovits, Ullrich, van Dick, & Davis, 2008; Rietzschel, 2011; Spanjol, Tam, Qualls, & Bohlmann, 2011; Tseng & Kang, 2008; Zhang, Higgins, & Chen, 2011; Zhao & Namasivayam, 2012), consumer decision-making (Arnold & Reynolds, 2009; Bodur & Matyas, 2008; De Bock & Van Kenhove, 2010; Florack, Friese, & Scarabis, 2010; Florack & Hartmann, 2007; Florack, Ineichen, & Bieri, 2009; Higgins, 2002; Kirmani & Zhu, 2007; Mogilner, Aaker, & Pennington, 2008; Molden & Hui, 2011; Poels & Dewitte, 2008; Roy & Ng, 2012; Scarabis, Florack, & Gosejohann, 2006; Van Noort, Kerkhof, & Fennis, 2008; Wang & Lee, 2006; Werth & Förster, 2007a; Yoon, Sarial-Abi, & Gürhan-Canli, 2012), leadership styles and their effects (Kark & van Dijk, 2007; Moss, 2009; Neubert, Kacmar, Carlson, Chonko, &

Roberts, 2008; Stam, van Knippenberg, & Wisse, 2010; Wallace, Little, Hill, & Ridge, 2010), group psychology (Brazy & Shah. 2006; Ellemers, Scheepers, & Popa, 2010; Faddegon, Ellemers, & Scheepers, 2009; Faddegon, Scheepers, & Ellemers, 2008; Florack & Hartmann, 2007; Levine, Higgins, & Choi, 2000; Sassenberg, Kessler, & Mummendey, 2003; Sassenberg & Woltin, 2009; Shah, Brazy, & Higgins, 2004; Spanjol et al., 2011; Zaal, Van Laar, Ståhl, Ellemers, & Derks, 2011), health psychology and subjective well-being (Brenninkmeijer, Demerouti, le Blanc, & Hetty van Emmerik, 2010; Friedman-Wheeler, Rizzo-Busack, McIntosh, Ahrens, & Haaga, 2010; Fuglestad, Rothman, & Jeffery, 2008; Grant & Higgins, 2003; Joireman, Shaffer, Balliet, & Strathman, 2012; Jones, Papadakis, Hogan, & Strauman, 2009; Kees, Burton, & Tangari, 2010; Kim, 2006; Schokker et al., 2010; Vartanian, Herman, & Polivy, 2006) and interpersonal relationships and role model choice (Bohns et al., 2013; Lockwood, Chasteen, & Wong, 2005; Lockwood, Jordan, & Kunda, 2002; Lockwood, Marshall, & Sadler, 2005; Molden & Finkel, 2010; Molden, Lucas, Finkel, Kumashiro, & Rusbult, 2009; Molden, Lucas, Gardner, Dean, & Knowles, 2009; Santelli, Ward, & Eaton, 2009; Sassenberg & Hansen, 2007; Winterheld & Simpson, 2011; Wirtz & Lwin, 2009). The sheer breadth and number of studies even in these few selected areas underlines the impact of RF theory in contemporary social psychology. However, the topics thus far covered are

taken from applied research and therefore do not illuminate the mechanisms underpinning the effects of RF. It seems clear that an examination of the cognitive and affective mechanisms involved in RF could inform further research.

Much of the more foundationally oriented work in RF theory has focused on the effects of goals and feedback. Many studies have investigated the impact of specific feedback types on individuals with varying RFs (Förster, Grant, Idson, & Higgins, 2001; Higgins et al., 2001; Shu & Lam, 2011; van Dijk & Kluger, 2004; van Dijk & Kluger, 2011). Consistently, this research has shown that success feedback (that is, feedback framed in terms of success achieved so far) increases motivation for individuals in a promotion focus, whereas failure feedback (feedback framed in terms of failure so far) has the same effect for individuals in a prevention focus. Motivation in these studies has been measured both as a self-report (e.g. van Dijk & Kluger, 2011) and as goal persistence (e.g. Förster et al., 1998; Förster et al., 2001). Explanations for these motivational effects have centered on the idea of *regulatory fit* (Higgins, 2000). Regulatory fit is defined as a gain in value of an outcome when it is pursued with means that correspond to its RF. Therefore, an individual striving for a gain should experience regulatory fit when using promotion-oriented strategies, i.e. strategies focused on approaching gains and avoiding nongains. This increased value may manifest in increased valuation of behavioral outcomes, increased valuation of

goals and goal pursuit or in increased motivation (Freitas, Liberman, & Higgins, 2002; Freitas, Liberman, Salovey, & Higgins, 2002; Higgins, 2000; Higgins et al., 1997; Idson, Liberman, & Higgins, 2004; Spiegel, Grant-Pillow, & Higgins, 2004). Therefore, the fit of feedback type to global RF may also increase motivation. Furthermore, promotion focus has been shown to increase motivation in goal attainment, whereas prevention focus has this effect for goal maintenance (Brodscholl, Kober, & Higgins, 2007). Some research has proposed more precise mechanisms to explain motivational gains from fit, including "feeling right" (Cesario, Grant, & Higgins, 2004) or increased processing fluency (Aaker, 2006; Lee & Aaker, 2004).

Beyond motivational effects, RF has also been shown to have an effect on task performance, both via direct improvement (Craig, Little, & Shull, 2008; Keller & Bless, 2006; Hazlett, Molden, & Sackett, 2011; Markman, Baldwin, & Maddox, 2005; Markman, Maddox, & Baldwin, 2007; van Dijk & Kluger, 2011) and via increased resistance to distraction (Freitas et al., 2002). These findings primarily mirror the findings on motivational increases: when task requirements fit an individual's RF, task performance is improved. However, Freitas and colleagues (2002) show an exception to this pattern of regulatory fit. They showed that a prevention focus was generally better for upholding goal pursuit in the face of distractions. It is unclear whether this finding reflects a main effect of RF above and beyond the

regulatory fit effects found in other studies or whether it may be attributed to a promotion focus bias in the distraction stimuli used by Freitas and colleagues. In addition, de Lange and van Knippenberg (2007) offer a surprising pattern of data: in their studies, participants were distracted more strongly by stimuli with valence opposed to their current RF. This finding would seem to contradict Higgins' (1998) experiments, which show that contents fitting an individual's RF are remembered better than contents that do not fit, implying deeper processing of fitting contents. De Lange and van Knippenberg explain this effect in terms of processing efficiency, stating that distracters of opposing valence require more attention to process and therefore distract more strongly, an explanation that underlines that bottom-up and top-down processes might be differentially affected by RF. A further perspective on task performance has been offered by Keller and Bless (2008). Their research shows that the effect of task expectancies on performance depends on RF: negative task performance expectancies impair performance under a prevention focus, but under a promotion focus, positive task performance expectancies have this effect instead. This is assumed to be because the respective RFs increase sensitivity to the possible negative outcomes of the appropriate expectancy (i.e. doing badly in a prevention focus or not doing well enough in a promotion focus), thereby inducing threat.

In a sphere closely related to motivational research, RF has also been found to affect the type and

intensity of emotional responses. The theory predicts that individuals in a prevention focus should experience greater variation in quiescence-agitation-related emotions, whereas individuals in a promotion focus should experience variation in cheerfulness-dejection-related emotions. Evidence for these conjectures can be found in studies on self-discrepancy theory (Higgins, 1987; Higgins et al., 1997; for a review of these studies, see Higgins, 1998). Furthermore, individuals in a specific RF are quicker to appraise their own emotional responses on the relevant emotional axis (Shah & Higgins, 2001). Self-discrepancy theory states that people represent multiple domains of the self (either actual, ideal or ought) and can be considered a precursor theory to RF theory. The main difference between the two is that self-discrepancy theory predicts variability in emotional responses to ideal/ought self-discrepancies, whereas RF theory concerns itself with behavioral and cognitive strategies that are deployed in attempts to alleviate such discrepancies. The gap between the emotional and motivational consequences of self-guide discrepancies has also been addressed: the anticipation of stronger negative emotional consequences of an action's failure (agitation or dejection) leads to more positive evaluation of the action (Leone, Perugini, & Bagozzi, 2005), which should translate to increased motivation to perform the action. Other research has extended the emotional impact of RF beyond the framework provided by self-discrepancy theory. For example, Idson and colleagues

(2000; see also Liberman, Idson, & Higgins, 2005) showed a direct connection between RF and the intensity of positive and negative affect. Specifically, their research demonstrated that gains led to increased pleasure compared to nonlosses, whereas losses led to increased pain compared to nongains. Although in principle, promotion and prevention goals should not differ in their overall valence, only in the *type* of emotion elicited by success or failure, this finding suggests that this may not be the case in actual practice. If gains/nongains are associated more with pleasure than losses/nonlosses and the opposite holds true for pain, then promotion focus may also be more associated with positive affect and prevention focus with negative affect in general. This is further supported by research showing that brain activity in response to emotional words varies with RF (Touryan et al., 2007). Further research has examined the impact of RF on emotional responses to negative outcomes under conditions of procedural fairness (Brockner, De Cremer, Fishman, & Spiegel, 2008) and on responses to stereotype disconfirmation (Förster, Higgins, & Strack, 2000; Förster, Higgins, & Werth, 2004). In both of these fields, a prevention focus was linked with increased agitation responses, consistent with the interpretation of both fairness and existing stereotypes as standards to which the world is expected to conform (e.g. Burgess & Borgida, 1999; Cropanzano, Paddock, Rupp, Bagger, & Baldwin, 2008; Gu, Bohns, & Leonardelli, 2013).

In terms of cognitive effects of RF, Higgins and Spiegel (2004) apply a motivated cognition perspective (e.g. Kruglanski, 1996) to RF theory. In their review of RF effects, they evaluate various effects of RF on judgments and self-regulation, including effects on probability estimates and risky behavior. With regard to the former, Brockner and colleagues (2002) showed that people in a promotion focus were less likely to underestimate the probability of an event if that event depended on only one of several preconditions, whereas people in a prevention focus were less likely to overestimate the probability of an event that depended on all of a number of preconditions. In further work on probability assessments, Halamish and colleagues (2008) postulated that not just the valuation of gains and losses, but also their discounting due to risk was a function of RF. Risky prospects concerning losses were discounted less than equally risky gain prospects by individuals with a prevention focus, but this difference was reduced for individuals with a promotion focus. It is unclear, however, whether this is an effect of changed risk perception or simply of a change in the valuations of the gains/losses involved (but see Kluger, Stephan, Ganzach, & Hershkovitz, 2004, for evidence of effects of RF on risk perception under certain circumstances). Beyond probability and risk estimates, a promotion focus has been shown to induce a bias towards more risky decision-making (i.e. a disregard for false alarms and preference for hits). On the other hand, a prevention focus leads to a

conservative bias (i.e. a preference for correct rejections and disregard for misses). These effects occur both individually (Boldero & Higgins, 2011; Crowe & Higgins, 1997) and at the group level (Levine et al., 2000). This bias has also been shown to generalize to actual behavior in traffic (Hamstra, Bolderdijk, & Veldstra, 2011; Werth & Förster, 2007b). However, the conservative bias induced by a prevention focus may be reversed into a risky bias if the expected consequences for a miss are negative (Scholer, Stroessner, & Higgins, 2008). This supports the view that shifts in risky behavior occur due to strategic concerns of promotion and prevention and are therefore not linked inextricably with their 'typical' respective RF.

Building on this research, Friedman and Förster (2001) assumed that a "risky" promotion mindset would be associated with increased creativity. Their studies showed that a promotion focus led individuals to generate more strongly creative uses for a brick than a prevention focus. They attributed this finding to decreased perseverance in processing specific exemplars when in a promotion focus compared to a prevention focus, thereby leading to more varied proposed solutions. A conceptually similar finding was produced in foundational work by Crowe and Higgins (1997). They showed that individuals in a promotion focus generated more possible categories for a set of fruit and more characteristics for a set of furniture objects than individuals in a prevention focus. This pattern also

extended to selecting more possible causes of a target person's behavior from a given set of hypothetical reasons when in a promotion focus (Liberman, Molden, Idson, & Higgins, 2001). Increased cognitive flexibility due to promotion focus was also demonstrated in a study by Smith, Wagaman and Handley (2009), who showed that a promotion focus was associated with more spontaneous task variation when engaged in a boring activity. In line with this research, Tumasjan and Braun (2012) showed that individuals were more sensitive to entrepreneurial opportunities when in a promotion focus. Attempting to explain this effect of RF on creativity, Herman and Reiter-Palmon (2011) investigated the effect of promotion focus on the evaluation of self-generated creative ideas. They found that individuals' promotion focus was positively linked to the accuracy of their evaluations of their ideas' originality, but negatively related to the accuracy of their evaluations of their ideas' quality. The opposite held for prevention focus. Importantly, the general effect that promotion focus increases the creativity of ideas originally found by Friedman and Förster (2001) was replicated in their study. This pattern of results suggests that individuals are more willing to present their ideas and less focused on whether they are good enough to pass muster when in a promotion focus. Such results are in line with the tendency towards errors of commission and hits associated with promotion focus, but it remains unclear whether creativity effects of RF can be attributed only to the reduction in self-censorship suggested by Herman and

Reiter-Palmon (2011) or whether the mechanism of perseverance in processing individual ideas proposed by Friedman and Förster (2001) also plays a role.

Molden and Higgins (2004) identified a potential moderator of the general cognitive flexibility effect. In their study, people in a promotion focus applied more possible categories to a target individual only when faced with a small amount of information on which to base their assessment of that individual. When the information about the person was plentiful but contradictory, prevention-focused individuals applied more possible categories instead. This finding can be interpreted in terms of the possible consequences for making a mistake. In a state of uncertainty (i.e. with little information), individuals in a prevention focus might minimize the categories they apply to a target individual in order to ensure that they do not incorrectly infer something that is insupportable. In addition, attempting to integrate the information given about the target into a category that covers as much as possible is a strategy that is likely to maximize accuracy and thereby avoid errors. However, in a state of ambiguity (i.e. with conflicting information), this dynamic changes. Generating more categories is necessary to preserve accuracy, whereas limiting oneself to fewer categories carries the risk of disregarding pertinent information. This interpretation is in line with further work by Baas, De Dreu and Nijstad (2011), who showed that individuals with a currently unfulfilled prevention goal achieved similar levels of creativity to

promotion-focused individuals. In both cases, when there was an activated prevention goal that required increased cognitive flexibility, a prevention focus achieved this end. Therefore, it seems that promotion focus might increase cognitive flexibility "by default" in the majority of cases, but the task circumstances moderate whether the same might be achieved by prevention focus.

Research by Maddox and colleagues (Maddox, Baldwin, & Markman, 2006a, 2006b; Markman et al., 2007) has attempted to shed light on the precise circumstances that lead to increased cognitive flexibility. They manipulated regulatory fit by inducing promotion or prevention goals and varying the task structure between promotion and prevention. Their studies showed that participants who were experiencing regulatory fit were better at a perceptual categorization task when the relevant categories could be discriminated according to a verbal rule. On the other hand, participants who were experiencing a regulatory mismatch performed better when the discrimination criterion required the integration of various pieces of information in a way that could not be described as a simple verbal rule (Maddox et al., 2006a, 2006b). They concluded that regulatory fit increased cognitive flexibility directly, arguing that this increase in flexibility led to the application of more rules and therefore to an improvement in a rule-based categorization task. Such application of more rules should however impair performance when the task is not rule-based. This is further supported by research showing that

individuals experiencing regulatory fit performed better at the Remote Associates Test (RAT, Mednick & Mednick, 1967), a task in which participants are shown three words and must find a fourth word that connects all three conceptually. However, their research cannot rule out an explanation based on positive affect and increased motivation induced by regulatory fit. As mentioned above, regulatory fit is associated with greater motivation due to increased valuation of the activated goal. Higher motivation is likely to increase the persistence of participants trying to apply explicit rules to the task and may even impair performance if explicit processing interferes with task execution (e.g. Dijksterhuis, 2004). In the perceptual categorization task implemented by Maddox and colleagues (2006a, 2006b), conscious, inferential searching for a category rule interfered with performance in their information-integration condition. Therefore, increased motivation to process the task explicitly from regulatory fit might have led to the same results as the increase in cognitive flexibility proposed by the authors. The RAT results may also be explained by a simple positive affect account: recent research has shown that positive affect increases the likelihood that RAT-like triads will be intuitively judged as coherent (Topolinski & Strack, 2009). Therefore, participants may have experienced a greater expectation of success in the RAT task when experiencing regulatory fit due to the positive affect generated, improving their self-efficacy and thereby their performance (Bandura, 1977). It remains

unclear whether regulatory fit increases cognitive flexibility or not.

Research has shown that RF is linked to a host of cognitive effects. However, few studies have attempted to shed light on integrative mechanisms of information processing that might underlie these diverse effects. In order to understand how the relatively abstract state of promotion or prevention focus influences the actual mechanisms by which information is processed, it is necessary to systematically apply a more complete model of information processing to RF theory.

The Reflective-Impulsive Model of Social Cognition

Reflective and Impulsive Processing

The *Reflective-Impulsive model* (RIM, Strack & Deutsch, 2004) attempts to explain judgments and behavior using a dual-process framework. It distinguishes between two systems of information processing: the *impulsive system*, which is characterized by fast, associative processing, high levels of automaticity and negligible necessity of motivation or opportunity, and the *reflective system*, which is characterized by relatively slow propositional reasoning, generally low levels of automaticity and necessary operating conditions such as high motivation, adequate arousal levels and sufficient opportunity to process. These systems jointly process information and influence each other, ultimately leading to specific judgments and behavioral responses.

The impulsive system utilizes principles of associative processing. It consists of elements represented in the long-term memory store. Such elements may include semantic representations, perceptual traces, motor states or other bodily feelings, whether affective or nonaffective. These elements are connected via associative links. Depending on the frequency of co-occurrence and the similarity of the elements involved, such links may be stronger or weaker. When one element

in the impulsive system is activated, all other elements linked to it are also activated in proportion to the strength of the associative link. Such activation may be strong enough to cross the threshold of consciousness or it may simply increase the preconscious accessibility of the linked element. Therefore, seeing the word "couch" might spontaneously activate a visual representation of a couch with which one is familiar, causing this picture to "pop" into mind, but it is less likely to have the same effect on the less strongly associated concept of a psychoanalyst. However, this activation of the word "couch" does increase the chance that the concept of a psychoanalyst will be brought into consciousness by further processing of elements that are connected to it, such as "therapy" and "childhood". As linked elements may in turn activate further elements, this principle is known as *spreading activation* (Collins & Loftus, 1975).

Strack and Deutsch (2004) argue that the impulsive system is always active and cannot be inhibited by lack of central resources or top-down control. Associations are learned and modified slowly via contiguity learning and are therefore comparatively rigid. However, the RIM postulates that the impulsive system is capable of a degree of flexibility via the adoption of a specific *motivational orientation*. Individuals can adopt either an approach or an avoidance orientation (e.g. Elliot & Covington, 2001). An approach orientation implies preparedness to reduce the distance between the self and some aspect of the environment, whereas an avoidance

orientation is preparedness to increase this distance. Such an orientation can facilitate associative activations that are congruent to the orientation. For example, an individual in an approach orientation may experience a greater activation of elements of positive valence when confronted with a couch, such as the anticipation of a comfortable rest, whereas the same individual in an avoidance orientation may instead experience the activation of elements of negative valence, such as their aching muscles. Importantly, the connection between valence and motivational orientation is believed to be bidirectional. Being in an avoidance orientation may facilitate a negatively framed perception of a stimulus, but perceiving a negative stimulus may also induce an avoidance orientation.

The impulsive system is capable of representing only elements and simple associations. More complex relationships between elements (such as causality, i.e. "lying down reduces tiredness" or "tiredness causes lying down") are not represented in the impulsive system. Therefore, the strength of an associative link between two elements is not always indicative of their specific relationship in the environment, merely of their contiguity. The operation of the reflective system addresses such mismatches. The reflective system draws upon elements in the impulsive system and places them in propositional relationships to one another. In this way, the reflective system provides a more nuanced representation of connections between concepts, one that can incorporate

information about the validity of an association and its structural implications. By applying principles of reasoning to the propositions it generates, the reflective system can increase the activation of elements in the impulsive system associated with the inferences it draws. For example, a proposition consisting of "foreigners", "is/is not" and "bad" ("foreigners are not bad") can activate elements associated with "good" due to the implication that foreigners are good. Combining various propositions can allow syllogistic reasoning in order to draw inferences from the combination – "John does not speak German" and "Germans speak German" can lead to "John is not German". Importantly, a reflectively generated proposition may imply a different conclusion than the association between its elements in the impulsive system. When speaking with John, one might often consider that he does not speak German, leading to a strong association between "John" and "speaking German". However, only the reflective system can qualify this association with a truth value and infer "John does not speak German". In this way, negation of associations can serve as an index of reflective processing (Deutsch, Gawronski, & Strack, 2006; Deutsch, Kordts-Freudinger, Gawronski & Strack, 2009): insofar as responses to stimuli reflect an association between concepts that are actually only connected in a negated context, they are driven by impulsive processing of the individual concepts. If they reflect a negative association between

these concepts, they are driven by reflective processing of the implied proposition.

The aforementioned operating conditions for the two systems provide insight on when reflective processing is likely to occur and change further activation patterns. The two systems differ primarily in facets of automaticity (Bargh, 1994; Bargh & Chartrand, 1999). The operations of the reflective system are generally more intentional than those of the impulsive system. In addition, the operations of the reflective system are often (but not always; see Deutsch et al., 2009) accompanied by a feeling of noetic awareness, whereas the impulsive system only achieves experiential awareness under circumstances of particularly strong activation of an element. The reflective system is more resource-dependent than the impulsive system and may therefore be hindered by lack of cognitive resources or opportunity while impulsive processing continues regardless. Finally, reflective processes can be stopped or redirected to the degree that they are in awareness, but preventing impulsive processing is only possible by engaging the reflective system as a competitive process.

Regulatory Focus and the RIM

The operating principles of the RIM described above offer a perspective towards understanding how RF changes information processing. In its original form, RF was postulated to affect motivation directly, both by changing the relative motivation to select behavioral

strategies in line with the active focus and by increasing motivation towards a goal framed compatibly to that focus (Higgins, 1997; Higgins, 1998; Higgins, 2000; Scholer & Higgins, 2013). Both of these effects are related to reflective operations at first glance, being concerned with intentional cognitions and behaviors. However, RF has been shown to influence lower levels of processing as well (e.g. affective responses, see Idson et al., 2000). The conceptualization of RF as a chronic trait linked to such basic principles of learning as negative reinforcement and rewards also implies that it may affect more fundamental aspects of information processing than purely reflective operations. Therefore, the question arises which aspects of which system are influenced by RF. Various mutually nonexclusive possibilities can be considered.

RF may influence the basic accessibility of concepts associated with the current focus. In this view, individuals in a particular RF have an increased pre-activation of specific concepts. The experience of being in a particular RF is likely to have coincided with the activation of concepts associated with that RF in the past. Over time and multiple experiences with a particular RF, this co-activation could lead to an associative connection between this focus and concepts that fit it. For example, an individual might learn to associate the concept of security with being in a prevention focus more than with being in a promotion focus, as they are more likely to pursue and achieve or fail goals concerning security in a

prevention focus than in a promotion focus. This conceptualization is in line with Higgins' (1997) idea that chronic RF develops early in life and that individuals with a high chronic RF are more concerned with emotions and self-guides pertaining to that RF.

Another avenue of influence that might allow RF to affect information processing is that of motivational orientation. As discussed earlier, a particular RF is not identical to the corresponding motivational orientation, but the consequences of being in a particular RF increase the likelihood of activation for the corresponding motivational orientation. For example, an individual in a promotion focus is likely to focus on positive end-states and utilize means to approach them, both of which fit an approach motivation. Although it is possible for a promotion-oriented individual to utilize avoidance strategies to achieve their goal, it seems clear that a promotion focus should lead to an approach orientation more often than not. Conversely, a prevention focus should be more likely to be associated with an avoidance orientation. The RIM postulates that motivational orientation can change the association strength between particular elements of the impulsive system. Therefore, it is possible that RF may indirectly have the same effect. Elements associated with approach might therefore be more strongly associated with one another when the individual is in a promotion focus than when in a prevention focus. The opposite applies for elements associated with avoidance.

A third potential effect of RF on information processing lies in the facilitation or hindrance of reflective operations. Previous research has found that implicit attitudes predict explicit preferences better for individuals in a promotion focus than a prevention focus (Florack et al., 2010) and that consumers rely more on simple heuristic rules when in a promotion focus (Mourali, Böckenholt, & Laroche, 2007; Mourali & Pons, 2009; Pham & Avnet, 2004, 2009). One study has even showed direct activation of cognitive resources due to prevention focus (Ståhl, Van Laar, & Ellemers, 2012; see also Trawalter & Richeson, 2006 for indirect evidence). This preference for more efficient processing may be a matter of strategic choice or it may indicate an increase in difficulty in certain operations. Put another way, if individuals in a prevention focus are more likely to rely on more effortful reflective processing, such processing might be facilitated by a prevention focus due increased accessibility of the relevant propositions (Strack & Deutsch, 2004). An increase in efficiency of reflective processing when in a prevention focus would also offer an explanation for findings that show increased confidence in resulting judgments (e.g. Chernev, 2009; Mourali & Pons, 2008) via a fluency account (Cesario et al., 2004; Lee & Aaker, 2004). As reflective processing would be easier in a prevention focus, this feeling of ease should translate to greater processing fluency (e.g. Reber, Schwarz, & Winkielman, 2004; Reber, Winkielman, & Schwarz, 1998). Increased fluency has been shown to

affect confidence in judgments (Ackerman & Zalmanov, 2012; Reber & Schwarz, 1999; Reber & Unkelbach, 2010). This possible effect of RF would be in line with much of the literature on the topic.

This dissertation attempts to address the question of how RF affects basic information processing by testing each of the three possible mechanisms discussed: modification of association strength, activation of behavioral orientation and facilitation of reflective operation. In order to achieve this end, RF manipulations are applied to paradigms selected to measure effects on various levels of information processing. However, it should be noted that the proposed mechanisms are not derived directly from RF theory. Although directed predictions may be possible, the studies presented in this dissertation cannot be considered confirmatory. Instead, they illuminate new possible connections between existing theories, adopting an explorative approach. Unexpected results are more likely with such an approach, as the surrounding infrastructure of supporting research is less directly applicable and the uncertainty of predictions therefore higher. Such unexpected results are useful for finding new directions for further work and are therefore welcome. For this reason, the data in the following studies is exhaustively analyzed and any unexpected results are discussed in terms of theoretical approaches that might explain them. Nevertheless, effects discovered in this research must first be directly and conceptually replicated in confirmatory research in order to make meaningful

theoretical statements about them, as the current approach is otherwise conducive to false-positive results (Simmons, Nelson, & Simonsohn, 2011). In this way, exploratory research such as this provides a pathway to theory development, playing an important role in advancing psychological science.

Study 1 – Regulatory Focus and Semantic Pre-activation

Theoretical Background

Study 1 aimed to test a direct effect of RF on associative processing. More specifically, the state of being in a promotion or a prevention focus might imply a general pre-activation of concepts associated with the respective focus. For example, a person in a promotion focus might have concepts like ‘gain’ come to mind more easily than concepts like ‘loss’, whereas the opposite pattern would hold for a person in a prevention focus. Although this prediction should hold independently of the valence of the activated concepts, previous research has shown that promotion might be more associated with positive and prevention more with negative valence (Idson et al., 2000). A pretest of words describing concepts related to RF bore this association out (see Appendix A). Consequently, the greatest such effects might be expected with positive promotion and negative prevention concepts.

A measure of semantic pre-activation in wide use is the Lexical Decision Task (LDT, e.g. Fischler, 1977; Wittenbrink, Judd, & Park, 2001). In this task, participants are instructed to decide as quickly as possible whether one or more target letter strings comprise words (e.g. “glass”) or nonwords (e.g. “gless”). To the degree

that a word is pre-activated by preceding primes that are semantically connected, the reaction time for the decision is lessened. Accounts for this effect vary, although they mostly center on the assumption of facilitated processing of the target word. Alternative explanations include the retrospective semantic matching hypothesis (Neely, Keefe, & Ross, 1989), which explains LDT response facilitation with the post-processing matching of the target with a prime. This matching process serves as a marker for a word if it results in a positive match, as only words can match other words. Other accounts emphasize a possible increase in a feeling of familiarity due to matching prime-target pairs as a possible mechanism for LDT priming effects (Ratcliff & McKoon, 1988) or processes of affective matching or mismatching for affectively laden stimuli (e.g. Klauer & Stern, 1992; for a discussion, see Voss, Rothermund, Gast, & Wentura, 2013). It is important to note, however, that all accounts agree that any mechanisms operating in the LDT priming paradigm are likely to be in addition to, not in place of, target processing facilitation.

Therefore, it seems reasonable to assume that the LDT might be capable of detecting "chronic" pre-activation of specific semantic concepts when no primes are presented. Prime-free versions of the LDT have been used in the past to measure accessibility of goal-related constructs in previous research (e.g. Denzler, Förster, & Liberman, 2009), demonstrating its suitability for such an application. Although such a paradigm would not benefit

from retrospective semantic matching, as there would be no prime to match the target to, most of the other proposed mechanisms might be expected to function. If concepts are chronically pre-activated due to a particular mindset, it seems likely that they would also generate a stronger feeling of familiarity when processed (for example due to fluency, see Wagner & Gabrieli, 1998; Whittlesea, Jacoby, & Girard, 1990). In addition, if a mindset is connected with a specific affective experience, then affective matching processes should also operate, even without primes. For these reasons, the LDT was implemented in order to test whether RF causes a pre-activation of concepts related to the current focus. Furthermore, in this and in all following studies that assessed chronic RF, exploratory research questions were formulated regarding possible interactions of situational and chronic RF.

H1: Participants perform better in a LDT when the target word fits their current RF than when it does not.

H2: Participants perform better in a LDT when the target word fits their chronic RF than when it does not.

RQ: Do situational and chronic RF interact in predicting LDT performance?

Method

Design and Sample. The study followed a 2x2 mixed design with the between factor RF (promotion vs. prevention focus) and the within factor target type (promotion/positive vs. prevention/negative word). A power analysis was conducted to determine an appropriate sample size. As the precise mechanism of the expected effect was expected to be analogous to either associative or semantic priming, the weaker of these two effects was used for the estimate (d = .29, see meta-analysis by Lucas, 2000). Based on these assumptions, the necessary total sample size to detect a within-between interaction of this magnitude with a target α of .05 and a minimum power of .80 was 96 participants. However, due to the likelihood that the proposed chronic pre-activation effect would be smaller than typical semantic priming involving direct primes, a larger sample of 140 participants was set as the goal. This sample size would provide a power of .926 to find the semantic priming effect and would be sensitive enough to detect an effect size of d = .24 with a power of .80.

The study was conducted at the University of Würzburg on November 3rd and 4th, 2014, with students who participated in exchange for one or more chocolate bars. A total of 160 participants took part in the study (62.4% female, M_{age} = 21.1, SD_{age} = 3.6, Min_{age} = 17, Max_{age} = 44). Data was collected in a lab room with nine cubicles that shielded the participants from each others'

and the experimenter's view. Participants were free to walk in and take part at any time if a cubicle was free.

LDT. The LDT paradigm consisted of six practice trials followed by two blocks of 200 trials each. Each trial began with a blank screen for 300ms followed by the presentation of a target in the center of the screen. Participants were instructed to hit the left Shift key if the target was a word and the right Shift key if it was a nonword. Visual cues in each trial reinforced this instruction. The target remained on screen until participants responded or until 1000ms had passed. After 1000ms, the screen displayed the message "TOO SLOW!!!" for 1000ms before moving on to the next trial. If participants responded incorrectly, the error message "WRONG!!!" was displayed for 1000ms before the next trial began. If the participant responded correctly, the next trial began immediately.

Each block of 200 trials consisted of one half nonword trials and one half word trials, with the word trials being further divided into 50 promotion word and 50 prevention word trials per block, presented in a random order. Nonword targets were selected from a validated list of nonwords (Gupta et al., 2004). They included letter strings such as "EMURAS", "PUREIT", and "PFILER". Ten promotion/positive and ten prevention/negative target words were selected based on a pretest (see Appendix A), each of which was presented a total of five

times to each participant. The selected words are listed in Appendix B.

Regulatory focus manipulation. A state of promotion or prevention focus was induced by manipulating reward expectancies (Higgins, 1997). At the beginning of the task, participants were informed that they would be performing a word categorization task and that their reward depended on their performance in the task. In the promotion focus condition, participants were informed that they would receive one chocolate bar for taking part in the study, but they could earn an additional chocolate bar if they responded correctly to at least 80% of the LDT trials within one second, reflecting potential for increased reward. In the prevention focus condition, participants were informed that they would receive two chocolate bars for taking part in the study, but they would lose one of their chocolate bars if they responded incorrectly or slower than one second to more than 20% of the LDT trials, reflecting potential for possible losses. In each condition, participants were reminded of the possible gain/loss respective to their condition during the break between the blocks.

Procedure. Participants were recruited in a 'walk-in' fashion in a lab room near the University campus canteen. When a participant entered, they were directed to a free cubicle, where the experiment session was started on a computer. Participants read the LDT instructions including the RF manipulation and then completed the

LDT. Thereafter, participants completed an adapted German version of the Lockwood General Regulatory Focus Measure (LGRF; Lockwood, Jordan, & Kunda, 2002; German version by Sassenberg, Ellemers, & Scheepers, 2012). This version of the LGRF consists of two subscales: chronic promotion focus (twelve items) and chronic prevention focus (eight items), each on a 5-point Likert scale (see Appendix B for example items). Finally, they were asked for demographic information and their suspicions of the study's purpose. The experiment took about 10 minutes.

Results

Due to a technical problem, data from eleven participants were not recorded. Outliers in the variables of error number and total average reaction time were identified using the Tukey criterion, creating a cutoff value at 1.5 times the interquartile range from each quartile. Accordingly, participants with 41 or more errors or an average reaction time equal to or greater than 825ms were excluded from the analysis. The final sample consisted of 134 participants (65.7% female, M_{age} = 21.1, SD_{age} = 3.7, Min_{age} = 17, Max_{age} = 44, sensitive to f = .121). If this filter changed the results substantially, it is noted.

Log-transformed reaction times[1] in the LDT were analyzed using a mixed-model ANOVA with the between factor RF group (promotion vs. prevention) and the within factor word type (promotion/positive vs. prevention/negative). The analysis yielded a significant main effect of word type ($F(1,132) = 226.541$, $p < .001$, $\eta_P^2 = .632$) such that promotion/ positive words were responded to faster than prevention/negative words (ΔM = 27.3ms), but no main effect of RF group ($F(1,132) = 1.135$, $p = .289$, $\eta_P^2 = .009$) nor the predicted interaction effect ($F(1,132) = .892$, $p = .347$, $\eta_P^2 = .007$). Hypothesis 1 is not supported.

Both the promotion focus (Cronbach's $\alpha = .686$) and the prevention focus subscales (Cronbach's $\alpha = .651$) of the LGRF achieved poor reliability. Due to the metric character of these predictors, they were mean-centered and included as predictors in separate restricted maximum likelihood random intercept linear mixed models. The other predictors in each model were log-transformed word frequency (Leipzig Corpora Collection, 2016), word type and the interaction term of word type and one of the two subscales per model. This method allowed for controlling word frequency effects (e.g. Ratcliff, Gomez, & McKoon, 2004) and testing for interactions between one chronic RF and the word type while controlling for the other (Shah,

[1] Descriptive statistics are given in untransformed values to facilitate clarity of interpretation in this and all following studies that analyze reaction times.

Higgins, & Friedman, 1998).[2] In order to assess possible interaction effects of chronic RF and situationally induced RF, further restricted maximum likelihood random intercept linear mixed models were calculated that augmented the previously described models with a situational RF group variable and its interaction terms.[3]

Both chronic RF models show similar results. The effect of word type remains when controlling for word frequency: participants respond more slowly to prevention/negative words ($F(1,5223) = 8.925$, $p = .003$). Chronic promotion focus is associated with faster responses, fitting an eager mindset ($F(1,131) = 7.264$, $p = .008$), and chronic prevention focus is associated with slower responses, fitting a vigilant mindset ($F(1,131) = 4.259$, $p = .041$[4]; Förster, Higgins, & Bianco, 2003). The expected interaction of chronic RF and word

[2] In all multilevel analyses in this dissertation, effects that include a chronic RF score are reported with the test values from the model for the pertinent RF. Effects that do not include a chronic RF score are reported with the test values from the pertinent promotion focus model. Test values for such effects do not differ meaningfully between promotion and prevention models in any study. For complete analysis tables for all multilevel models, see Appendix C.

[3] Previous studies have utilized difference scores between chronic promotion and prevention focus to assess effects of regulatory fit (e.g. Keller & Bless, 2006). However, this approach cannot show effects of chronic RF that are independent of the converse chronic RF, unlike the method adopted here.

[4] This effect becomes marginal ($p = .065$) if the entire sample is analyzed.

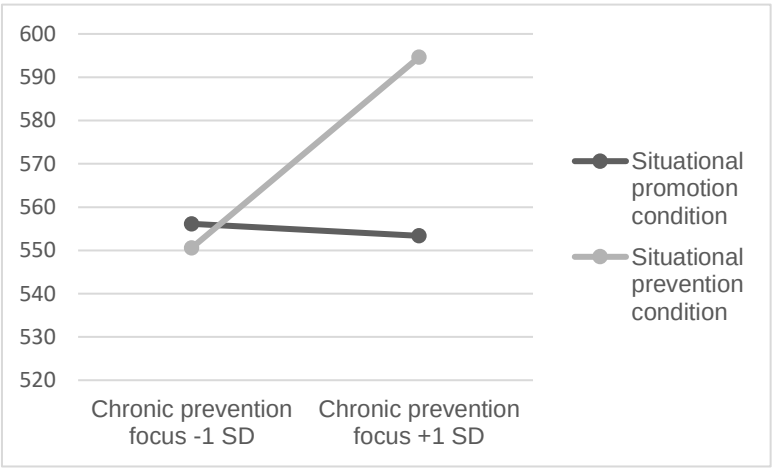


Figure 1: Estimates for reaction times, prevention interaction model, Study 1.

type did not manifest (promotion: $F(1,5223) = .069$, $p = .793$; prevention: $F(1,5223) = .023$, $p = .879$).

For the promotion focus interaction model, no novel effects achieved significance (all $F \leq 2.582$, all $p \geq .111$). For the prevention focus interaction model, the effect of chronic prevention focus is reduced ($F(1,129) = 3.409$; $p = .067$) and qualified by a significant interaction between chronic prevention focus and situational RF condition ($F(1,129) = 4.393$; $p = .038$). These results show that the slowing effect of chronic prevention focus occurs only in the situational prevention focus condition (see Figure 1). No further novel effects achieve

significance (all $F \leq 2.536$, all $p \geq .114$). Hypothesis 2 is not supported.

Discussion

This study aimed to test whether being in state of a particular RF improved recognition of valent words pertaining to that focus, implying impulsive pre-activation. The predicted effects could not be found. In general, participants responded more quickly to promotion/positive words than to prevention/negative words. Chronic promotion focus was related to faster responses, whereas chronic prevention focus was related to slower responses. Further analysis showed a moderating factor: the slower responses due to high chronic prevention focus were driven by participants in the situational prevention focus group.

It is possible that the predicted effects could not be found due to weaknesses in the experimental design. Although the RF framing manipulation used was both established (e.g. Higgins, 1998) and substantial in its objective effect (half of the potential reward), it is still possible that it lacked sufficient strength to induce a situational RF. The nature of RF does not lend itself to simple self-report manipulation checks, as the state of being in a promotion or a prevention focus is not easily introspectively accessed. Nevertheless, a manipulation check would have allowed statements about whether the lack of the predicted effect was due to its nonexistence or to a failure of the manipulation. However, the existence

of interactions with dispositional RF indicate that the RF manipulation had an effect, ameliorating this issue somewhat. With regard to the LDT itself, a weakness of the study is that the target words varied strongly in their everyday frequency. In this study, a stimulus set was required that fit a close theoretical definition of RF and yet was suitable for use in a LDT. Although word frequency effects were controlled for in the statistical analyses, it is still possible that the differences between the two subsets of words made subtle effects difficult to detect.[5] Finally, the confound of valence and RF in the word stimuli likely led to valence effects (e.g. Estes & Adelman, 2008; Yap & Seow, 2014), possibly masking RF effects.

However, the study did produce some interesting data patterns. Beyond the established valence effect in the LDT (Estes & Adelman, 2008), the main finding of this study was the unpredicted interaction of dispositional and situational RF. Taken alone, only dispositional promotion focus was consistently related to faster responses, fitting an eager mindset. However, when analyzed together, a different pattern emerged. Individuals with strong chronic prevention focus showed a more vigilant pattern of responding when in a fitting situation framing, reacting slower. On the other hand, situational promotion framing

[5] The average log-transformed word frequency was slightly higher for promotion words (M = 9.77) than for prevention words (M = 8.24).

did not seem to increase the effect of chronic promotion focus. It is possible that the experimental situation was perceived as generally more gain-oriented by the participants, as in each condition, participants could expect a reward (gain) for their participation; only the size of the reward varied due to their performance. If this was the case, the gain framing might have had little impact due to a ceiling effect for promotion focus. Another explanation for this pattern can be found in prospect theory (Kahneman & Tversky, 1979). If losses loom larger than gains, than the motivational effect of losing one chocolate bar of two should be greater than the effect of gaining one chocolate bar in addition to another. Therefore, the gain framing might have had a weaker effect than the loss framing in this experiment.

Ultimately, the study refutes the idea that RF (whether situational or chronic) affects the recognition of words appropriate to the current focus. It seems that the effects of RF on cognition and behavior cannot be explained by semantic pre-activation of the relevant concepts. However, RF might still affect impulsive processing in a different manner. Study 2 aimed to address such an alternative avenue of influence.

Study 2 – Regulatory Focus and Semantic Priming

Theoretical Background

Study 1 aimed to identify basic semantic pre-activation and attentional effects of RF. Study 2 extended this goal to another aspect of associative processing: the strength of semantic associative links. Although Study 1 failed to provide evidence for a generalized semantic pre-activation due to RF, it is still reasonable to assume that concepts associated with a particular RF may be more strongly associated with one another than with concepts associated with the opposite RF. As individuals typically apply similar strategic concepts, experience similar emotional states and construe their environments in similar ways when operating in a particular RF, these elements are likely to co-occur often. Furthermore, as people prefer to utilize means that fit their current RF due to regulatory fit (Lee & Aaker, 2004; Spiegel et al., 2004), they are less likely to experience the co-occurrence of elements from differing RFs. Therefore, concepts that fit the same RF should facilitate each other' processing through mechanisms of associative or semantic priming.

In addition, the RIM posits that the strength of existing associations is flexibly moderated by an individual's current motivational orientation. An individual in an approach orientation should experience

stronger associative connections between impulsive elements that are of positive valence or deal with approach behavior, whereas an individual in an avoidance orientation should experience stronger associative connections between impulsive elements that are of negative valence or deal with avoidance behavior. As RF is closely linked to approach and avoidance behavior and is posited to have a deeply rooted effect on processing, it is possible that RF may moderate associative links in a similar fashion, whether this moderation is mediated by changes in motivational orientation or not. If so, individuals in a RF should have stronger associations between impulsive elements typically associated with that RF. Importantly, as the underlying processes are impulsive in nature, they should occur whether individuals are aware of the activation of any particular element or not.

A possible method of uncovering such effects is by utilizing a LDT that implements semantic priming. As discussed above, various mechanisms may operate in primed LDTs. The goal of the current study is to determine whether a situationally induced or chronic dispositional RF moderates the effects of primes on semantic processing, which may occur via effects on any of these mechanisms. RF may increase the efficiency of target-prime matching for relevant domains, leading to both faster retrospective semantic matching (Neely et al., 1989) and increased fluency of processing, likely

increasing feelings of familiarity (Klauer & Stern, 1992; Ratcliff & McKoon, 1988).

H1: Participants' LDT performance is better when the target fits the RF of the prime.

H2a: The strength of this priming effect is increased for a matching situational RF.

H2b: The strength of this priming effect increases with the matching chronic RF.

RQ: Do situational and chronic RF interact in predicting on LDT performance and priming effects?

Method

Design and Sample. The study followed a 2x2x2 mixed design with the between factor RF (promotion vs. prevention focus) and the within factors target type (promotion /positive vs. prevention/negative word) and prime type (promotion/positive vs. prevention /negative word). As logistical constraints dictated a maximum sample size and no prior studies could be found to provide an effect size estimate, a sensitivity analysis was conducted based on the expected sample size to calculate the smallest effect size the study could expect to detect. With an estimated 120 participants, the study would be capable of detecting a predicted within-between interaction with a magnitude of Cohen's f =.128 with an acceptable degree of statistical power (.80). Although the expected effect is likely small, this seems an acceptable

threshold of detection (corresponding to d = .26, a small effect).

The study was conducted at the University of Würzburg between November 6th and November 10th, 2014, with participants recruited via mailing list. A total of 119 participants took part in the study (71.8% female, M_{age} = 26.3, SD_{age} = 9.9, Min_{age} = 16, Max_{age} = 62). Data was collected in a lab room with six computerized workplaces in cubicles that shielded the participants from each others' and the experimenter's view. Participants received 7€ for their participation in the entire session, which included several other experiments.

LDT. The LDT paradigm consisted of six practice trials without meaningful primes followed by two blocks of 100 trials each and a final block of 96 trials. It was structured identically to Study 1 except as follows: each trial began with a letter mask that was presented in the center of the screen for 250ms (XXXXXXXXXXXXXXX), which participants were instructed to focus on. Thereafter, a prime word was presented for 30ms, followed by the letter mask for 250ms. Finally, the target was presented.

Each block consisted of one half nonword trials and one half word trials, with the word trials being further divided into 50 promotion word and 50 prevention word trials per block, presented in a random order. Each trial was preceded by either a promotion or a prevention prime. The nonword targets were identical to those used in Study

1. The 20 target words for each RF from Study 1 were split into two subsets of 10 each to create a set of primes and targets (see Appendix B).

Regulatory focus manipulation. Drawing on manipulations of RF from the extensive literature available, an essay priming task (e.g. Higgins, Roney, Crowe, & Hymes, 1994) was adopted in order to ensure a strong and theoretically sound manipulation that would not be affected by the motivational relevance of the task reward. Essay priming requires participants to activate memories and experiences associated with a particular RF, but has no immediate connection to the task that follows it, relying on principles of accessibility to affect behavior (e.g. Morewedge & Kahneman, 2010). At the beginning of the task, participants were asked to write an essay describing their hopes, ideals and wishes in the promotion condition or their standards, requirements of themselves and duties in the prevention condition. Participants were given five minutes for this task. In order to ensure the continued effect of the manipulation during the LDT, participants were asked to recall one central concept from their essays after each block.

Procedure. Participants took part in a series of experiments over a one-hour session, of which this was the second. Participants first read the instructions for the RF manipulation and wrote their essays. They then completed the LDT task. Thereafter, participants completed the German LGRF (Sassenberg et al., 2012)

and were finally asked for demographic information and their suspicions concerning the purpose of the study. The entire experimental session took about 15 minutes.

Results

Due to a technical error, LDT data was not collected from two participants. Outliers in the variables of error number and total average reaction time in the remaining sample were identified using the Tukey criterion. Six participants with 35 or more errors or an average reaction time equal to or greater than 820ms were excluded from the analysis.

Each essay was read by a judge blind to the condition who coded it as either promotion-focused, prevention-focused or ambiguous. Only participants whose essays' coding by the judge matched the condition they were assigned to were included in the analysis. Furthermore, some of the essays were identified by the judge as containing very little content with no emotional descriptions or as consisting only of lists of relevant concepts with no self-relevance. One participant noted that they could not think of anything to write and one participant copied the instructions. In total, eleven datasets contained such essays and were excluded from analysis. The remaining sample consisted of 100 participants (77.0% female, M_{age} = 25.5, SD_{age} = 8.5, Min_{age} = 16, Max_{age} = 57, sensitive to f = .141). If this filter affected the results substantially, it is noted at the appropriate analysis.

Log-transformed reaction times in the LDT were analyzed using a mixed-model ANOVA with the between factor RF condition (promotion vs. prevention) and the within factors word type (promotion/positive vs. prevention/negative) and prime type (promotion/positive vs. prevention/negative). The analysis yielded a significant effect of word type ($F(1,98) = 80.961$, , $p < .001$, $\eta_P^2 = .421$) such that participants responded faster to promotion/positive words (ΔM = 24.9ms). No other effects achieved significance (all $F \leq 2.048$, all $p \geq .156$, all $\eta_P^2 \leq .020$), including the predicted interaction between prime and target type ($F(1,98) = 1.772$, $p = .186$., $\eta_P^2 = .018$) and three-way interaction ($F(1,98) = .104$, $p = .748$., $\eta_P^2 = .001$). Hypotheses 1 and 2a are not supported.

The promotion focus subscale of the LGRF achieved acceptable reliability (Cronbach's $\alpha = .742$), the prevention focus subscale achieved poor reliability (Cronbach's $\alpha = .671$). Linear mixed models were calculated as in Study 1, with separate models assessing chronic RF effects alone and interactions between situational and chronic RF.

In the analyses for chronic RF, the effect of word type demonstrated in the ANOVA persisted. Participants also show marginally faster responses after promotion/positive primes ($F(1,3854) = 2.844$, $p = .092$[6]). In addition, the interaction of chronic promotion focus

[6] This effect is no longer significant if the entire sample is analyzed ($p = .274$).

and prime type is marginally significant ($F(1,3854) = 3.636$, $p = .057$): high chronic promotion focus leads to faster reaction times for targets preceded by promotion/positive primes, but does not affect reactions when targets are preceded by prevention/negative primes (see Figure 2). Surprisingly, high chronic prevention focus leads to faster reactions generally ($F(1,96) = 4.428$, $p = .038$), but especially when presented with prevention/negative target words regardless of the prime (interaction: $F(1,3854) = 4.682$, $p = .031$, see Figure 3). Hypothesis 2b is not supported.

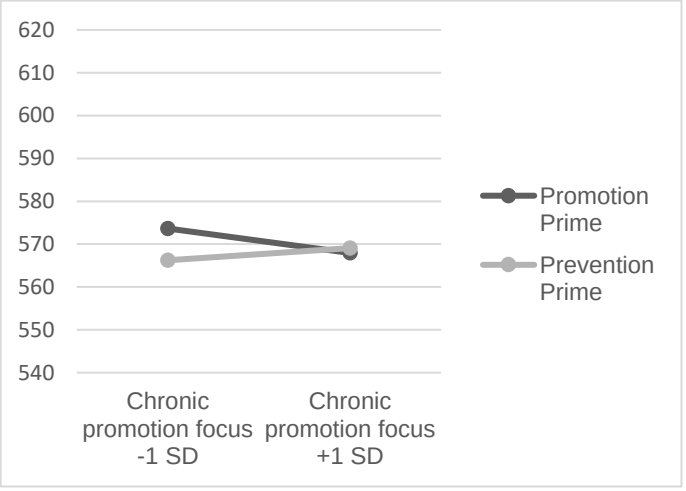


Figure 2. Estimates for reaction times, chronic promotion focus model, Study 2.

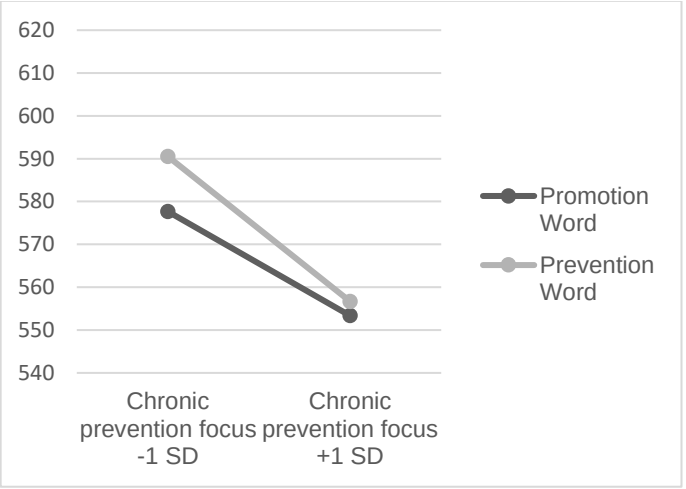


Figure 3. Estimates for reaction times, chronic prevention focus model, Study 2.

In the dispositional-situational analysis of reaction times, the previously discussed effects persist in both models. The promotion focus interaction model yields no new effects (all $F \leq 1.674$, all $p \geq .196$). However, the analysis reveals a marginal interaction of chronic prevention focus, situational RF and prime type ($F(1,3848) = 3.441$; $p = .064$, see Figure 4). Chronic prevention focus improves reaction times under all circumstances, but this effect is weaker generally in the situational promotion focus condition. In the situational prevention focus condition, the effect is strongest after a promotion/positive prime. These results do not support Hypothesis 1 or 2.

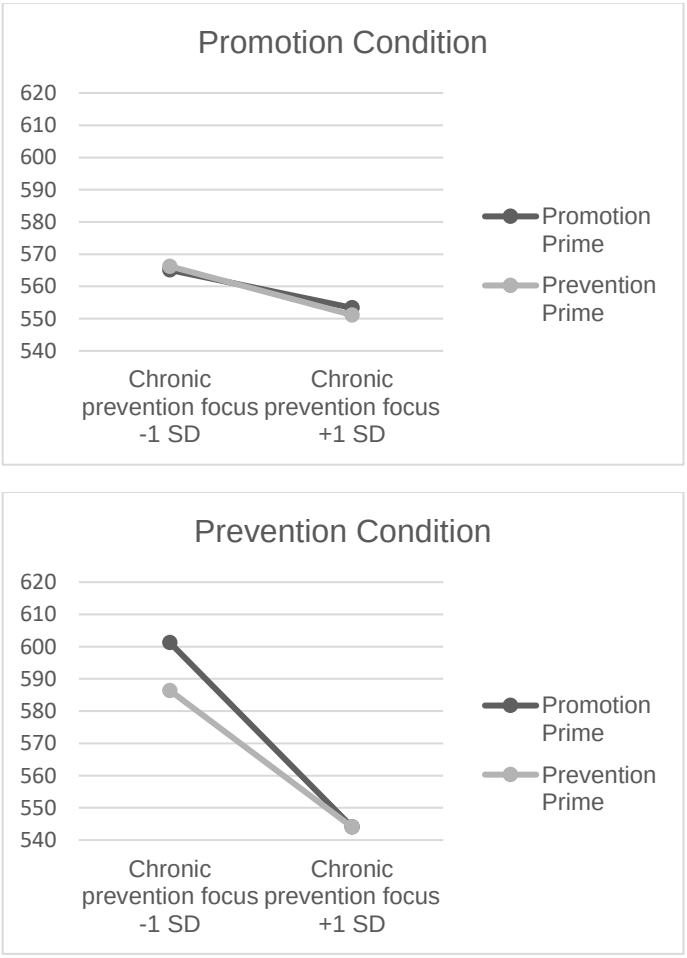


Figure 4. Estimates for reaction times, prevention focus interaction model, Study 2.

Discussion

Study 2 aimed to detect moderation of associative links between RF-relevant concepts by situational as well as chronic RF. The facilitation of processing target words by a preceding conceptually congruent prime was expected to be greater when participants were in the respective RF condition or when they had high chronic levels of the respective RF condition. The results failed to demonstrate this modulation or indeed to show any effect of semantic facilitation from primes for targets related to their RF.

Although there were no results that indicated an effect of situational RF independent of chronic RF, chronic RF did show some effects. Participants with low chronic promotion focus show slower reaction times after promotion primes, but increasing chronic promotion focus attenuates this difference. In a similar fashion, participants with low chronic prevention focus show slower reaction times for prevention targets, but increasing chronic prevention focus attenuates this difference while also improving reaction times generally. In order to explain these results, it is necessary to first delineate the specific effects of primes and target words on reaction times in the LDT.

Chronic promotion focus affected reactions depending on the prime rather than the target word. As mentioned above, priming effects in the LDT can be explained by semantic (Neely et al., 1989) or affective

(Klauer & Stern, 1992) matching or by a feeling of familiarity elicited by the prime (Ratcliff & McKoon, 1988). The first two accounts do not fit the current data, as the independence of the effect from the target word rules out matching processes. However, it is possible that individuals with a strong chronic promotion focus process words that fit their focus more fluently, leading to a greater feeling of familiarity (e.g. Alter & Oppenheimer, 2009; Reber & Zupanek, 2002) which in turn may drive faster responses to target words (Ratcliff & McKoon, 1988). This would imply that chronic RF may influence the ease of processing related semantic stimuli.

Unfortunately, there are two problems with this interpretation. First, if stimuli fitting chronic RF are more easily processed, Study 1 should also have shown an effect. This issue may be addressed by considering the precise process postulated by Ratcliff and McKoon (1988). According to their account, the existing association between the representation of a prime and the representation of the target determines the feeling of familiarity. Strong associations lead to greater familiarity. Therefore, in the absence of a prime, no difference in responses should be found. In this case, the effect would not have been detected in Study 1. However, the effects of the prime might have influenced the response to the target in Study 2's paradigm. This explanation would fit both the lack of results in Study 1 and the observed pattern here, addressing this issue. The second problem with this explanation is the question why such an effect should

exist for promotion focus, but not for prevention focus. This issue is more difficult to address, but may be due to valence effects. Fluency is typically linked to positive affect (Reber et al., 2004), and even non-fluency related positive affect has been shown to have similar effects to actual fluency on judgments (Topolinski & Strack, 2009). Building on this idea, chronic prevention focus might indeed have improved the processing of negative stimuli, but the negative affect associated with these stimuli might have masked the resulting fluency-related positive affect, leading to a net null effect for prevention fit.

An alternative, but related explanation might be that individuals with a stronger chronic RF experience stronger affect from processing fitting words, a supposition supported by prior research on affect and RF (Idson et al., 2000; Liberman et al., 2005). This mechanism would lead to somewhat similar results as the fluency explanation if the resulting stronger affect interfered with the metacognitive fluency signal in the response to the target. The difference would be that the affect would result not from improved processing, but as an amplified result of said processing. These different explanations both predict facilitation for promotion focus and positive primes, but differ for the predicted effect of prevention focus on negative primes. A fluency account would predict an improvement in reaction times after negative primes with increasing chronic prevention focus, as the increased fluency should counteract the negative affect from the word. An affect amplification account

would instead predict a decline in performance after negative primes, as the increasing negative affect should interfere with the positive fluency signal to categorize the target as a word. The data from this single experiment are insufficient to test such detailed predictions, but they show a tendency towards the affect amplification explanation: The relative advantage conferred by prevention primes diminishes with increasing chronic prevention focus, albeit only in the situational prevention focus condition.

However, increased affective responses might not be the only result of a strong chronic RF, as can be seen in the different effects of chronic prevention focus on positive and negative targets. In general, previous studies have found that positive targets are responded to more quickly than affectively neutral targets in the LDT (e.g. Hofmann, Kuchinke, Tamm, Vö, & Jacobs, 2009; see Briesemeister, Kuchinke, & Jacobs, 2011 for a more in-depth discussion). However, high-arousal negative targets may also facilitate responses, whereas low-arousal negative targets might even slow them further (Hofmann et al., 2009). From this perspective, the response facilitation for negative words with increasing chronic prevention focus may be a result of these words eliciting greater arousal. As a prevention focus is typically associated with high-arousal negative affective states rather than low-arousal negative affective states (Higgins, 2001) and prevention goals deal with actively avoiding negative endstates, it may be that individuals with a

strong, stable tendency towards a prevention focus generally experience more arousal when processing negative words, thereby leading to faster responses in the LDT. Such negative arousal effects have been shown to occur early in target processing (Kuchinke et al., 2005), which might explain how they could dominate a possible priming effect.

The exploratory analysis revealed a further interaction of chronic prevention focus with the prime and situational RF condition. Participants responded faster with increasing chronic prevention focus, particularly so when also in a situational prevention focus. In the latter case, the facilitation was at its most extreme after a positive prime. One partial explanation for this pattern has already been discussed: prevention focus may amplify negative affect from negative primes, so they interfere with the affective results of increased fluency more, leading to relatively slower responses. However, research on counter-regulation (Rothermund, Voss, & Wentura, 2008) offers an alternative approach. If one examines the pattern for individuals with a weak chronic prevention focus, primes that do not fit the situational RF appear to inhibit responses more strongly than primes that do. Insofar as primes may be considered a distraction from the main task of word recognition, this pattern is consistent with a counter-regulation perspective. The principle of counter-regulation states that stimuli that are in opposition to the valence of the current endstate expectation bind more attentional resources. Applied to

this experiment, individuals in a situational promotion focus (a current focus on positive endstates) should be more distracted by negatively valenced primes, possibly inhibiting their performance in recognizing the following target, whereas the converse holds true for individuals in a situational prevention focus. From this perspective, increasing chronic prevention focus would appear to insulate participants from the inhibitory effects of counter-regulation caused by primes. Performance is generally improved and the difference between prime types is attenuated when individuals have a strong chronic prevention focus. This pattern fits previous research showing increased vigilance and avoidance of errors due to irrelevant information associated with a prevention focus (Freitas et al., 2002). Therefore, it is less surprising that the benefits of a strong chronic prevention focus are greater when the situation also induces a prevention focus – this is not a regulatory fit effect, but a prevention-specific effect that is strengthened when both situation and disposition combine to induce a prevention focus. The possibility that a prevention focus can insulate individuals from the effect of primes in a (nonaffective) task is an interesting one that merits further research to investigate thoroughly.

The results of Study 2 show several general differences to those of Study 1. In the Study 1, participants with a high chronic prevention focus responded particularly slowly to both word types when under a situational prevention focus. In this study, the

opposite held true: such participants were particularly fast to respond. The two studies differed in only two substantive ways: the addition of semantic primes in Study 2 and the method of induction of situational RF. A possible explanation why the presence of primes as distracting stimuli might have led to relative facilitation rather than inhibition for prevention-focused participants has already been discussed. However, the difference in RF induction may also be relevant. The reward manipulation used in Study 1 was directly relevant to the LDT, being based on performance in said task. The essay priming manipulation in Study 2, however, was incidental to the LDT. Although these manipulations have been treated as interchangeable in the past (e.g. Higgins, 1997), recent work has underlined the importance of distinguishing between different levels of goal hierarchies (Scholer & Higgins, 2013). This perspective distinguishes between three levels of goals: the system level, which concerns itself with global goals, that is abstract, high-level endstates (e.g. a specific career destination, being rejected socially), the strategy level, which deals with the general method used to approach or avoid a specific endstate (e.g. approaching matches to the desired career, avoiding matches to being rejected), and the tactics level, which are the precise means used to follow the strategy. Scholer and Higgins (2013) maintain that these levels may function orthogonally to one another and that each may be approached with either a promotion or a prevention focus, implying that RF may have varying

effects on information processing depending on which level is affected. The reward manipulation from Study 1 appears to fit best on the strategic level: the possibility to gain or lose half of the potential reward does not dictate how to approach the task, but it also does not concern global goals. However, the priming manipulation used in this study instead appears to speak to the system level, drawing to mind global goals associated with either a promotion or a prevention focus.

From this perspective, it is possible that the application of a prevention focus in Study 1 may have induced participants to adopt a vigilance-oriented strategy in the task itself, leading to slower responses. The thoroughness of this application may have been moderated by chronic prevention focus, as individuals with a strong tendency to value security goals should be particularly inclined to employ vigilance means when the task is framed in a prevention focused manner. In Study 2, however, the irrelevance of the main task for the participants' prevention goals would not have lent itself to a vigilance-based strategy. Instead, participants who generally valued security goals and had also been made to think about these goals immediately before may have experienced increased motivation in the subsequent task, in line with regulatory fit theory (Higgins, 2000). This might explain their particularly fast responses. However, it is unclear why only individuals experiencing prevention fit should show this pattern. In addition, prior research has shown that both priming manipulations such as that used

in Study 2 and chronic RF dispositions do lead to eagerness (promotion) and vigilance (prevention) means when approaching new goals, which contradicts this explanation (e.g. Scholer & Higgins, 2013).

It is also possible that high chronic prevention focus participants did indeed benefit from more efficient word recognition when primed with ought self-guides, but this effect was mitigated in Study 1 by the goal relevance of the word stimuli. When the word recognition task was linked to a potential loss, participants may have reevaluated their spontaneous reactions more often to avoid errors, slowing their performance in line with typical vigilance-style processing. However, when the word recognition task was free of performance-dependent negative consequences, participants may instead have gone with their initial spontaneous responses, which grew faster with increasing fit between their prior priming and their disposition.

A final alternative explanation comes from the difference in the specificity of prevention goals between the studies. Individuals who are used to pursuing security goals and have just been reminded of said goals on a system level might differentiate more strongly between self-relevant security goals and irrelevant ones. Achieving a performance standard in a LDT is likely not one of such individuals' core ought-guides. Therefore, they might not implement a vigilant approach to this task, as it does not correspond to any of their more important

prevention goals. Low chronic prevention focus individuals, however, might be more vulnerable to vigilance-means priming. Such individuals may not have a clear set of goals that they perceive as ought-guides, but instead retrieve more generalized self-standards when subjected to the prevention essay priming. Such broader standards may be more likely to induce a vigilance approach to consequent irrelevant tasks compared to the possibly more precise ought-guides of high chronic prevention focus individuals.

In summary, Study 2 could not show any consistent effect of RF on the semantic association strength of RF-associated words. However, possible moderating effects of RF on the fluency of processing emotional words or their affective impact have been revealed. Future studies might attempt to disentangle these two mechanisms, for example by directly manipulating fluency orthogonally to RF. In addition, the insulation from distracting stimuli tentatively ascribed to prevention focus in this experiment offers an interesting avenue of study. This might be directly tested via eye-tracking or using experimental paradigms that explicitly measure attention effects (e.g. the dot-probe task, MacLeod, Mathews, & Tata, 1986). It would also be illuminating to examine the differences between high and low chronic prevention focused individuals that lead to the latter's slower responses in Study 2, for example by manipulating the relevance of task performance to an individual's dispositional ought-guides via more specific

priming. Thus, although Study 2 cannot itself address these questions, it is a fruitful explorative study that can generate much further research.

Study 3 – Regulatory Focus and Affective Priming

Theoretical Background

The prior studies examined the effects of RF on simple semantic discrimination and on semantic associations. However, although the stimuli utilized were affectively charged, these studies did not speak directly to effects of RF on affective associations. Study 3 aimed to address this gap.

In general, RF theory makes few statements about valence. The dimensions of promotion and prevention are assumed to be orthogonal to valence, with each focus concerning both positive (gains, nonlosses) and negative (nongains, losses) endstates. However, these endstates have been found to vary in their intensity between the two foci (Idson et al., 2000). Specifically, gains are perceived as more positive than nonlosses and losses are perceived as more negative than nongains. From the perspective of the RIM (Strack & Deutsch, 2004), this modulation of affect may occur in two different ways: either the positive reflective evaluation of the stimulus is enhanced (for example by increased weighting of the value component in expectancy-value judgments; Fishbein & Ajzen, 1975) or its impulsive affective associations are strengthened. The latter describes a possibility that RF may influence affective processing. More precisely, individuals in a

promotion focus should attend more to gains (more extreme positive affect) and nongains (less extreme negative affect). On balance, a promotion focus should therefore be associated with more variations in positive affect than in negative affect, whereas the opposite holds for individuals in a prevention focus. Following from this logic, a promotion focus may lead to stronger activation of positive affect when processing unambiguously positive stimuli, which in turn should facilitate processing of subsequent positive stimuli and inhibit processing of subsequent negative stimuli (Fazio, 2001; Fazio et al., 1986).

Typically, such facilitation/inhibition is investigated using indirect measures of affective activation, as these are less vulnerable to intentional correction (e.g. Greenwald, McGhee, & Schwartz, 1998). A well-established family of measurement instruments in this field is that of affective priming (Fazio et al., 1986). Affective priming measures generally follow the procedure of showing an individual a prime from the category to be investigated, then quickly following up with another task that has the potential to be affected by the automatic evaluation of the prime. Importantly, the prime is always stated to be irrelevant to the task. An example of such a measure is the bona-fide pipeline task (BFP, Fazio, Jackson, Dunton, & Williams, 1995). In this task, participants see a prime and must immediately thereafter categorize a target word as either positive or negative. Individuals respond more quickly and

accurately to the target when it matches the valence of the prime. Although this effect is assumed to be at least partially driven by the facilitation or inhibition of target encoding due to the prime (Fazio, 2001), it has also been explained as a function of response interference (e.g. Deutsch & Gawronski, 2009; Gawronski, Deutsch, LeBel, & Peters, 2008). This account postulates that the processing of the prime cues the response associated with its valence. This activation then facilitates the correct response if it is congruent with the target's valence or interferes with the correct response if it is not, leading to the typical reaction time effects observed in this paradigm. Although both accounts depend on the congruence of the spontaneously activated valence between target and prime to show effects, implying that the BFP measures this valence in either case, this can become a problem when testing for differences in affective activation (Deutsch & Gawronski, 2009). A difference as measured by the BFP may be due to differences in affective activation, but it may also be specifically due to a difference in the corresponding response activation.

This issue with the BFP and response interference based measures in general is problematic for the goal of identifying RF effects on affective processing. As shown in Study 2, RF may influence the processing of primes in the LDT, at times reducing their influence on the subsequent response to the target. This may be due to RF damping the effect of the prime on information processing

or to RF preventing the prime from cueing a response, even if the prime is affecting information processing. This ambiguity can be addressed by implementing another measure of affective activation that is not based on a response interference mechanism, such as the Affect Misattribution Procedure (AMP, Payne, Cheng, Govorun, & Stewart, 2005). In contrast to the BFP, the AMP measures affective activation by first presenting a prime, then having participants rate a briefly presented neutral target stimulus as either positive or negative. The affective response elicited by the prime is irrelevant for the target, but is still used as information to judge its valence. Importantly, the neutral target stimuli in the AMP should not themselves prime a specific response, eliminating response interference as a mechanism for AMP effects (Deutsch & Gawronski, 2009). These two measures together seem well suited to disambiguating possible effects of RF on affective responses.

H1: Participants show greater priming effects when the prime is consistent with their situational RF.

H2: Participants show greater priming effects when the prime is consistent with their chronic RF.

RQ1: Do effects of situational and chronic RF differ depending on the indirect measure instrument?

RQ2: Do effects of situational and chronic RF interact in predicting affective priming strength in either measure?

Method

Design and Sample. The study followed a 2x2 mixed design with the between factor situational RF (promotion vs. prevention focus) and the within factor prime type (promotion/positive vs. prevention/negative). As in Study 2, the estimated sample of 120 participants implies sensitivity to effects of $f = .128$ or greater.

The study was conducted at the University of Würzburg between November 24th and November 27th, 2014 with participants recruited via mailing list. A total of 136 participants took part in the study, although demographic data could not be collected from two participants due to computer errors (remaining 134: 75.3% female, M_{age} = 30.0, SD_{age} = 9.9, Min_{age} = 18, Max_{age} = 58). Data was collected in a lab room with six computerized workstations in cubicles that shielded the participants from each others' and the experimenter's view. Participants received 7€ for their participation in the entire session, which included several other experiments.

BFP. The BFP paradigm consisted of four practice trials followed by one block of 100 trials. Each trial began with a blank screen for 700ms, then a fixation cross presented for 700ms in the middle of the screen. Thereafter, a prime word replaced the cross for 133ms, followed by a blank screen for 34ms. Finally, the target word appeared in the middle of the screen. Participants were instructed to hit the right Shift key if the word presented was positive or the left Shift key if the word

presented was negative. Visual anchors reminded participants of the response keys in each trial. The target remained on screen until participants responded or until 1000ms had passed. After 1000ms, the screen displayed the message "TOO SLOW!!!" for 1000ms before the next trial began. If participants responded incorrectly, the error message "WRONG!!!" was displayed for 1500ms before the next trial began. Participants were instructed to ignore the primes and focus only on the targets.

The block consisted of one half trials with promotion/positive targets and one half trials with prevention/negative targets. These trial groups were further subdivided into one half trials with promotion/positive primes and one half trials with prevention/negative primes. Therefore, each prime category was paired with each target category 25 times. The 20 target words for each RF from Study 1 were again split into two subsets of 10 each to create a set of primes and targets (see Appendix B). In order to ensure a constant number of prime-target pairings, each participant saw a set of five primes and five targets per category randomly selected from the respective pool. Each prime was paired with each target once.

AMP. The AMP paradigm consisted of four practice trials followed by one block of 80 trials. Each trial began with a row of Xs presented for 500ms, followed by a blank for 200ms. Thereafter, a prime word was presented for 200ms, followed by a blank for 100ms.

Finally, a Chinese ideograph from the stimulus set used by Payne and colleagues (2005) was shown for 100ms, followed a 75ms blank and finally a mask. Participants were asked to judge the ideograph they had seen as more or less pleasant than the average Chinese ideograph by pressing the right (more pleasant) or left (less pleasant) Shift keys. The prime words were the 20 target words for each RF from Study 1 (see Appendix B). Each word was presented as a prime twice.

Regulatory focus manipulation. Similarly to Study 2, a state of promotion or prevention focus was induced by autobiographical essay priming (Higgins et al., 1994). In order to ensure the continued effect of the manipulation during the experiment, participants wrote an essay before completing the first affective priming paradigm and a second essay directly before the second one. In the latter, participants either elaborated on their first essay or described other hopes and dreams or standards and duties respectively. Participants spent five minutes on each essay. As a manipulation check, participants were asked how they felt on 7-point two items directly after writing: how happy vs. sad they were and how relieved vs. anxious they were. The absolute deviations from the scale midpoints on these two items should act as a measure of how strongly feelings fitting a promotion (happy vs. sad) or prevention (relieved vs.

anxious) were activated by the essays (Zhao & Pechmann, 2007)[7].

Procedure. Participants took part in a series of experiments that lasted a total of one hour, of which this experiment was last. After finishing the preceding task, participants read the instructions for the RF manipulation, wrote their essays and responded to the manipulation check items. They then completed the first affective priming paradigm (BFP or AMP). Next, they wrote the second essay on the same general topic as the first and again responded to the manipulation check items, followed by the remaining affective priming paradigm. The order of the paradigms was counterbalanced. Thereafter, participants completed the German LGRF (Sassenberg et al., 2012) and were then asked for demographic information and their suspicions concerning the purpose of the study. The entire experimental session took about 20 minutes.

Results

Data selection and preparation. For the BFP data, latencies stemming from incorrect responses (6.1%)

[7] An analysis of this manipulation check after the experiment ran showed that its original effect size in the paper by Zhao & Pechmann (2007) was small (highest possible effect size from descriptives in the paper: $d = .23$). This study did not have a sufficient sample size to reliably detect this effect (power in final BFP sample: 34.3%). Therefore, this manipulation check is unsuitable for this study and will not be discussed further.

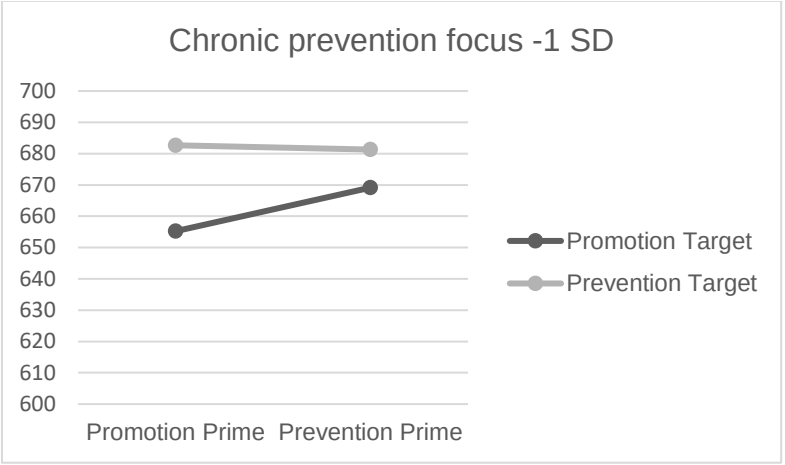
or anticipations (RT < 300ms, 0.2%) were discarded. Sample outliers in the variables of error/anticipation number and total average reaction time were identified using the Tukey criterion. Accordingly, five participants with 16 or more errors or anticipations or an average reaction time equal to or greater than 1223ms were excluded from the BFP analysis. Difference scores between mean reaction times for the two target categories were calculated. Higher values were coded to indicate relatively faster responses to promotion/positive targets (i.e. increased positivity). For the AMP analysis, data from nine participants who categorized the ideographs as either more or less positive than average over 80% of the time were discarded.

Each pair of essays was read by a judge blind to the condition who coded them as either promotion-focused essays, prevention-focused essays or as ambiguous. In this coding process, the first essay written was coded first and independently of the second essay, but as participants often referred back to their first essay in the second essay, the second essay was coded with knowledge of the content of the first essay. Only participants whose essays' coding by the judge matched the condition they were assigned to were included in each analysis. Furthermore, additional participants were eliminated following the essay criteria described in Study 2 (13 participants for the BFP analysis, 18 participants for the AMP analysis). This resulted in a final sample size of $N = 118$ for the BFP analysis (74.3% female, $M_{age} = 26.3$,

SD_{age} = 9.1, Min_{age} = 18, Max_{age} = 58, sensitive to f = .130) and N = 109 for the AMP analysis (75.9% female, M_{age} = 26.3, SD_{age} = 9.4, Min_{age} = 19, Max_{age} = 58, sensitive to f = .135). If application of these filters changed the results substantially, it is noted at the appropriate analysis.

BFP Analysis. The positivity indices were subjected to a mixed-model ANOVA with the between factor situational RF (promotion vs. prevention) and the within factor prime (promotion/positive vs. prevention/negative). The expected pattern would have implied a main effect of situational RF, as a promotion focus should increase the positivity index of promotion/positive primes relative to a prevention focus while a prevention focus should decrease the positivity index of prevention/negative primes. Therefore, the two prime categories should not differ by RF (a statistical interaction), but rather positivity indices should be higher averaged over both primes for promotion than for prevention focus (a main effect). This prediction was not supported in the analysis, which yielded a significant main effect of prime ($F(1,116) = 6.558$, $p = .012$, $\eta_P^2 = .054$) such that promotion/positive primes produced higher positivity indices than prevention/negative primes. Neither the expected main effect of situational RF ($F(1,116) = .006$, $p = .938$, $\eta_P^2 < .001$) nor the interaction of situational RF and prime ($F(1,116) = .008$, $p = .931$, $\eta_P^2 < .001$) achieved significance. For the BFP, Hypothesis 1 is not supported.

Both the promotion focus subscale (Cronbach's α = .774) and the prevention focus subscale of the LGRF achieved acceptable reliability (Cronbach's α = .715, both tested in the entire sample). These predictors were once again mean-centered and included as predictors in separate restricted maximum likelihood random intercept linear mixed models. Due to the nature of the models, the positivity index calculated for the ANOVAs could not be used in the mixed models. Instead, both prime type and target type were included as predictors, as well as the targeted subscale with all interactions. For this reason, the statistical expectation for these analyses was separate interactions for each chronic regulatory focus with prime type and target type. Increasing chronic promotion focus would be expected to reduce reaction times to positive targets after promotion/positive primes, but increase them to negative targets after promotion/positive primes. Conversely, increasing chronic prevention focus would be expected to increase reaction times to positive targets after prevention/negative primes, but reduce them to negative targets after prevention/negative primes. As in previous studies, log-transformed target word frequency and the converse subscale were included in each analysis as control variables. A second set of models added situational RF condition as a predictor and assessed its interactions with the other predictors.



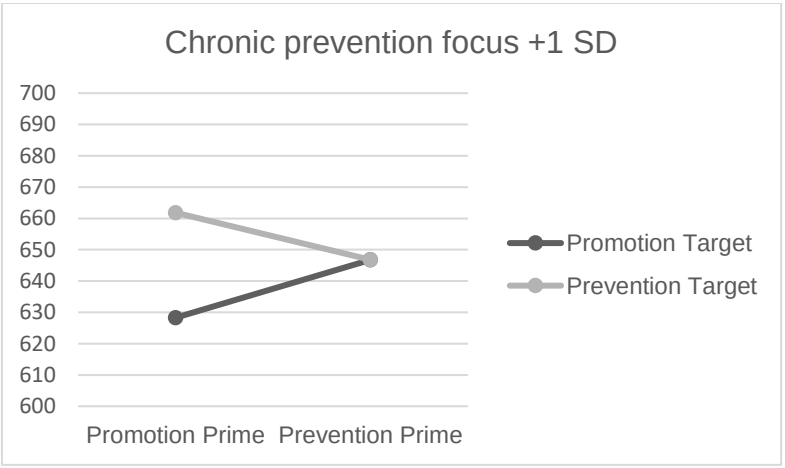


Figure 5. Estimates for reaction times, chronic prevention focus model, BFP task, Study 3.

Both chronic RF models upheld the affective priming effect shown in the ANOVA and also showed an effect of target type such that participants responded slower to prevention/negative targets ($F(1,11130.755) = 32.482$, $p < .001$). The chronic promotion focus model yielded no novel significant effects (all $F \leq 2.279$, all $p \geq .134$) [8]. However, for chronic prevention focus, the analysis revealed a marginally significant three-way interaction of prime, target and chronic prevention focus score ($F(1,11118.229) = 2.780$, $p = .095$[9], see Figure 5). Individuals with a high chronic prevention focus showed greater affective priming effects, which appeared to be driven more by increased effectiveness of the prevention/negative primes. These results partially support Hypothesis 2.

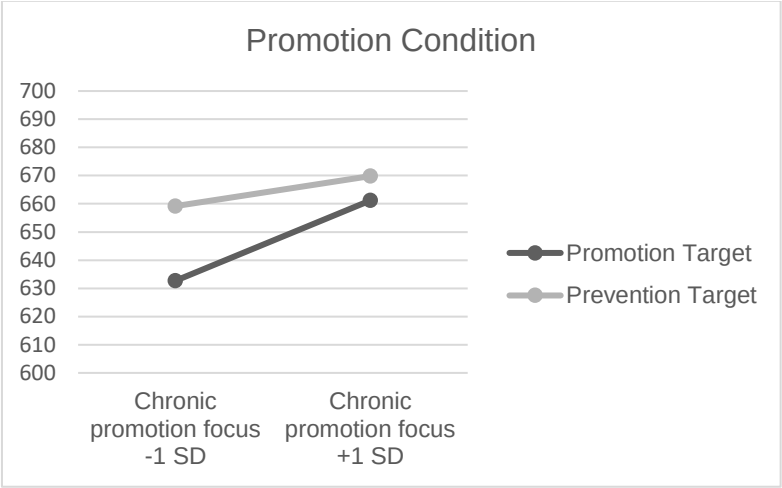
In the situational-dispositional promotion focus interaction model, the analysis yielded a novel interaction of chronic promotion focus, target type and RF condition ($F(1,11112.226) = 10.562$, $p = .001$, see Figure 6)[10].

[8] The interaction of prime type and chronic promotion focus achieves marginal significance ($p = .085$) if the entire sample is analyzed. Participants respond slower to prevention/negative primed trials with increasing chronic promotion focus.

[9] This effect is no longer significant if the entire sample is analyzed ($p = .130$).

[10] The interaction of RF condition and prime type achieves significance ($p = .020$) if the entire sample is analyzed. Participants respond slower to prevention/negative primed trials in the situational prevention focus condition. This holds true over both interaction models.

Participants' reaction time increased with their chronic promotion focus. However, this increase was particularly strong for prevention/negative targets under a situational prevention focus. The prevention focus model yielded no new results (all $F \leq 2.233$, all $p \geq .135$).



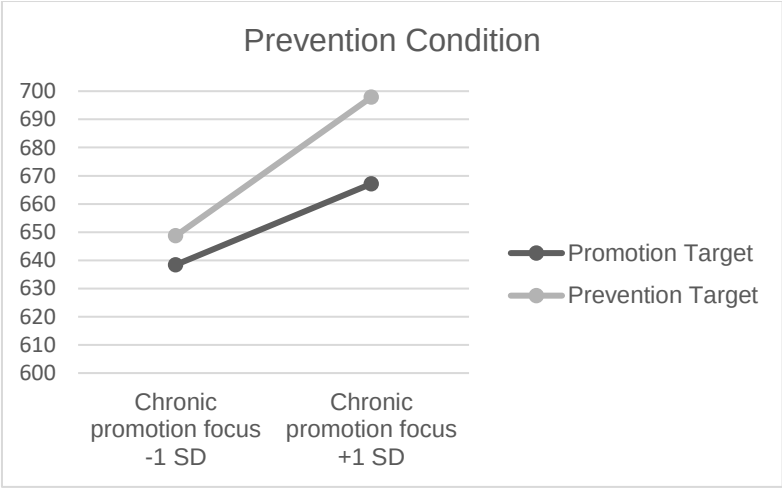


Figure 6. Estimates for reaction times, promotion focus interaction model, BFP task, Study 3.

AMP Analysis. The positivity ratios were subjected to a mixed-model ANOVA with the between factor situational RF (promotion vs. prevention) and the within factor prime (promotion/positive vs. prevention/negative). The analysis yielded a significant main effect of prime ($F(1,107) = 6.379$, $p = .013$, $\eta_P^2 = .056$) such that promotion/positive primes were associated with more positive judgments of targets. This effect was qualified by a significant interaction between RF group and prime ($F(1,107) = 4.320$, $p = .040$, $\eta_P^2 = .039$). Participants in the promotion focus group showed a stronger priming effect than participants in the prevention focus group (see Figure 7). As in the BFP ANOVA analysis, the predicted pattern implied a main effect of RF group, which was not significant in the analysis ($F(1,107) = .413$, $p = .522$, $\eta_P^2 = .004$)[11]. Therefore, Hypothesis 1 is not supported for the AMP.

To assess the effects of dispositional RF, restricted maximum likelihood random intercept linear mixed models were calculated in a similar fashion to previous studies. The dependent variable was whether the target was judged as more positive than average. Word frequency was not included as a control variable, as the analysis was not concerned with reaction times. A second set of models added situational RF condition and its

[11] When analyzing the entire sample, the main effect of prime was unchanged, but the interaction was no longer significant ($F(1,134) = 1.313$, $p = .234$, $\eta_P^2 = .011$).

interactions with the other predictors. The chronic RF models yielded only the main effect of prime ($F(1,8609) = 14.132$, $p < .001$) demonstrated in the ANOVA. Neither the chronic promotion focus model (all $F \leq .683$, all $p \geq .409$) nor the chronic prevention focus model (all $F \leq .305$, all $p \geq .581$) showed any other effects, providing no support for Hypothesis 2. In the dispositional-situational interaction models, the previously demonstrated interaction of situational RF and prime type was stronger ($F(1,8607) = 9.138$, $p = .003$)[12]. The promotion focus

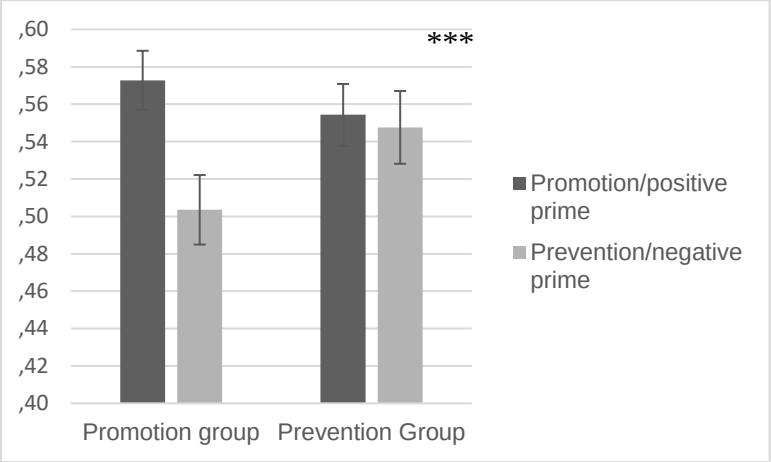


Figure 7. ANOVA estimates for AMP positivity ratios, Study 3. Error bars represent standard errors. *** indicates $p \leq .001$.

[12] This effect is reduced to marginal significance if the whole sample is analyzed ($p = .081$).

interaction model added no new effects (all $F \leq 1.534$, all $p \geq .261$) [13], but the prevention focus interaction model yielded a marginally significant three-way interaction of chronic prevention focus, situational RF and prime type ($F(1,8607) = 2.896$, $p = .089$, see Figure 8). Individuals with a strong chronic prevention focus show weaker AMP effects in a situational promotion focus, but stronger AMP effects in a situational prevention focus.

Discussion

Study 3 sought to investigate possible effects of RF on affective associations. It was predicted that a promotion focus should lead to greater activation of positive affect when processing positive stimuli, whereas a prevention focus should lead to greater activation of negative affect when processing negative stimuli. The BFP task and the AMP were implemented to measure affective activation strength after subjects had been primed with a specific RF by writing an essay. The study provided only weak support for the hypotheses. The analysis of the BFP showed no results of the RF manipulation. Furthermore, although the predicted pattern of greater priming effects for negative primes was found for individuals with a strong dispositional prevention focus, the expected converse pattern

[13] The three-way interaction between chronic promotion focus, situational RF and prime type achieves significance if the whole sample is analyzed ($p = .039$).

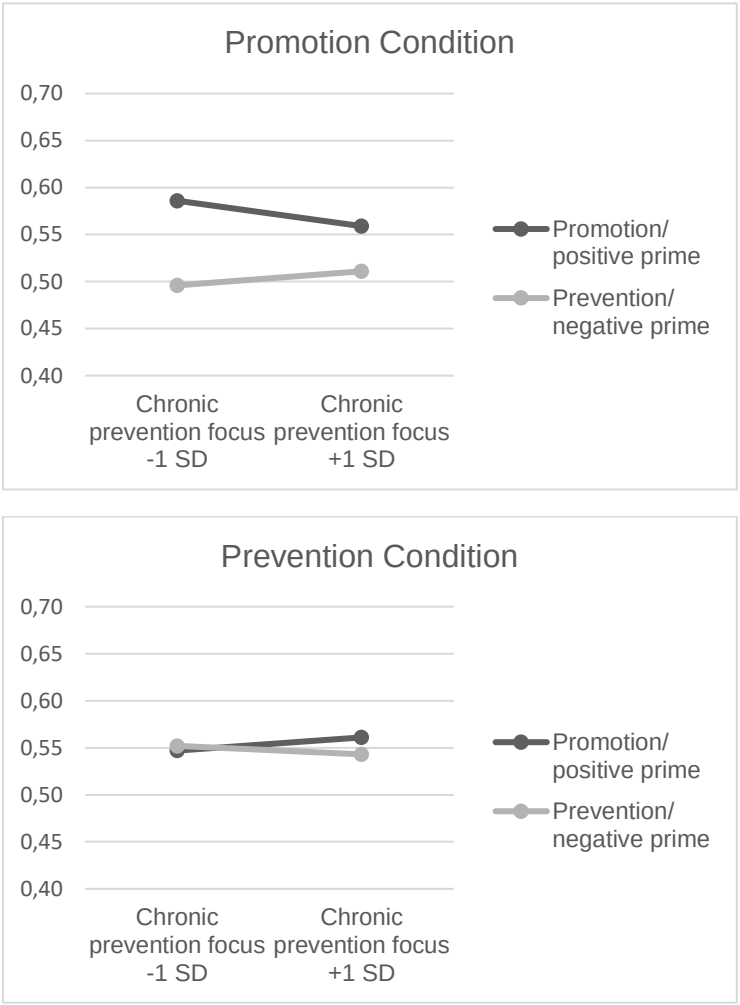


Figure 8. Estimates for positivity ratios, AMP, prevention focus interaction model, Study 3.

for dispositional promotion focus could not be found. For the AMP, neither the RF manipulation nor individuals' dispositional RF produced the predicted effects. Instead, the promotion focus group produced a relatively typical pattern of AMP priming effects, whereas the prevention focus group showed no priming effect at all.

The only effect of the RF manipulation that was independent of chronic RF was found in the AMP. Individuals in a situational prevention focus seemed less affected by primes in general. Recalling that in the AMP, the primes are assumed to elicit an affective response which is then misattributed to the affectively neutral target, this lack of priming effects might therefore be caused by a lack of affect elicitation or by a failure to misattribute. If participants in a situational prevention focus did not experience affective responses due to the primes, this begs the question of why not. In general, prevention focus is not associated with less emotional experience than promotion focus (Higgins, 2001) and it is unclear which mechanism should reduce general affective responses under a prevention focus. Therefore, barring replications of this effect on further measures, it seems more likely that participants did not attribute the affect they felt to the targets in the AMP. This may either be due to participants correctly attributing the affect to the prime and thereby disregarding it in their evaluation of the target or to participants correcting for their bias (Payne, Hall, Cameron, & Bishara, 2010). Both of these explanations might fit with existing research about RF. Prior studies

have shown that individuals in a prevention focus are vigilant against errors of commission (e.g. Higgins, 1998) and more resistant to distraction (Freitas et al., 2002). In the context of the AMP, affect caused by the primes might be seen as inducing an error of commission (i.e. wrongly rating the target as positive/negative when it is in fact not). Furthermore, the primes themselves might be viewed as distractions in this task. If so, individuals in a prevention focus would be expected to show weaker priming effects than individuals in a promotion focus, fitting the pattern shown in this study.

This idea has implications for the field of attitude measurement. If replicated, this effect of RF implies that individuals in a prevention focus are more capable of shielding themselves from irrelevant influences on their attitudes. Although such effects might be driven by intentional processes and therefore not be found in comparatively low-level measures such as the LDT or BFP, they would certainly play a role in higher-level phenomena such as implicit-explicit attitude correlations, persuasion, and the connection between attitudes and behavior. For example, building on this finding, individuals in a prevention focus should be less vulnerable to persuasion via the indirect route (Petty & Cacioppo, 1986), as indirect persuasive cues are generally irrelevant to the content of the persuasive message. They should also show weaker correlations between implicit and explicit attitudes in general, as they should be more motivated to validate their spontaneous associations

before making an explicit judgment (Gawronski & Bodenhausen, 2006; Strack & Deutsch, 2004). Indeed, some evidence for this supposition already exists in the field of consumer research (Florack et al., 2010; Pham & Avnet, 2009), but this study provides the first evidence that such effects may generalize to faster "snap" judgments. Finally, this study implies that individuals might show greater correlations between attitude and behavior when in a prevention focus, as irrelevant considerations that might otherwise influence behavior might be more easily blocked.

The effects of chronic RF were less clear in this study. For promotion focus, the data showed a tendency for individuals to respond more slowly to target words in the BFP that fit their situational RF with increasing chronic promotion focus. This effect is only marginally significant and may not replicate in future studies. If it is not spurious, however, it may imply that words that are relevant to currently activated episodes in memory (via the essay priming) bind more attentional resources than those which are not relevant. From a goal-pursuit perspective, the situational RF manipulation should activate goals associated with the required self-guide. Therefore, targets associated with those goals should be processed differently from irrelevant targets (e.g. Corbetta & Shulman, 2002; Vogt, De Houwer, Moors, Van Damme, & Crombez, 2010). Normally, this would imply an advantage in task performance, but it is possible that individuals with a strong chronic promotion focus

(i.e. individuals who are used to taking risky and fast action in pursuit of their goals) might experience more interference with the proximal task goal from correspondingly stronger behavioral impulses associated with the distal self-guide goal activated by the essay. Such an explanation can account for the effect found in this study and lends itself to further research, but it must be noted that it is based on several strong and novel post-hoc assumptions that are made to explain an empirically weak effect. Although research in this vein might be interesting, it is likely not the most productive avenue to follow based on these results.

Furthermore, the BFP results show some evidence for the expected effect of chronic prevention focus: stronger chronic prevention focus appeared to increase the effects of negative primes specifically. Taken together with the mixed evidence for affect amplification due to chronic RF from Study 2, this result underlines the necessity of further investigating whether chronic RF indeed increases the magnitude of fitting affective responses. Such a mechanism would go beyond regulatory fit theory in explaining how RF impacts motivation via affect. The evidence from this experiment is weak, implying that the proposed effect might be small, but its theoretical significance warrants further study. Another important aspect that this experiment hints at is the possible role of response interference in these effects. Effects consistent with affect amplification only occurred in the BFP. No corresponding effect could be found in the

AMP. Gawronski and colleagues (2008) suggest that RI effects depend on the salience of affective components of the primes in the BFP. The current pattern therefore suggests that chronic RF may specifically increase the salience of affect that fits it. However, this effect is possibly unreliable, so high-powered replications would be necessary to establish its robustness before further investigation is warranted.

Finally, the results show a marginally significant interaction between chronic prevention focus and situational RF that affects the strength of priming effects in the AMP. These effects appear to contradict the basic effect of situational prevention focus – chronic prevention focus seems to weaken priming effects similarly in the situational promotion focus condition, but this trend seems to reverse in the situational prevention focus condition. Although this seems odd at first glance, it is possible that the increased priming effect associated with chronic prevention focus in the situational prevention focus condition is not in itself a significant trend. Speaking more generally, the results show that chronic prevention focus reduces priming effects when not overlaid by situational prevention focus. If this interpretation is correct, the results would bolster the account given above: prevention focus reduces the effect

of irrelevant primes on liking judgments.[14] Nevertheless, it must be noted once more that this interaction is only marginally significant and its robustness is therefore questionable. If chronic prevention focus does reduce priming effects in an analogous way to situational prevention focus, further studies should expect relatively small effects and avoid implementing a situational manipulation that might obscure such subtle effects.

To sum up, Study 3 provides intriguing indications that prevention focus' protection from distraction (Freitas et al., 2002) might generalize to other processes that deal with the application of irrelevant information to affective judgments, including misattribution. Even when judgments occur relatively fast and without much consideration as in the AMP, misattribution is hindered. Whether this insulating effect generalizes to all irrelevant influences on judgments or only affective ones remains to be seen in further research.

[14] Post-hoc simple slope analyses partially support this conclusion: analyzing only the situational promotion focus group, the interaction of chronic prevention focus and prime valence is close to marginal significance ($F(1,4501) = 2.469$, $p = .116$). Priming effects decrease with increasing chronic prevention focus. The trend in the opposite direction is nonsignificant when only the situational prevention focus group is analyzed ($F(1,4106) = .732$, $p = .392$, cf. Figure 8).

Study 4 – Situational Regulatory Focus and Affective Negation

Theoretical Background

The studies presented until now have concentrated on elucidating possible RF effects on associative processing. However, as discussed in the introduction, the RIM posits both an impulsive system based on associative processing and a reflective system based on propositional processing (Strack & Deutsch, 2004). Prior research has shown that RF may have an effect on the likelihood to engage in more effortful processing (Mourali et al., 2007; Mourali & Pons, 2009; Pham & Avnet, 2004; Pham & Avnet, 2009). It is, however, not yet clear whether the demonstrated effects of RF on effortful processing are due to increased motivation or facilitation of the underlying sub-processes. Although RF is generally considered to be a motivational theory (Higgins, 1997), its effects on basic cognitive operations that may be motivation-independent have also been demonstrated (e.g. de Lange & van Knippenberg, 2007; Maddox et al., 2006a, 2006b). The early developmental roots of RF postulated by Higgins (1997) also lend credence to the idea that it may be connected to basic cognitive operations. The RIM states that the reflective system is responsible for effortful processing, but also makes mention of reflective

operations that occur without noetic awareness, thereby allowing for a non-motivational effect of RF on reflective processing. Therefore, Study 4 builds upon the prior studies by exploring automatic effects of RF on reflective processing. If RF can be shown to impact reflective operations unintentionally, a purely motivational explanation for its effect becomes more unlikely.

One such 'unconscious' reflective operation is that of negation (Deutsch et al., 2009). Negations can be defined as the reversal of the truth value of a proposition (Deutsch et al., 2006). A negation is a genuine proposition in that it connects two concepts in a way that implies a different meaning than a simple association. For example, the negated proposition "chocolate is not good" implies a different conclusion than an association between "chocolate" and "good". The resulting evaluation of chocolate changes due to the negation. Therefore, if an individual is presented with information that is in a negated format, the resulting effects on subsequent behavior and cognition can be seen as an index of reflective processing: if these effects are consistent with those expected for the net meaning of the negated information, the individual must have processed said negation propositionally.

In order to investigate the effect of RF on reflective operations by using negations, a paradigm is needed that can show a facilitation of negation operations. However, such a basic and comparatively simple

operation as negation is fast enough that finding such a facilitation under normal processing circumstances is almost impossible. Therefore, a paradigm must be adopted in which negation effects (i.e. responses consistent with successful negation operation) can be found, but are weak enough that any facilitating circumstance should show a measurable increase in their strength. Deutsch and colleagues (2009) provided such a paradigm. In their studies, they implemented an AMP with verbal positive and negative primes which were either affirmed (e.g. EIN VERGNÜGEN – a pleasure, EIN VIRUS – a virus) or negated (e.g. KEIN VERGNÜGEN – no pleasure, KEIN VIRUS – no virus). They compared different versions of the AMP tasks with varying prime presentation times and response windows. When participants saw the primes for a brief period and were made to respond quickly, the AMP results reflected the base valence of the primes, but not their net valence due to negation. When participants were either given more time to respond or shown the prime for longer, their AMP results instead reflected the net valence of the primes. This pattern shows boundary conditions for negation processing: if participants are deprived of processing time, their ability to process negations declines. If, then, a prevention focus can facilitate negation processing, the proportion of successfully negated primes under time pressure should increase.

H1: Participants are less influenced by the base valence of a negated prime under a situational prevention focus than under a situational promotion focus.

Method

Design and Sample. The study followed a 2x2x2 mixed design with the between factor RF (promotion vs. prevention focus) and the within factors valence (positive vs. negative) and negation (affirmed vs. negated). Similarly to previous studies, a sensitivity analysis was conducted based on the expected sample size. An estimated 90 participants yielded a sensitivity for effects of $f = .150$ or greater for a statistical power of 80%.

The study was conducted at the University of Würzburg on December 2nd and December 3rd, 2013, with students who participated in exchange for one or more chocolate bars. A total of 91 participants took part in the study (44.0% female, $M_{age} = 20.9$, $SD_{age} = 2.4$, $Min_{age} = 17$, $Max_{age} = 28$). Data was collected in a lab room with nine cubicles that shielded the participants from each others' and the experimenter's view. Participants were free to walk in and take part at any time if a cubicle was free.

AMP. The AMP paradigm consisted of four practice trials followed by two blocks of 80 trials each. The basic procedure was identical to that used in Study 3, except that primes were presented for only 75ms rather than 200ms and participants had to respond within 600ms

or they received feedback to respond faster (Deutsch et al., 2009). The prime words were taken from Deutsch et al.'s study (2009; see Appendix B). Each affirmed prime was preceded by the indefinite article (EIN or EINE), each negated prime by the pronoun 'no/not' (KEIN or KEINE). Each prime was presented eight times (four affirmed, four negated).

Regulatory focus manipulation. A state of promotion or prevention focus was induced by manipulating reward expectancies in a similar fashion to Study 1. Only the criterion was adapted to the time-pressure AMP: participants had to respond to at least 80% of trials within 600ms to get the extra reward or miss not more than 20% of the trials to avoid losing part of their reward. In each condition, participants were reminded of the possible gain/loss respective to their condition during the break between the blocks.

Procedure. Participants were recruited in a 'walk-in' fashion in a lab room near the University campus canteen. When a participant entered the room, they were directed to a free cubicle, where the experiment session was started on a computer. Participants first read the instructions for the RF manipulation. They then completed the AMP task. Thereafter, participants completed a reaction time based measure of chronic regulatory focus, the Self-guide Strength measure (Shah

et al., 1998).[15] Finally, participants were asked for demographic information and their suspicions concerning the purpose of the study. The entire experimental session took about 10 minutes.

Results

Data selection and preparation. Preliminary analyses of the data showed that a large proportion of response times in the AMP were extremely fast. In order to eliminate evaluations resulting from anticipated responses, trials with a response time of less than 100ms were discarded[16] (14.5% of trials). If the number of total valid trials for any valence/negation combination for a given participant dropped below 15, that participant was eliminated from the analysis. Two participants were dropped for this reason. In accordance with the procedure employed by Deutsch et al. (2009), data from two further participants who categorized the ideographs as either more or less positive than average over 80% of the time

[15] Although this measure has been used to assess chronic regulatory focus in previous research, it has been shown to have low reliability, correlate poorly with other measures of chronic regulatory focus and to have strong intercorrelations between the promotion and prevention subscale (r = .74 in this sample). Therefore, this measure will not be further discussed. See Haws, Dholakia, & Bearden, 2009, for further information.

[16] Due to the interval between the target onset and the beginning of the response window, the threshold of 100ms implies a total response time of 275ms after onset of the target. Such a criterion is comparable to the threshold of 300ms usually applied to other affective priming measures (e.g. the BFP, Deutsch et al., 2009).

were discarded. Finally, one further participant indicated that they had pressed keys randomly in the AMP, so their data was discarded as well. The final sample therefore consisted of 86 participants (46.5% female, M_{age} = 20.9, SD_{age} = 2.4, Min_{age} = 17, Max_{age} = 28, sensitive to f = .153).

Analysis. A mixed-model ANOVA with the between factor RF condition and the within factors valence and negation yielded a significant main effect of valence ($F(1,84) = 6.541$, $p = .012$, $\eta_P^2 = .072$) such that positive primes yielded more positive AMP evaluations ($\Delta M = .035$). No other effects were significant, including the expected three-way interaction ($F(1,84) = 2.575$, $p = .112$, $\eta_P^2 = .030$; all other $F \leq 1.547$, all other $p \geq .217$, all other $\eta_P^2 \leq .018$). Applying a planned contrast test to the three-way interaction showed a tendency in the expected direction (see Figure 9). Negated primes appear to reverse their valence in the prevention condition, but not in the promotion condition – in fact, the strongest individual contrast is the valence effect between negated primes in the promotion focus condition. Although the interaction is not statistically significant, it points in the direction that negation processing may be facilitated by a prevention focus. These results partially support Hypothesis 1.

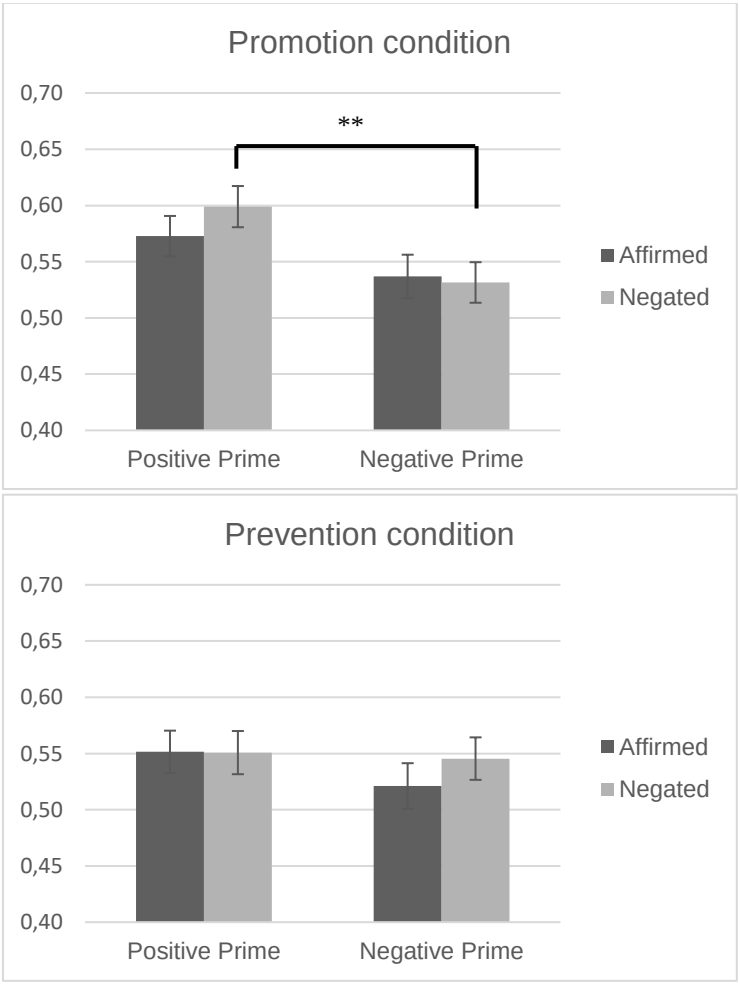


Figure 9. ANOVA estimates for positivity ratios, Study 4. Error bars represent standard errors. ** indicates $p \leq .01$.

Discussion

Study 4 investigated whether prevention focus directly facilitates reflective processing as indicated by applying negations to impulsively activated valence. For this purpose, an AMP was implemented that utilized primes with a clear valence presented in either an affirmed or negated context. Prime presentation durations and reaction times were constrained to prevent a possible ceiling effect from obscuring a moderation of negation processing (Deutsch et al., 2009). The results showed no significant support for the hypotheses, but did indicate a descriptive trend in the expected direction. Participants in the promotion condition showed a tendency to respond more positively to negated positive primes than to affirmed ones, hinting at an inhibition of negation processing, whereas those in the prevention condition tended to respond more positively to negated negative primes than to affirmed negative primes, indicating a possible facilitation of negation processing. Although this study did not show strong evidence in favor of the hypothesis, neither did it falsify it entirely.

Although the sample size for this study was larger than that of most psychology experiments conducted with a comparable design (Simmons et al., 2011), it was still not sensitive to subtle effects. Even though achieving a sufficient sample size to detect a conventionally small effect is not always economically feasible or useful, when the focus of research is on basic processes, even small

effect sizes can be of theoretical relevance. Furthermore, hidden moderators may render an effect unstable and difficult to detect. Study 4 did not assess chronic RF with a reliable measure. However, the studies discussed prior to Study 4 showed several effects of chronic RF as well as interactions between chronic RF and situational RF. In addition, the implied "anti-negation" effect observed for the promotion focus condition can also be tested by formulating a specific hypothesis for chronic promotion focus.

For this reason, Study 5 replicates Study 4 directly and implements a better measure of chronic RF. This allows for a test of the hypothesis using both situational and chronic RF. In addition, Study 5 investigates the interaction of situational and dispositional RF in a fashion similar to Studies 1-3.

Study 5 – Regulatory Focus and Affective Negation

Hypotheses

Due to the inclusion of a more reliable chronic RF measure, additional hypotheses can be formulated in addition to the hypothesis from Study 4. Chronic prevention focus may have a similar effect to situational prevention focus, facilitating negation processing and thereby reversing the valence of negated primes. In addition, based on the tentative results from Study 4, chronic promotion focus might have an opposite effect. Finally, the research question of whether situational and dispositional RF interact may again be examined.

H1: Participants are less influenced by the base valence of a negated prime under a situational prevention focus than under a situational promotion focus.

H2: Participants with a strong chronic prevention focus are less influenced by the base valence of a negated prime than participants with a weak chronic prevention focus.

H3: Participants with a strong chronic promotion focus are more influenced by the base valence of a negated prime than participants with a weak chronic promotion focus.

RQ: Do situational and chronic RF interact in predicting the effects of negated primes?

Method

Study 5 was identical to Study 4 in all respects except as noted.

Sample. The study was conducted at the University of Würzburg from May 26th to June 3rd, 2014. A total of 99 participants took part in the study (78.8% female, M_{age} = 25.2, SD_{age} = 7.6, Min_{age} = 18, Max_{age} = 55). They were recruited from an online mailing list and took part in the experiment as part of a longer session including several other experiments. They received a total of 7€ as compensation for all of the studies, as well as a bar of chocolate depending on their performance. Data was collected in a lab room with three cubicles that shielded the participants from each others' and the experimenter's view.

Regulatory Focus manipulation. This manipulation was identical to Study 4 except that participants were told they could get one chocolate bar for good performance (promotion condition) or that they would get one chocolate bar, but lose it for bad performance (prevention condition).

Procedure. Participants completed the experiment as part of a session comprising this study and two further unrelated experiments. Participants first read

the instructions for the RF manipulation. They then completed the AMP task. Thereafter, participants completed the German LGRF (Sassenberg et al., 2012). Finally, participants were asked for demographic information and their suspicions concerning the purpose of the study. The experiment took about 10 minutes.

Results

Data selection and preparation. The AMP data for two participants was not recorded due to a technical issue; their remaining data was discarded. As in Study 4, trials with a response time of less than 100ms were discarded (22.1% of trials). Four participants had less than 15 valid trials for at least one valence/negation combination after this correction and were dropped. Additionally, six participants who categorized the ideographs as either more or less positive than average over 80% of the time were excluded. The final sample therefore consisted of 87 participants (80.5% female, M_{age} = 25.6, SD_{age} = 7.9, Min_{age} = 18, Max_{age} = 55, sensitive to f = .152).

Analysis. A mixed-model ANOVA with the between factor RF condition and the within factors valence and negation yielded no significant effects (all $F \leq 2.589$, all $p \geq .111$, all $\eta_P^2 \leq .030$), including the predicted three-way interaction ($F(1,85) = .445$, $p = .506$, $\eta_P^2 = .005$). Hypothesis 1 is not supported.

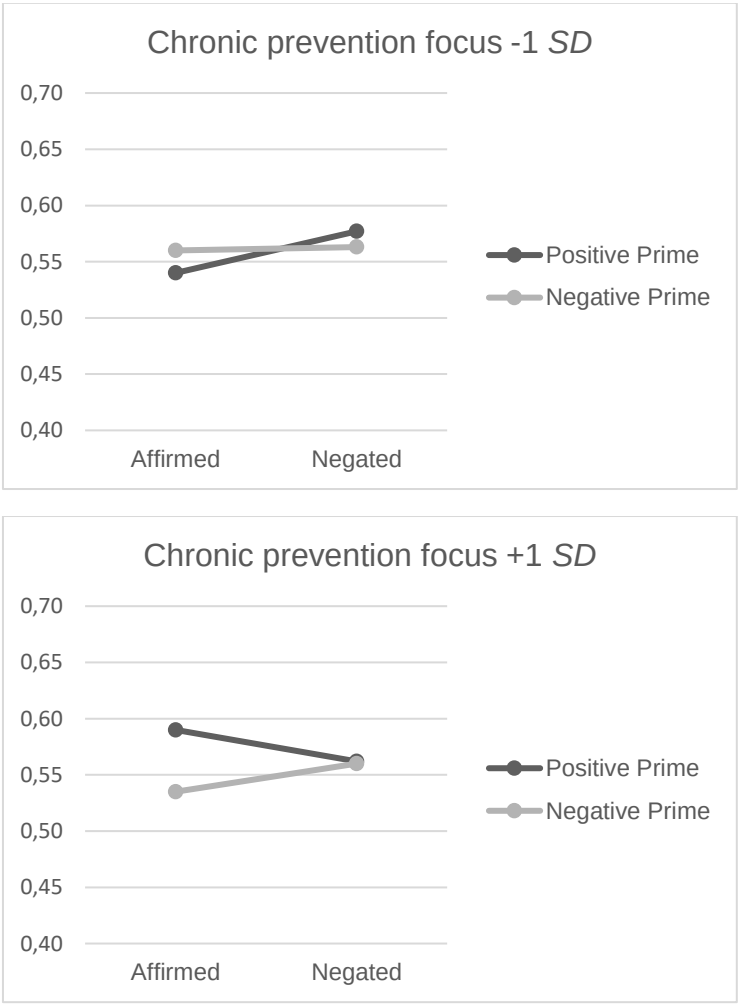


Figure 10. Estimates for positivity ratios, chronic prevention focus model, Study 5.

The promotion focus subscale of the LGRF achieved acceptable reliability (Cronbach's α = .760), the prevention focus subscale achieved poor reliability (Cronbach's α = .583). To assess the effects of dispositional RF, they were mean-centered and included in restricted maximum likelihood random intercept linear mixed models. The dependent variable was whether the target was judged as more positive than average. A second set of models added situational RF condition and assessed its interactions with the other predictors. Although the chronic promotion focus model shows no effects (all $F \leq$ 1.855, all $p \geq .173$), the chronic prevention focus model yields a marginally significant interaction of chronic prevention focus and valence ($F(1,11020.309) = 2.824$, p = .093), qualified by a significant three-way interaction with negation ($F(1,11013.754) = 5.294$, p = .021, see Figure 10). While participants with a weak chronic prevention focus show no or inverted negation effects, those with a strong chronic prevention focus respond consistently with successful negation processing. These results support Hypothesis 2, but not Hypothesis 3.

Table 1 shows the results for the dispositional-situational interaction models. Both yield a novel interaction between situational RF and prime valence. However, each model also yields its own unique effects. The promotion focus model shows an interaction of situational RF and chronic promotion focus that is qualified by a marginally significant three-way interaction of situational RF, chronic promotion focus and prime negation (see Figure

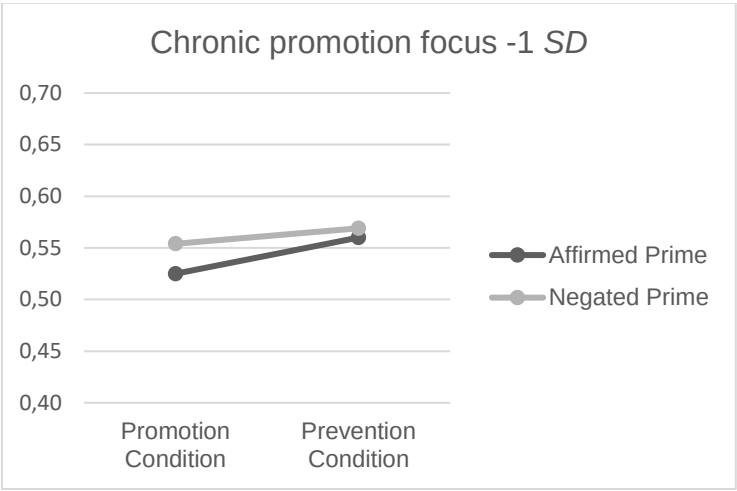
Table 1.
Results of linear mixed modeling for judgments of positivity, dispositional-situation interaction models.

Type III tests of effects for promotion focus interaction model			
Parameter	Numerator *df* = 1 Denominator *df*	*F*	*p*
Intercept	84.886	3271.457	<.001
Prevention Score (control)	87.151	.144	.705
Promotion Score	86.892	.748	.389
Prime Valence	11009.958	2.235	.135
Negation	11005.052	1.043	.307
RF Condition	84.950	2.059	.155
Promotion Score*Prime Valence	11009.580	.607	.436
Promotion Score*Negation	11006.693	1.021	.312
Promotion Score*RF Condition	87.174	7.101	.009
Prime Valence*Negation	11008.054	.289	.591
Prime Valence*RF Condition	11010.072	4.411	.036
Negation*RF Condition	11005.081	.719	.396
Promotion Score*Prime Valence*Negation	11003.550	.450	.502
Promotion Score*Prime Valence*RF Condition	11009.840	.137	.711
Promotion Score*Negation*RF Condition	11006.726	3.578	.059
Prime Valence*Negation*RF Condition	11008.104	.246	.620
Prom Score*Prime Valence*Negation*RF Cond	11003.572	.467	.494

Type III tests of effects for prevention focus interaction model			
Parameter	Numerator *df* = 1 Denominator *df*	*F*	*p*
Intercept	85.227	3106.611	<.001
Promotion Score (control)	86.874	.073	.788
Prevention Score	87.114	.009	.925
Prime Valence	11009.948	2.183	.140
Negation	11005.118	.703	.402
RF Condition	85.331	2.112	.150
Prevention Score*Prime Valence	11015.308	3.212	.073
Prevention Score*Negation	11006.216	1.173	.279
Prevention Score*RF Condition	87.381	2.264	.136
Prime Valence*Negation	11007.821	.274	.601
Prime Valence*RF Condition	11009.715	4.827	.028
Negation*RF Condition	11005.070	.880	.348
Prevention Score*Prime Valence*Negation	11007.980	5.638	.018
Prevention Score*Prime Valence*RF Condition	11015.637	.213	.644
Prevention Score*Negation*RF Condition	11006.271	6.159	.013
Prime Valence*Negation*RF Condition	11007.807	.401	.527
Prev Score*Prime Valence*Negation*RF Cond	11008.048	1.478	.224

Note. Prime Valence coding: 0 indicates positive prime, 1 indicates negative prime.
Negation coding: 0 indicates affirmed, 1 indicates negated.
RF Condition coding: 0 indicates promotion focus condition, 1 indicates prevention focus condition.
Dependent variable coding: 0 indicates negative judgment, 1 indicates positive judgment.

Figure *11*). Whereas individuals with a weak chronic promotion focus do not differ strongly between situational RF conditions, only showing a slight tendency towards more positive judgments in a situational prevention focus, individuals with a strong chronic promotion focus show more positive judgments when their situational RF fits their chronic promotion focus. This effect seems especially pronounced for affirmed primes. In the prevention focus interaction model, the previously demonstrated improved negation processing for individuals with a strong chronic prevention focus persists. In addition, the interaction of chronic prevention focus, situational RF and prime negation achieves significance (see Figure 12). Whereas individuals with a weak chronic prevention focus show less positive judgments for both affirmed and negated primes when in a situational prevention focus, individuals with a strong chronic prevention focus judge negated primes more positively when their situational RF fits their chronic prevention focus, but affirmed primes more positively when this is not the case.



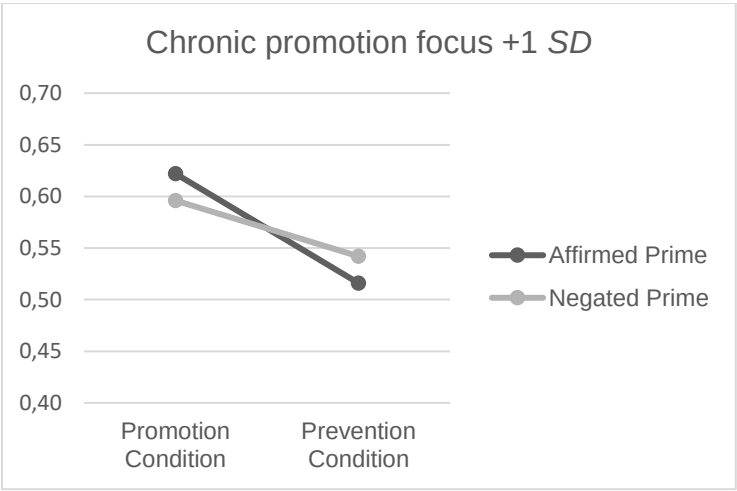
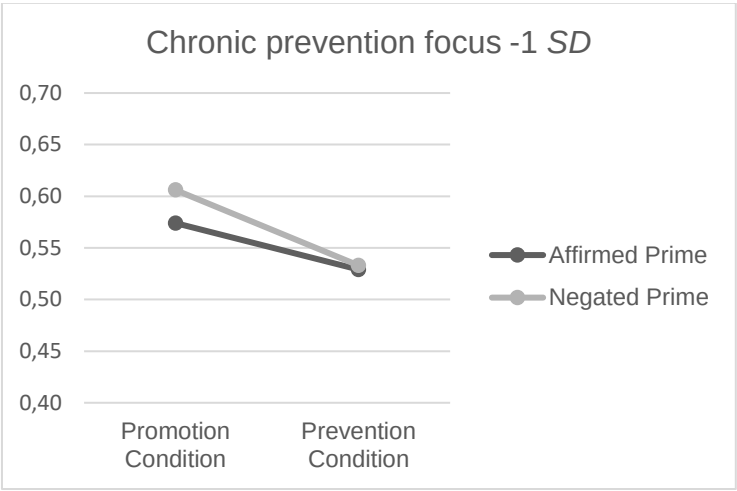


Figure 11. Estimates for positivity ratios, promotion focus interaction model, Study 5.



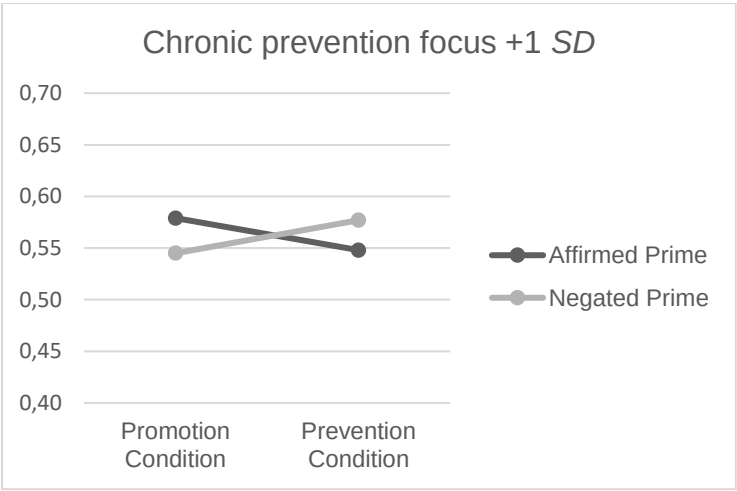


Figure 12. Estimates for positivity ratios, prevention focus interaction model, Study 5.

Discussion

The aim of Study 5 was to clarify the ambiguous results of Study 4 and augment them by testing for effects of chronic RF. The results showed no evidence for an anti-negation effect of promotion focus. However, the initial basis for this hypothesis from Study 4 was weak and based on situational RF, so it is unsurprising that it failed to replicate in this study with chronic promotion focus. No situational effects were found, implying that the predicted promotion focus effect may not exist. Although the predicted facilitation of affective negation processing in a situational prevention focus was not demonstrated, this effect was found with the chronic prevention focus measure. Therefore, Study 5 provides some evidence for the idea that a prevention focus might facilitate reflective processing. However, the question arises why this effect was not induced by a situational RF. Higgins (1997, 1998) conceptualizes chronic RF as a stable attribute which is acquired through early caretaker-child interactions. Although this is often interpreted as a simple chronic accessibility of a strategic mindset that is otherwise identical to a situationally induced RF, the implications of having such a chronically accessible mindset deserve more consideration. If individuals acquire their chronic RF early in life, it seems plausible that this mindset might shape the way further basic cognitive skills develop. This might explain why the expected results were only observed for the chronic RF measure: if the influence of RF is developmental in nature rather than flexibly

cognitive, a situational induction should have no effect, although this is at odds with the results of Study 4.

In addition, the prime-insulating effect of situational RF in the AMP that was demonstrated in Study 3 replicated in this study. Furthermore, it obtained independently of chronic RF. This study provides further evidence that individuals who are currently in a prevention focus are less vulnerable to priming effects on their judgments. It also makes a unique contribution: unlike Study 3, participants responded under time pressure in this experiment. The effect persisted, indicating that it may not require elaborate corrective processes to occur. If prevention-focused participants are insensitive to prime valence even when responding at high speeds comparable to the BFP, this implies that the process preventing the misattribution of prime affect is likely to be highly efficient. Further studies might focus on the cognitive underpinnings of this insulation effect and further testing its automaticity, for example by manipulating cognitive load or adjusting the AMP instructions to gauge its intentionality, as well as applying it to broader contexts such as persuasion. Nonetheless, the addition of the negation factor to this study means it is less suitable to provide evidence for such an insulation effect, as it is unclear how the negation operation may interfere with the proposed insulation effect. Further research must focus directly on one or the other.

The remaining results of the study were unexpected. Individuals with a strong chronic promotion focus judged targets more positively when the situational RF framing fit their chronic focus, particularly so if the preceding prime was affirmed. The basic pattern of regulatory fit leading to more positive judgments is in line with previous research on the topic (Lee & Aaker, 2004; Spiegel et al., 2004). However, it is surprising that this effect could not be found in Study 3. Although Study 3 did not differentiate between affirmed and negated primes, the interaction between situational and dispositional RF should have obtained if fit were the explanation. Furthermore, in that study, no corresponding effect was found for prevention focus, ruling out a general fit hypothesis. As this pattern was not observed in Study 3, any conclusions drawn should be viewed with a degree of caution. However, Study 3 employed an ideal-ought essay priming manipulation of RF, whereas this study instead manipulated the outcome framing. It is therefore possible that this promotion fit effect is specific to circumstances where the task demands fit an individual's chronic RF. If so, this indicates that the observed effect may depend on higher-level strategic processes associated with RF and goal implementation rather than more basic ones that would also be activated by simple priming. Furthermore, the interaction with negation in this study may indicate that propositional processes affected the outcome. Both the insulation effect and this unexpected fit effect might not be comparable over the two studies,

underlining the need for future studies to address these effects specifically.

The observed marginal interaction of this effect with the prime's affirmation or negation mirrors the similar interaction observed in participants with a strong chronic prevention focus: when in a situational prevention focus, participants with high values in either dispositional RF judge negated primes more positively than in a situational promotion focus, while the opposite holds true for affirmed primes. With regard to chronic promotion focus, this effect is not statistically significant and difficult to interpret. However, for chronic prevention focus, this pattern may be explained by negation facilitation. If such facilitation occurs for individuals with a strong chronic prevention focus as seen above, it might be increased when the situation also induces a prevention focus. Although the implied four-way interaction including valence did not achieve significance, the increased positivity of responses to negated primes might be due to fluency effects associated with negations. Participants might have processed the negated primes themselves more fluently even without a facilitation of the actual transformation of valence implied by negation. Much research has shown that processing fluency is connected to positive affect (e.g. Reber et al., 2004; Topolinski & Strack, 2009), implying that such fluent processing of negated primes might have contributed to the resulting positive responses. If this interpretation holds true, then it becomes important to differentiate

between facilitation of negation and facilitation of negation cue processing. The former has been the basis of the theoretical argumentation up to now; it refers to increased ease in suppressing the associations activated by processing a given target while simultaneously activating the associations activated by the lack of said target. The latter, however, refers to a simple improvement in processing targets that imply a negation, such as words like ‘no’ or ‘not’. Although the results in this study provide some support for the idea that a prevention focus may facilitate both negation and negation cue processing, it is difficult to disentangle these aspects in the current design. Study 6 sought to address this problem.

Study 6 – Regulatory Focus and Nonaffective Negation

Theoretical Background

As the results of Study 5 suggested that both negation itself and the perception of negation cues might be affected by RF, the current study attempted to disentangle these two possibilities. When a process is easy to perform, its operation is accompanied by a sense of fluency (Alter & Oppenheimer, 2009). Fluency has been shown to influence liking and positivity judgments in a variety of studies (e.g. Reber et al., 2004; Reber et al., 1998; for a review, see Alter & Oppenheimer, 2009). Importantly, this implies that facilitation of processing should have its own valence, independent of possible effects on its outcome. The previous studies attempted to measure facilitated negation processing by comparing the impact of negated valent primes in an AMP under different circumstances. In this case, facilitation would have been implied by AMP effects that were more consistent with the negated valence of the prime than with its base valence. Clearly, such an approach is only possible with primes that have an unambiguous valence both when affirmed and negated. However, applying the research on processing fluency offers an alternative approach. If negation (or the perception of negation cues) is facilitated, then the feeling of relative ease associated

with this processing should lead to positive affect. Therefore, such facilitation should cause more positive judgments in the AMP even without valent primes.

In the previous studies, the prime valence may have obscured such relatively subtle processing effects. However, if the primes involved have no valence, then these effects should become visible. Furthermore, it is possible to vary whether negation can meaningfully take place or not depending on the prime. This offers an avenue towards disambiguating any effects with regard to whether they originate from facilitated negation (which should only affect judgments when the prime can be meaningfully negated) or from easier processing of negation cues (which should affect judgments regardless of the possibility of meaningful negation). These questions can be easily addressed by implementing neutral, but semantically meaningful primes as well as nonword primes in the previously utilized paradigm. Neutral words can be meaningfully negated: for example, "a square" brings to mind different associations than "no square". Nonwords, however, have no meaning and therefore cannot be negated: "a bipup" is equally meaningless to "no bipup". In addition, it is still possible to retain the valent primes from prior studies in order to evaluate the stability of the previously found effects.

H1 (Negation facilitation hypothesis): Prevention focus facilitates negation.

H1a: Participants under a situational prevention focus respond more positively to negated neutral primes than to negated nonword primes.

H1b: Participants under a situational prevention focus respond more positively to negated neutral primes than participants under a situational promotion focus.

H1c: Participants with a strong chronic prevention focus respond more positively to negated neutral primes than to negated nonword primes.

H1d: Participants with a strong chronic prevention focus respond more positively to negated neutral primes than participants with a weak chronic prevention focus.

H2 (Negation cue perception facilitation hypothesis): Prevention focus facilitates the perception of negation cues.

H2a: Participants under a situational prevention focus respond more positively to negated neutral and nonword primes than participants under a situational promotion focus.

H2b: Participants with a strong chronic prevention focus respond more positively to negated neutral and nonword primes than participants with a weak chronic prevention focus.

In addition, the inclusion of positive and negative primes in the same paradigm allows a replication of the chronic RF effects found in Study 5.

H3: Participants with a strong chronic prevention focus are less influenced by the base valence of a negated positive or negative prime than participants with a weak chronic prevention focus.

RQ: Do situational and chronic RF interact in predicting the effects of negated primes?

Method

Study 6 was identical to Study 5 in all respects except as noted.

Design and Sample. The study followed a 2x2x4 mixed design with the between factor RF (promotion vs. prevention focus) and the within factors negation (affirmed vs. negated) and valence (positive vs. negative vs. neutral vs. nonword).

The study was conducted on February 11th, 12th and 17th, 2014, with students who participated in exchange for two or more chocolate bars. A total of 127 participants took part in the study, although data from one participant was not collected due to technical issues and one participant elected to abort the study (remaining N = 125: 40.8% female, M_{age} = 24.1, SD_{age} = 5.5, Min_{age} = 16,

Max_{age} = 46[17]). Data was collected in a lab room with six cubicles that shielded the participants from each others' and the experimenter's view. Participants were free to walk in and take part at any time if a cubicle was free.

AMP. The basic AMP paradigm was identical to that implemented in Study 5. The positive and negative primes were augmented by neutral primes selected from a German rated word list (Schwibbe, Räder, Schwibbe, Borchardt, & Geiken-Pophanken, 1981) as well as nonword primes from the same list as in earlier studies (Gupta et al., 2004; see Appendix B). Again, each prime was preceded by either the indefinite article when affirmed (EIN or EINE) or by the pronoun 'no/not' when negated (KEIN or KEINE). Each prime was presented a total of four times affirmed and four times negated, leading to a structure of four practice trials followed by four blocks of 80 trials each.

Regulatory focus manipulation. RF was manipulated in the same way as in Study 4.

Procedure. Participants were recruited in a 'walk-in' fashion in a lab room near the University campus canteen. When a participant entered the room, they were directed to a free cubicle, where the experiment session was started on a computer. Participants first read the

[17] One participant entered their age as 205 and was excluded from the age descriptives.

instructions for the RF manipulation. They then completed the AMP task. Next, participants were asked whether they could recall any of the primes they had seen.[18] Thereafter, participants were shown all of the primes both affirmed and negated and asked to rate how positive they were on a Likert scale from 1 (extremely negative) to 7 (extremely positive) as a manipulation check. Next, participants completed the German LGRF (Sassenberg et al., 2012). Finally, participants were asked for demographic information and their suspicions concerning the purpose of the study. The entire experimental session took about 15 minutes.

Results

Data selection and preparation. As in Study 5, trials with a response time of less than 100ms were discarded (17.0% of trials). One participant indicated knowledge of the ideographs used in the task and one participant indicated that they had not been able to remember the meaning of the response keys in the AMP. Data from these participants was discarded. Four participants had less than 15 valid trials for at least one valence/negation combination after this correction and were dropped. Additionally, three participants who categorized the ideographs as more or less positive than average over 80% of the time were excluded. The final sample therefore consisted of 116 participants (48.8%

[18] The analysis of this data is beyond the scope of this dissertation. It will not be further discussed.

female, M_{age} = 24.2, SD_{age} = 5.6, Min_{age} = 16, Max_{age} = 46, sensitive to f = .129).

Analysis. To check the prime valence, the explicit ratings of the participants were analyzed. A within-subjects ANOVA applying the Greenhouse-Geisser correction for sphericity with the factors valence and negation yielded significant main effects of valence (F(2.6,301.3) = 36.170, p < .001, η_P^2 = .239) and negation (F(1,115) = 70.074, , p < .001, η_P^2 = .379) which were qualified by a significant interaction (F(1.4,165.0) = 462.272, , p < .001, η_P^2 = .801, see Table 2). As expected, participants like affirmed positive primes the most, preferring them to affirmed neutral primes (d_z = 1.90), affirmed nonword primes (d_z = 2.07) and affirmed negative primes (d_z = 2.38). For negated primes, this pattern reverses: negated positive primes are liked least, less than negated neutral primes (d_z = -1.45), negated nonword primes (d_z = -1.37) and negated negative primes (d_z = -1.69). Furthermore, affirmed neutral (d_z = .71) and nonword (d_z = .31) primes are preferred to their negated counterparts.

For the AMP data, separate analyses were conducted to compare neutral and nonword primes per Hypotheses 1 and 2 and to compare positive and negative primes per Hypothesis 3. A mixed-model ANOVA with the between factor RF condition and the within factors word type (neutral vs. nonword) and negation yielded a significant interaction of word type and negation

Table 2.
Explicit ratings of primes.

Prime Valence	Negation	Mean liking	*SD*
Nonword	Affirmed	3.93	.53
	Negated	3.78[a]	.55
Neutral	Affirmed	4.29	.51
	Negated	3.71[a]	.51
Positive	Affirmed	5.85	.81
	Negated	2.58	.73
Negative	Affirmed	2.54	.82
	Negated	4.98	.94

Note. Values marked [a] do not differ significantly from one another. All other values differ significantly (all $p < .01$).

($F(1,114) = 4.200$, $p = .043$, $\eta_P^2 = .036$). Positive responses to affirmed neutral primes were greater than to negated neutral primes ($\Delta M = .025$, $F(1,114) = 5.316$, $p = .023$, $\eta_P^2 = .045$), but there was no difference between affirmed and negated nonwords ($\Delta M = .006$, $F(1,114) = .296$, $p = .588$, $\eta_P^2 = .003$). Neither the interaction between RF condition and negation predicted by Hypothesis 2 ($F(1,114) = .033$, $p = .857$, $\eta_P^2 < .001$) nor the three-way interaction predicted by Hypothesis 1 ($F(1,114) = 1.741$, $p = .190$, $\eta_P^2 = .015$) nor any further effects (all $F \leq 1.756$, all $p \geq .188$, all $\eta_P^2 \leq .015$) achieved significance. Planned contrasts showed that nonwords elicited the same responses whether affirmed or negated in both the promotion ($\Delta M = .005$, $F(1,114) = .109$, $p = .742$, $\eta_P^2 = .001$) and prevention ($\Delta M = .018$, $F(1,114) = 1.182$, $p = .279$, $\eta_P^2 = .010$) groups. Neutral primes showed the same pattern in the promotion group ($\Delta M = .017$, $F(1,114) = 1.167$, $p = .282$, $\eta_P^2 = .010$), but were responded to more positively when affirmed in the prevention group ($\Delta M = .034$, $F(1,114) = 4.714$, $p = .032$, $\eta_P^2 = .040$). These tentative results support neither Hypothesis 1 nor Hypothesis 2.

Both the promotion focus subscale (Cronbach's $\alpha = .752$) and the prevention focus subscale (Cronbach's $\alpha = .763$) of the LGRF achieved acceptable reliability. To assess the effects of dispositional RF on negation, these predictors were once again mean-centered and included in restricted maximum likelihood random intercept linear mixed models. The dependent variable was whether the target

was judged as more positive than average. Only nonword and neutral prime trials were included in these models to simplify their interpretation. A second set of models added situational RF condition as a predictor and assessed its interactions with the other predictors. The chronic RF models partially uphold the previously found interaction between word type and negation ($F(1,15546.133) = 3.086$, $p = .079$), but show no new effects (promotion model: all $F \leq 2.676$, all $p \geq .102$; prevention model: all $F \leq 2.662$, all $p \geq .103$). However, the dispositional-situation interaction model for promotion focus yields a situation-disposition interaction ($F(1,111.005) = 5.664$, $p = .019$) as well as a marginally significant three-way interaction of situational RF, chronic promotion focus and negation ($F(1,15538.807) = 3.409$, $p = .065$), similarly to Study 5. However, this interaction differs strongly from the previous results (see Figure 13). In Study 5, the general pattern resembled a fit effect of increased positivity which was weaker for negated primes. However, in this experiment, promotion fit seems to reduce positivity, possibly more strongly so for negated primes. The prevention focus model yields a new interaction between RF condition and chronic prevention focus ($F(1,110.683) = 3.997$, $p = .048$) that is qualified by a three-way interaction between RF condition, chronic prevention focus and word type ($F(1,15537.900) = 4.336$, $p = .037$, see Figure 14). While individuals with a weak chronic prevention focus show generally more positive responses for both prime types, particularly nonwords,

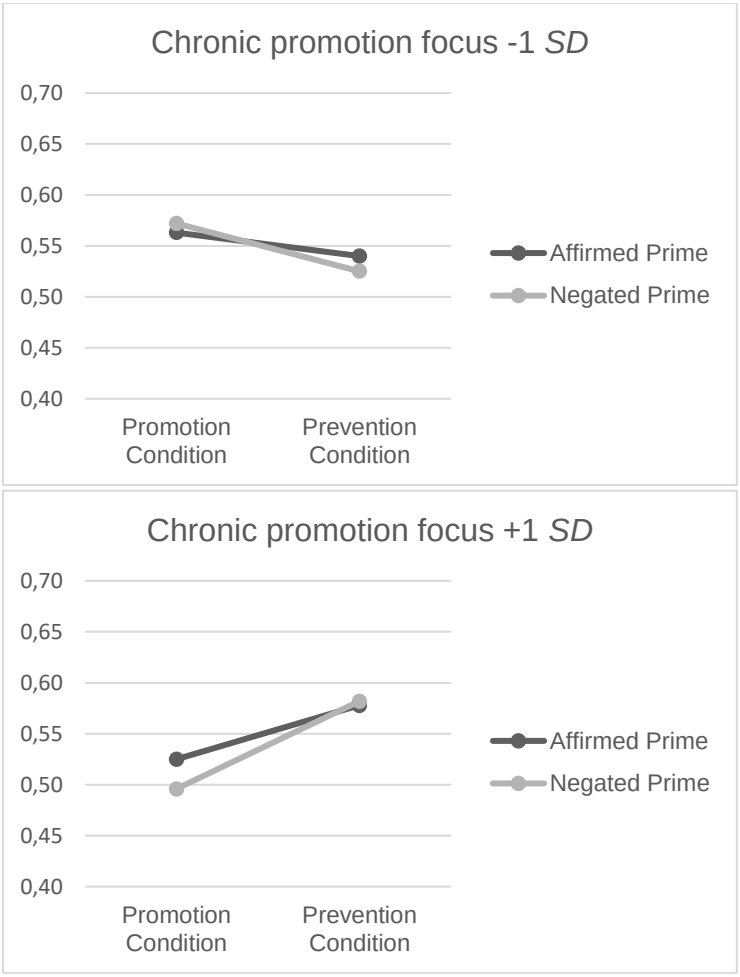


Figure 13. Estimates for positivity ratios, neutral-nonword prime comparison, promotion focus interaction model, Study 6.

when in a situational prevention focus, individuals with a strong chronic prevention focus instead show more negative responses for nonwords in a prevention focus and no effect of situational RF on responses to neutral words. This pattern of data is not in line with Hypotheses 1 or 2.

The models calculated to address Hypothesis 3 were similar to those for Hypotheses 1 and 2, but positive and negative prime trials were included instead of nonword and neutral prime trials. The analysis of dispositional RF yielded no significant effect for either model beyond a main effect of word type such that negative primes led to more negative responses than positive primes ($F(1,15503.619) = 23.053$, $p < .001$; all other $F \leq 2.228$, all other $p \geq .130$). In the explorative situation-disposition promotion focus model, this effect was augmented by a significant interaction of chronic promotion focus and situational RF ($F(1,110.625) = 5.251$, $p = .024$). This interaction was similar to the neutral-nonword models: participants with a weak chronic promotion focus responded more positively when in a situational promotion focus, but those with a strong chronic promotion focus responded less positively under the same circumstances. The analysis also revealed a marginally significant interaction of word type and situational RF ($F(1,15497.756) = 3.121$, $p = .077$). However, this interaction was in the opposite direction to those found in Studies 3 and 5. Participants were not less influenced by primes when in a situational prevention focus in this

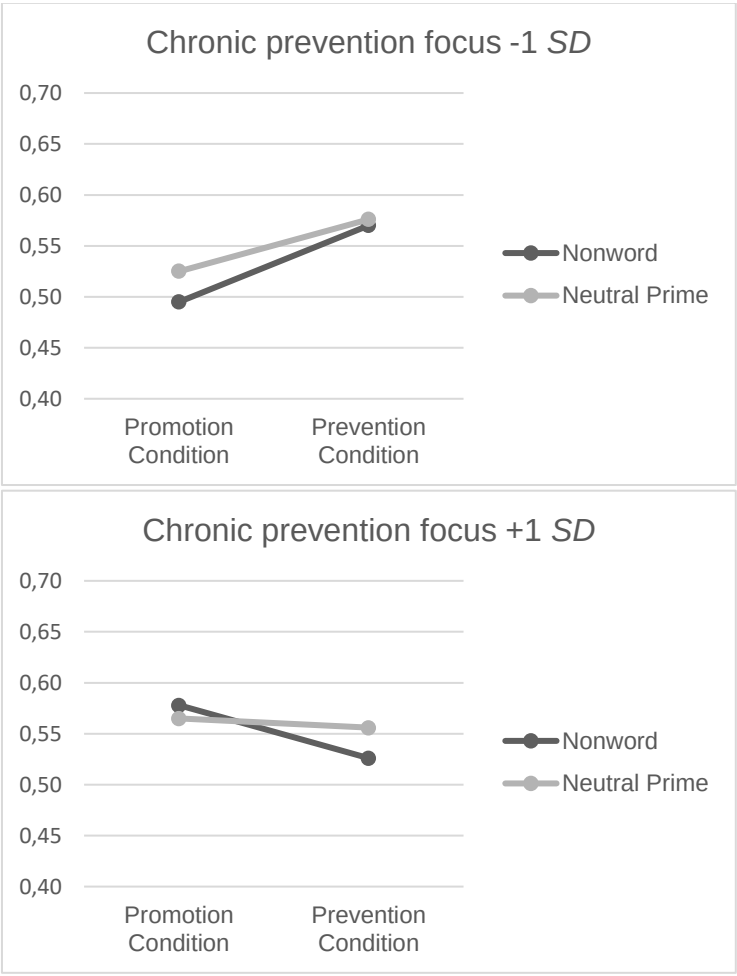


Figure 14. Estimates for positivity ratios, neutral-nonword prime comparison, prevention focus interaction model, Study 6.

experiment; instead, participants were less influenced by primes when in a situational *promotion* focus, counter to Hypothesis 3. For the explorative prevention focus model (see Table 3), the analysis yielded several significant and marginally significant results which were qualified by a four-way interaction of word type, negation, situational RF and chronic prevention focus (see Figure 15). Participants showed negation effects for valent primes when they both had a strong chronic prevention focus and were in a situational prevention focus. If their chronic prevention focus was weak or they were in a situational promotion focus, primes impacted the response as a function of prime valence, regardless of negation. Surprisingly, however, individuals who had *both* a weak prevention focus *and* were in a situational promotion focus also showed negation effects for valent primes.

Table 3.

Results of linear mixed modeling for judgments of positivity, dispositional-situation prevention focus interaction model, positive-negative comparison.

Type III tests of effects for prevention focus interaction model			
Parameter	Numerator *df* = 1 Denominator *df*	*F*	*p*
Intercept	111.252	2495.584	<.001
Promotion Score (control)	111.290	0.015	.904
Prevention Score	110.394	0.616	.434
Word Type	15497.684	24.107	<.001
Negation	15499.461	2.318	.128
RF Condition	111.255	1.704	.195
Prevention Score*Word Type	15496.991	1.406	.236
Prevention Score*Negation	15497.705	0.234	.629
Prevention Score*RF Condition	110.121	3.251	.074
Word Type*Negation	15497.179	2.914	.088
Word Type*RF Condition	15497.688	3.256	.071
Negation*RF Condition	15499.521	0.043	.835
Prevention Score*Word Type*Negation	15495.623	0.125	.724
Prevention Score*Word Type*RF Condition	15496.940	1.236	.266
Prevention Score*Negation*RF Condition	15497.666	0.005	.946
Word Type*Negation*RF Condition	15497.181	0.086	.770
Prev Score*Word Type*Negation*RF Cond	15495.620	4.415	.036

Note. Word Type coding: 0 indicates positive, 1 indicates negative prime.
Negation coding: 0 indicates affirmed, 1 indicates negated.
RF Condition coding: 0 indicates promotion focus condition, 1 indicates prevention focus condition.
Dependent variable coding: 0 indicates negative judgment, 1 indicates positive judgment.

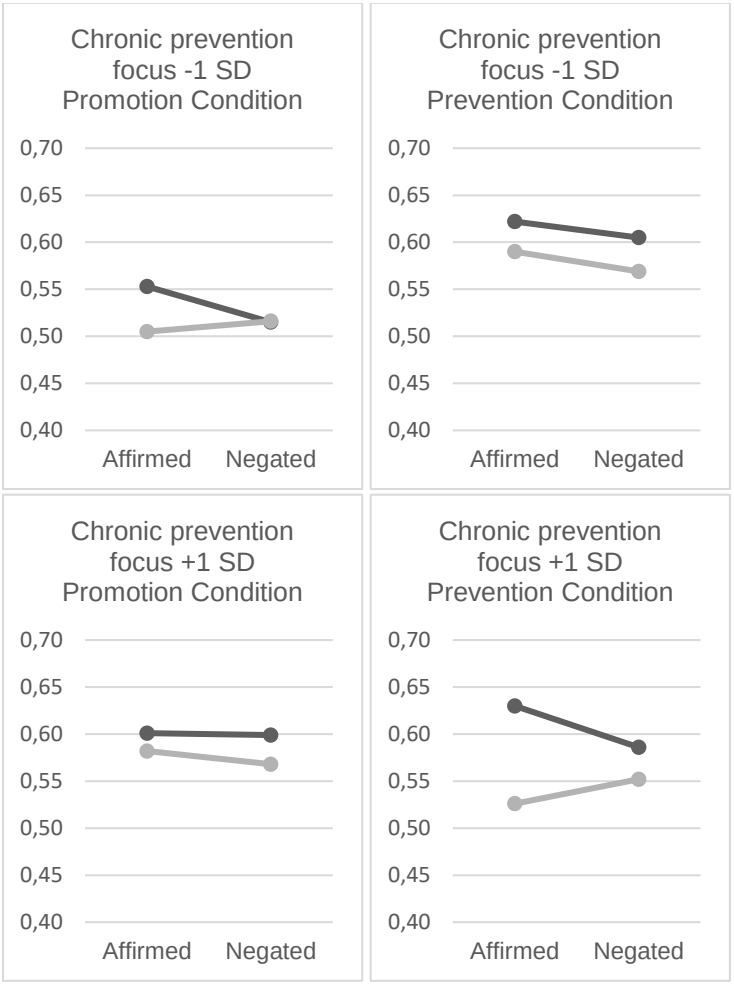


Figure 15. Estimates for positivity ratios, positive-negative prime comparison, prevention focus interaction model, Study 6. Dark lines denote positive primes, light lines denote negative primes.

Discussion

Study 6 implemented neutral and nonword primes in the procedure used before in Studies 4 and 5 in order to investigate possible effects of RF on the fluency of the negation operation. It was assumed that a prevention focus should increase the fluency of the negation operation or of the processing of negation cues, which should result in more positive AMP responses to negated neutral primes if the former and to both negated neutral and negated nonword primes if the latter. Furthermore, this study attempted to replicate the facilitation effect of chronic prevention focus previously implied by Study 5 on the negation of valent primes. The results were not in line with any hypotheses. Participants showed no negation effect for nonword primes, but preferred affirmed negative primes to negated ones. This effect appeared to be somewhat driven by individuals in the prevention focus group, counter to the expected pattern. In the analysis of the valent primes, the expected effect of chronic prevention focus on negation could not be found independently of situational RF, contradicting the results of Study 5.

However, several effects were revealed by the explorative dispositional-situational analyses. For the nonword/neutral analysis, both promotion and prevention focus showed a kind of “negative fit” effect, where participants with a strong chronic disposition that fit the situational demands showed fewer positive responses.

However, this effect was confined to nonwords only for prevention focus. Furthermore, although a strong chronic prevention focus alone did not facilitate negation of valent primes, it did so when augmented by a situational prevention focus. However, a similar pattern was also shown for individuals with a weak chronic prevention focus in a situational promotion focus. Finally, the insulating effect of situational prevention focus found in Studies 3 and 5 (primes influence responses less in a prevention focus) was reversed in this study, albeit only marginally.

When considering the primes without any a priori valence, it seems that participants preferred the affirmed versions of these primes to the negated ones in general. This was reflected in both the explicit prime ratings and the AMP responses to neutral primes. It seems that even when the valence involved is neutral, something is better than nothing – a hammer is better than no hammer, to use one of the primes from the study. If this was the basis for the differences in liking judgments, this effect may have been responsible for the lack of predicted negation facilitation effects. If the negation process was in fact facilitated by a prevention focus, it is plausible that the inference "something is better than nothing" was also facilitated. Although the ease of processing might have elicited positive affect, the conclusion this processing reached may have been negative, neutralizing the fluency-related affect. Indeed, such an account would even predict stronger negative responses to negated neutral primes, as

the results of fluent processing may be weighted more strongly (Alter & Oppenheimer, 2009). This may explain the results found in the study, which do in fact show such a pattern in the prevention focus condition. However, this highlights a weakness of the design, as such a post-hoc interpretation makes the initial hypothesis unfalsifiable in this paradigm. Therefore, pursuing this avenue of inquiry demands measures that are capable of ascertaining the ease of processing more directly or, alternatively, a paradigm in which the negation process itself leads to affectively neutral results, thereby revealing ease-of-processing effects. In general, however, these results show that individuals in a prevention focus seem to make the results of negation processes more extreme.

The reversed-fit effects observed in this study are more difficult to explain. There are few theoretical or empirical reasons to expect a general decrease in positive responses due to fit. Regulatory fit is associated with positive affect and feelings of fluency (Lee & Aaker, 2004; Spiegel et al., 2004). Furthermore, none of the prior studies in which such effects could be assessed showed any decrease in general positivity ratings when participants were put in situations that fit their chronic RF. Regulatory fit either increased positivity generally (as in Study 5 for promotion fit) or only decreased it for specific prime types (as for affirmed primes in Study 5 for prevention fit). If one of the two effects is not spurious, methodical differences between these studies must be responsible. The most important of these are the addition

of neutral and nonword primes to the paradigm. A relatively large proportion of primes in the previous studies had some kind of affective fit to the RF of the participant, namely half. In the current paradigm, only a quarter of the primes participants saw matched their RF. Although intuitively unlikely, it is possible that this proportion difference caused the reverse of the expected fit effect. For example, a participant who was experiencing prevention fit would have been particularly prepared to process negative primes. However, most of the primes they would have seen would have been of a different valence and might have been less fluently processed. Furthermore, the additional categories of primes, with some being more negative relative to others, may have prevented an easy "is/is not" categorization and therefore actually decreased the fluency such a participant experienced. However, this explanation depends on many additional assumptions, all of which concern fast and unintentional processes, making them even more specific and unlikely. Ultimately, the results of the fit analysis here raise questions that cannot be answered without further research. They demand replication before placing too much emphasis on them. Implementing a paradigm without valent primes may also be a useful next step in order to assess whether the context of valent primes influenced fit effects on the nonvalent primes.

Another area in which this study raises questions is the insulation effect of prevention focus. Previous experiments (Studies 3 and 5) have shown that being in a

prevention focus may insulate participants from the effects of valent primes. However, in this study, the reverse obtained – compared to a situational promotion focus, a situational prevention focus increased the effect of primes. It is unclear why this might occur. However, it is possible that the extra prime categories, which differed from the positive and negative primes not only on the valence spectrum, but also in whether they had a semantic meaning or not, changed the way the primes were processed. The presence of nonwords in the prime set may have induced participants to make a quick initial assessment of whether the prime was a word or not rather than the more AMP-typical assessment of its valence, thereby delaying said valence assessment. If participants in a prevention focus are normally better capable of avoiding valence misattribution, as suggested by the prior studies, then this implies that they weight the target-relevant valence more in their response. Meanwhile, if this improved avoidance of misattribution depends on the temporal distance between the prime-elicited affect and the target-elicited affect, later affective responses to the prime will be misattributed more, regardless of RF. Yet participants in a prevention focus might then weight the misattributed affect more strongly, leading to increased AMP effects. Once more, the possible explanation raises many new questions. Ultimately, the insulation effect demonstrated in Study 3 requires direct replication without interference from negation processes or

additional nonvalent primes before further conclusions can be drawn.

One effect that partially supported the hypotheses was the fit effect of chronic prevention focus on negation of valent primes. Participants who were experiencing prevention fit showed stronger negation effects than either participants who had only a strong chronic prevention focus or only a prevention framing. This might indicate that the results of such negation processes are indeed weighted more strongly in consequent behavior when individuals are in a prevention focus, but only when they also have a strong disposition towards it. Taken together with the results from Study 5, it seems that chronic prevention focus is the most important component of this effect. However, some degree of situational influence seems necessary as well for this effect to obtain for valent primes.

The interpretation that prevention focus might increase the weight given to the results of a negation process fits these data as well as the tendency observed with the neutral prime data. However, this support is not unequivocal. The effect for the neutral prime data occurred only for situational prevention focus, whereas the effect for valent primes requires both situation and disposition. Furthermore, situationally promotion-focused participants low in chronic prevention focus also showed stronger negation effects. It is unclear why these participants should show such results and it remains to be

seen whether they reoccur in future studies. In addition, such weighting might also be measurable in a paradigm without time-constrained responses. Study 7 addressed this possibility.

Study 7 – Regulatory Focus and Unconstrained Affective Negation

Theoretical Background

The studies investigating negation up to now have shared a common paradigm in that they all use an AMP with time-constrained responses. This has led to large proportions of trials being excluded from analysis due to extremely fast responses. This was a conscious decision in order to cultivate boundary conditions in which negation processes would sometimes fail, allowing better identification of facilitation effects. However, if the observed results are due to a bolstering of the outcome of negations rather than their facilitation, the same effects should obtain in a time-unconstrained AMP. The results for nonvalent primes in Study 6 suggest that if there is an effect of RF (specifically, prevention focus) on negation processing, it may consist of a stronger weighting of its results rather than a facilitation of the process itself. Therefore, it becomes an interesting question whether this increased weighting persists when individuals have time to consider their judgments instead of being forced to respond quickly. Study 7 aimed to address this gap.

Furthermore, the previous studies have all shared a stimulus set, raising the question whether the observed

effects are generalizable to further stimuli or are an artefact of the ones used up to now (Bahník & Vranka, in press). As Studies 1-3 had used a common stimulus set that was designed to not only contain valent words, but have those words fit the concept of RF, these stimuli were implemented in Study 7.

Due to the weaknesses identified in Study 6's design with regard to finding fluency effects, Study 7 returned to the simpler design of Studies 4 and 5, using only valent primes. Accordingly, similar hypotheses were formulated as in Study 5. However, the hypothesis postulating weaker negation effects for individuals with high chronic promotion focus was discarded, as the previous studies showed no evidence for this effect.

H1: Participants are less influenced by the base valence of a negated prime under a situational prevention focus than under a situational promotion focus.

H2: Participants with a strong chronic prevention focus are less influenced by the base valence of a negated prime than participants with a weak chronic prevention focus.

RQ: Do situational and chronic RF interact in predicting the effects of negated primes?

Method

Study 7 was identical to Study 5 in all respects except as noted.

Sample. The study was conducted at the University of Würzburg from January 16th to January 22nd, 2015. A total of 106 participants took part in the study. Due to technical issues, data was not collected from two participants, leaving an actual sample of 104 participants (73.1% female, M_{age} = 27.7, SD_{age} = 9.5, Min_{age} = 19, Max_{age} = 58). They were recruited from an online mailing list and took part in the experiment as part of a longer session including several other experiments. They received a total of 7€ as compensation for all of the studies. Data was collected in a lab room with eight cubicles that shielded the participants from each others' and the experimenter's view.

AMP. The basic AMP paradigm was identical to that implemented in Study 3. The positive and negative primes used in Study 3 were split into two groups of ten each. Half of the sample saw one group of positive and negative primes, the other half saw the other group (see Appendix B). Affirmed primes were preceded by the indefinite article for nouns (EIN or EINE) or the qualifier "very" for adjectives (SEHR). Negated primes were preceded by the pronoun 'no/not' (KEIN or KEINE for nouns, NICHT for adjectives). Each prime was presented a total of four times affirmed and four times negated, leading to a structure of four practice trials followed by two blocks of 80 trials each.

Regulatory Focus manipulation. As the AMP was no longer time-constrained in this study, the RF

manipulation could not depend on response speed. Therefore, an essay priming task was implemented. This manipulation was identical to that used in Study 2.

Procedure. Participants completed the experiment as part of a session comprising this study and two further unrelated experiments. Participants completed the RF manipulation, followed by two manipulation check items that assessed their promotion and prevention emotions (Zhao & Pechmann, 2007).[19] They then performed the AMP. Thereafter, participants completed the German LGRF (Sassenberg et al., 2012). Finally, participants were asked for demographic information and their suspicions concerning the purpose of the study. The experiment took about 15 minutes.

Results

Data selection and preparation. As in Study 5, trials with a response time of less than 100ms were discarded (3.4% of trials). Eleven participants who categorized the ideographs as more or less positive than average over 80% of the time were excluded.

Each essay was read by a judge blind to the condition who coded it as either promotion-focused, prevention-focused or ambiguous. Datasets were eliminated per the criteria applied in Study 2. Two

[19] As mentioned in Study 3, this manipulation check is unsuitable and will not be further discussed.

participants noted that they could not think of anything to write and one participant copied the instructions. In total, 20 participants were excluded from analysis due to their essays. If application of this essay filter changed the analysis substantially, it is noted at the appropriate analysis. The final sample therefore consisted of 73 participants (69.9% female, M_{age} = 26.8, SD_{age} = 8.7, Min_{age} = 19, Max_{age} = 57, sensitive to f = .166).

AMP Analysis. The AMP data were initially subjected to a mixed-model ANOVA with the within factors valence and negation and the between factors RF condition and stimulus group. The latter factor had no effect on positivity ratios, so a second mixed-model ANOVA without this factor was conducted. The analysis yielded a significant main effect of valence ($F(1,71)$ = 12.772, p = .001, η_P^2 = .152). Participants responded more positively to positive primes than to negative primes (ΔM = .039). No other effects achieved significance (all $F \leq$ 2.331, all $p \geq .131$, all $\eta_P^2 \leq .032$)[20]. Hypothesis 1 is not supported.

Both the promotion focus subscale (Cronbach's α = .771) and the prevention focus subscale (Cronbach's α = .730) of the LGRF achieved acceptable reliability. As in prior studies, these predictors were once again mean-

[20] If the entire sample is analyzed, the interaction of valence and negation achieves marginal significance (p = .087). In line with Deutsch et al. (2009), participants show a tendency to reverse the valence of negated primes.

centered and included in restricted maximum likelihood random intercept linear mixed models. The dependent variable was whether the target was judged as more positive than average. A second set of models added situational RF condition as a predictor and assessed its interactions with the other predictors. All analyses were initially conducted with stimulus group as a control variable, which showed no effect. Results are shown in models without this variable. In both chronic RF models, the main effect of prime valence previously demonstrated was upheld ($F(1,11351.787) = 18.640$, $p < .001$). Furthermore, significant interactions between valence and negation were found ($F(1,11351.561) = 6.516$, $p = .011$, see Figure 16). This mirrors the results found by Deutsch et al. (2009) – when responses in the AMP are unconstrained, participant responses are more consistent with the integrated valence of the valence/affirmation combination rather than the simple valence of the prime. The promotion focus model analysis additionally revealed a marginally significant interaction of chronic promotion focus and valence ($F(1,11351.501) = 3.561$, $p = .059$). A stronger chronic promotion focus was associated with more positive responses, but more so for negative valence primes than for positive valence primes.

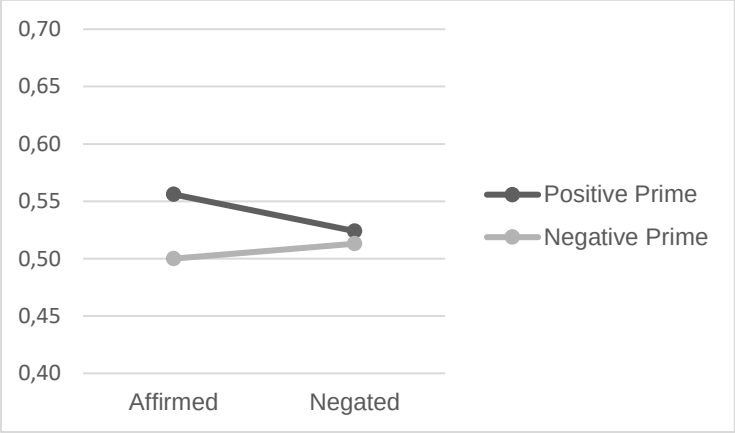


Figure 16. Estimates for positivity ratios, chronic promotion focus model, Study 7.

However, in the chronic prevention focus model, the interaction of valence and negation was further qualified by a three-way interaction with chronic prevention focus ($F(11352.187) = 4.357$, $p = .037$, see Figure 17) [21]. Only individuals with a strong chronic prevention focus showed a negation effect for valent primes. Individuals with a low chronic prevention focus responded only to prime valence. These results support Hypothesis 2.

[21] If the entire sample is analyzed, the interaction between chronic prevention focus and negation achieves marginal significance ($p = .085$), such that negated primes are responded to less positively with increasing chronic prevention focus.

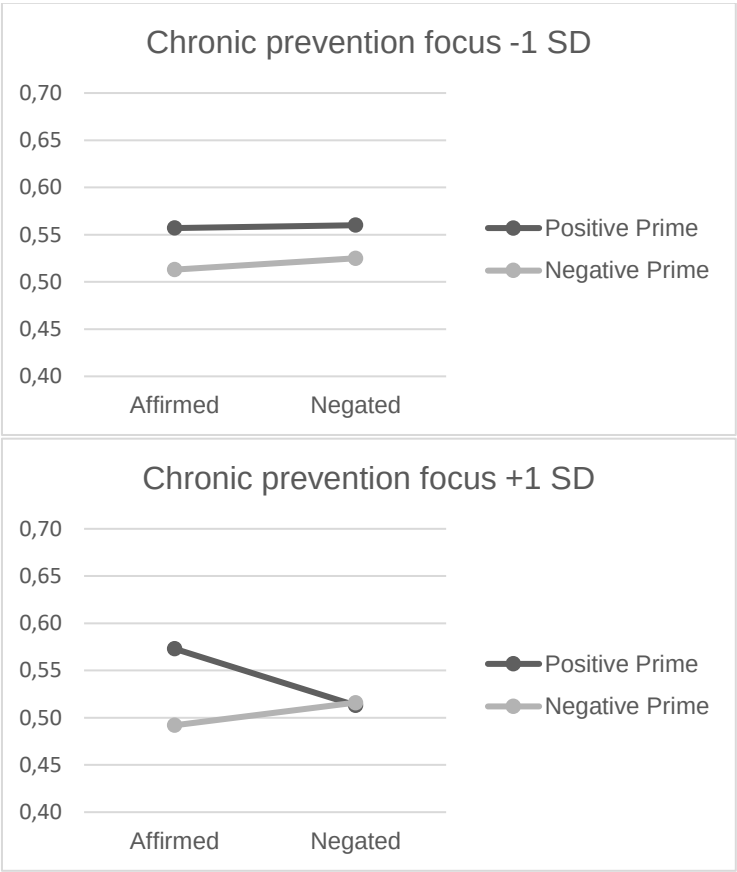


Figure 17. Estimates for positivity ratios, chronic prevention focus model, Study 7.

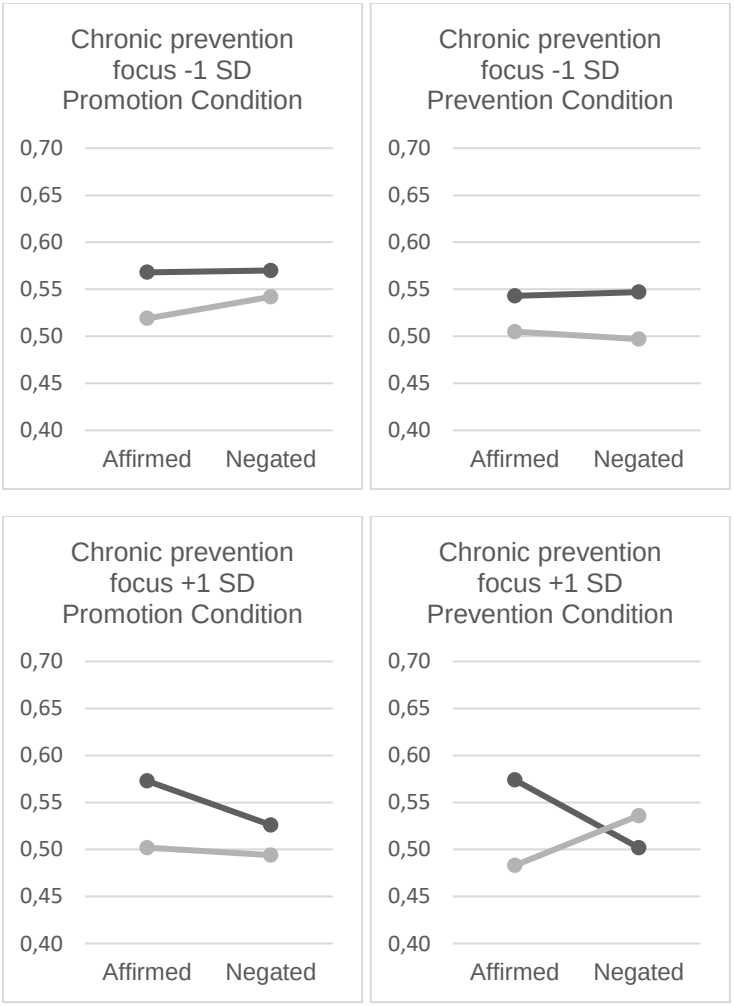


Figure 18. Estimates for positivity ratios, prevention focus interaction model, Study 7. Dark lines denote positive primes, light lines denote negative primes.

The exploratory dispositional-situational interaction model yields no new results for promotion focus (all $F \leq 1.677$, all $p \geq .200$)[22]. However, the four-way interaction with condition in the prevention focus model was close to marginal significance ($F(1,11346.246) = 2.626$, $p = .105$). As previous studies had demonstrated effects of situational RF (Study 4) and, more pertinently, effects of chronic prevention focus that were contingent on situational RF (Study 6), this interaction was examined more closely. As can be seen in Figure 18, the negation effect obtains most strongly for individuals whose strong chronic prevention focus fits the situation. These results are relevant to the effect postulated in Hypotheses 1 and 2.

Discussion

Study 7 applied a different set of stimuli and an AMP with longer prime presentation and without a time constraint on the response to the same basic research question as Studies 4-6. The aim was to further illuminate the effects of prevention focus on negation processing and to show that these effects generalize to other valent stimuli. The results partially confirmed the hypotheses: although situational prevention focus did not directly

[22] If the entire sample is analyzed, the interaction between chronic promotion focus and situational RF achieves marginal significance ($p = .069$), such that chronic promotion focus increases positivity when it fits situational RF, but decreases it when it does not.

facilitate negation processing, thereby nonreplicating Study 4 once more, there was evidence that chronic prevention focus increased the impact of negations on net prime valence. Nonsignificant trends in the data showed that this effect of chronic prevention focus seemed to occur most strongly under a fitting situational prevention focus. Furthermore, there was an unexpected effect of chronic promotion focus in that it increased positive responses more strongly after negative primes than after positive primes, regardless of negation. All of these effects persisted independently of which of the two new stimulus sets were used in the study.

In line with previous studies, Study 7 shows that prevention focus seems to increase the effects of negation affixes on the valence of primes. Although this effect cannot reliably be shown by manipulating situational RF, it does obtain somewhat consistently for chronic prevention focus. Study 7 further shows that this is not an effect that only occurs under cognitive constraints. The previous studies in this series worked from the assumption that negation, as a highly automated and overlearned process, would be facilitated on a processing level by a prevention focus and thereby succeed more often under highly constrained circumstances. Their results were somewhat consistent with this assumption, but the expected fluency effects implied by a facilitation account failed to manifest when tested on neutral or nonword stimuli. Therefore, in this study, primes were shown for longer and response times were not

constrained. If the effects observed in previous studies were due to an increased likelihood of the negation process completing for a prevention focus, there should have been no observable difference in the current study, as previous research has demonstrated reliable negation effects under similar circumstances (Deutsch et al., 2009). However, the effects still obtained in this study, implying that prevention focus might not facilitate the negation process, but rather strengthen its outcome. Negated positive primes become more negative in their impact, while the opposite occurs for negated negative primes.

Unfortunately, the final sample size for Study 7 was somewhat smaller than for previous studies implementing this paradigm. This is partially due to the use of an essay manipulation and the associated loss of participants whose essays were identified as problematic and partially due to logistical constraints. It is possible that the four-way interaction which reflected the effect of prevention fit on negation processing may have achieved significance with a larger sample size, as group sizes of below 50 are insufficient to detect subtle effects (Simmons et al., 2011). The current results cannot speak to the robustness of this observed interaction, so it must be interpreted with caution. The descriptive tendencies of the data suggest that the effect of chronic prevention focus might be particularly strong under circumstances of prevention fit. This observation is consistent with Study 6, with the difference that the anomalous negation pattern shown in the low chronic prevention/situational

promotion group in that study was less pronounced in this one. Taken together, these studies indicate that it might not be sufficient to simply be in an active prevention focus or to have a disposition towards such a focus to observe increased negation effects. Instead, these results point towards a combined causality of situation and disposition: individuals with a strong and early-acquired tendency towards prevention show stronger negation effects when that tendency is activated by the situation.

However, there is an important difference between this study and the previous experiments: the induction of RF. Unlike the previous studies, this study could not use a reaction time criterion to frame possible outcomes as gains or losses. Instead, participants wrote an essay describing their personal ideals or standards. As discussed in previous studies utilizing this manipulation, it is not trivial to assume that these two different inductions of RF should affect information processing in the same way. Interestingly, however, the results indicate similar effects on negation processing for high chronic prevention focus individuals regardless of the manipulation. Ideal-ought priming and task outcome framings, though distinct, may indeed share sufficient common ground to influence basic information processing in similar ways. For the results of the negation studies presented thus far, a prevention focus seems to have somewhat consistent effects whether induced on a system or on a strategic level (Scholer & Higgins, 2013).

This study also produced an unexpected result of chronic promotion focus. Although it might be expected that individuals with a strong chronic promotion focus respond more positively in general, as this fits the idea of an eager response bias, this tendency was not shown in prior studies. Furthermore, the interaction with prime valence does not fit the logic of RF – it is unclear why individuals with a strong chronic promotion focus should respond particularly positively after negative primes. This anomalous result also does not fit the results of the previous studies, raising the question of whether it is spurious. In general, the results of each experiment that tested negation effects raised new questions. Beyond the unexpected effect of promotion focus just described in the current study, Study 5 also showed increased positive responses for participants experiencing promotion fit. Study 6, however, showed more *negative* responses for participants experiencing either type of fit. Furthermore, Study 4 implied that situational prevention focus might be sufficient to facilitate negation processing on its own, whereas Study 5 implies the same for chronic prevention focus. In order to understand which of these effects is of interest for further discussion, it is necessary to test their individual stability. For this purpose, Studies 4-7 were subjected to a meta-analysis in order to identify effects that remain robust over all studies.

Meta-Analysis of Studies 4-7

Results

For each study, participants were removed from the dataset according to the criteria described in the respective Method sections. The participants from all four studies were then pooled and subjected to a meta-analysis in which the neutral and nonword trials from Study 6 were discarded. A mixed-model ANOVA (N = 366) with the within factors valence and negation and the between factors RF condition and study was initially conducted on positivity ratios, excluding trials where participants responded faster than 100ms. The study variable showed a marginally significant main effect (F(3,358) = 2.410, p = .067, η_P^2 = .020) which was qualified by a marginally significant interaction of study, RF condition and valence (F(3,358) = 2.238, p = .084, η_P^2 = .018). Participants responded less positively in Study 7 (without time-constraints on their responses) than in the other studies. The interaction reflected the results of the individual studies: while Studies 4 and 5 showed a stronger prime valence effect in the promotion focus condition than in the prevention focus condition, this difference was reversed in Study 6 and not present in Study 7. Although this pattern of results may indicate that there were relevant differences between the studies, there were no other

effects of study (all $F \leq 1.865$, all $p \geq .135$, all $\eta_P^2 \leq .015$). Therefore, the evidence that individual studies differed meaningfully was deemed to be weak, so a further mixed-model ANOVA was conducted that omitted the study variable. The analysis yielded a main effect of valence ($F(1,364) = 31.114$, $p \leq .001$, $\eta_P^2 = .079$) which was qualified by a marginally significant interaction of valence and negation ($F(1,364) = 3.470$, $p = .063$, $\eta_P^2 = .009$, see Figure 19). In general, there is a negation effect in the pooled data, albeit a small one. The three-way interaction between RF condition, valence and negation was not significant ($F(1,364) = 1.437$, $p = .231$, $\eta_P^2 = .004$), nor were any other effects (all $F \leq .604$, all $p \geq .437$, all $\eta_P^2 \leq .002$). The meta-analysis shows no evidence of an effect of situational RF alone on negation processing.

For the meta-analysis of chronic RF and the dispositional-situational interactions, only the participants from Studies 5-7 were analyzed ($N = 280$), as Study 4 had no comparable assessment of chronic RF. Chronic RF scores were mean-centered and included in restricted maximum likelihood random intercept linear mixed models. The dependent variable was whether the target was judged as more positive than average. A second set of models added situational RF condition as a predictor and assessed its interactions with the other predictors. Study was omitted as a variable for these analyses in order to simplify interpretation.

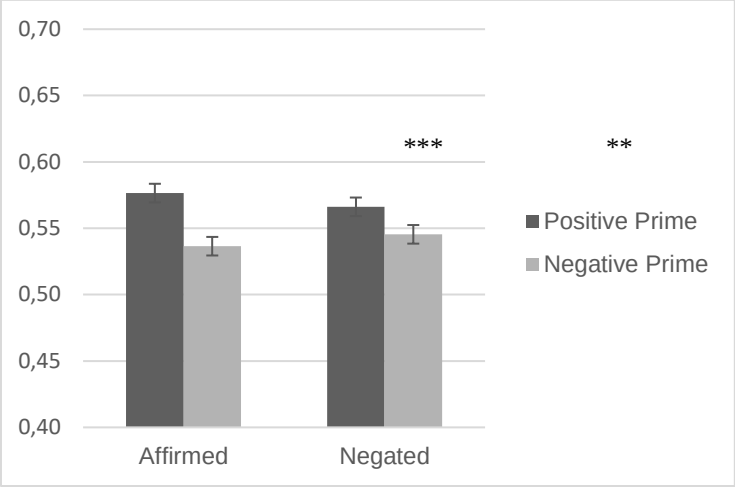


Figure 19. ANOVA estimates for positivity ratios, meta-analysis of Studies 4-7. Error bars represent standard errors. ** indicates $p \leq .01$, *** indicates $p \leq .001$.

The analysis of chronic promotion focus shows the same results as the ANOVA, albeit more pronounced (prime valence: $F(1,38149.029) = 38.468$, $p < .001$; interaction prime valence and negation: $F(1,38146.272) = 7.277$, $p = .007$). No new effects can be observed (all $F \leq 1.568$, all $p \geq .211$). However, in the chronic prevention focus analysis, the three-way interaction of chronic prevention focus, valence and negation achieves significance ($F(1,38144.150) = 5.145$, $p = .023$, see Figure 20). Chronic prevention focus moderates negation of valent primes over all three studies.

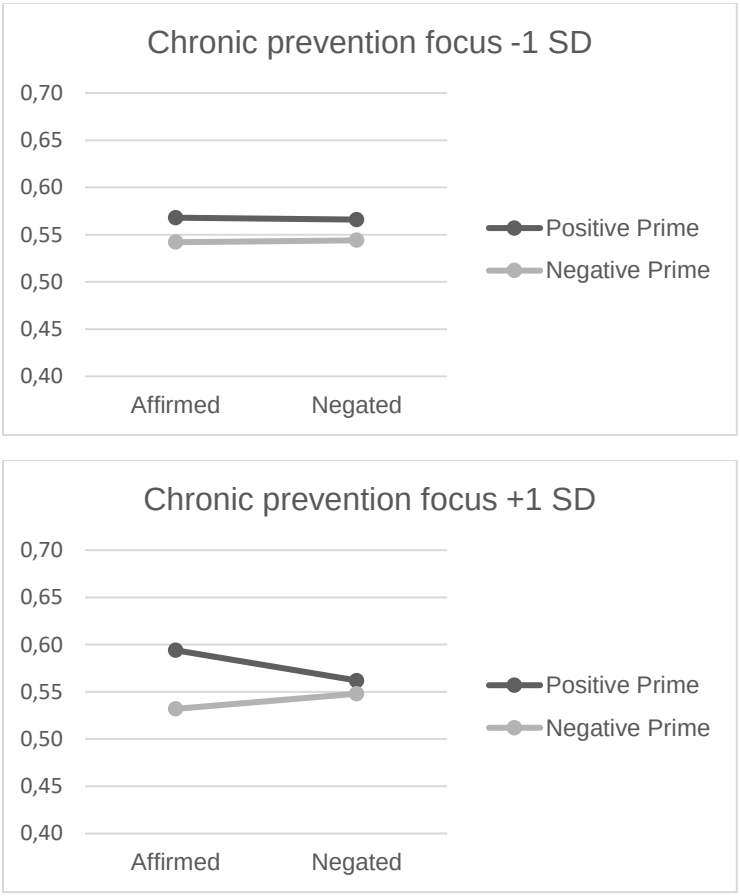


Figure 20. Estimates for positivity ratios, chronic prevention focus model, meta-analysis of Studies 5-7.

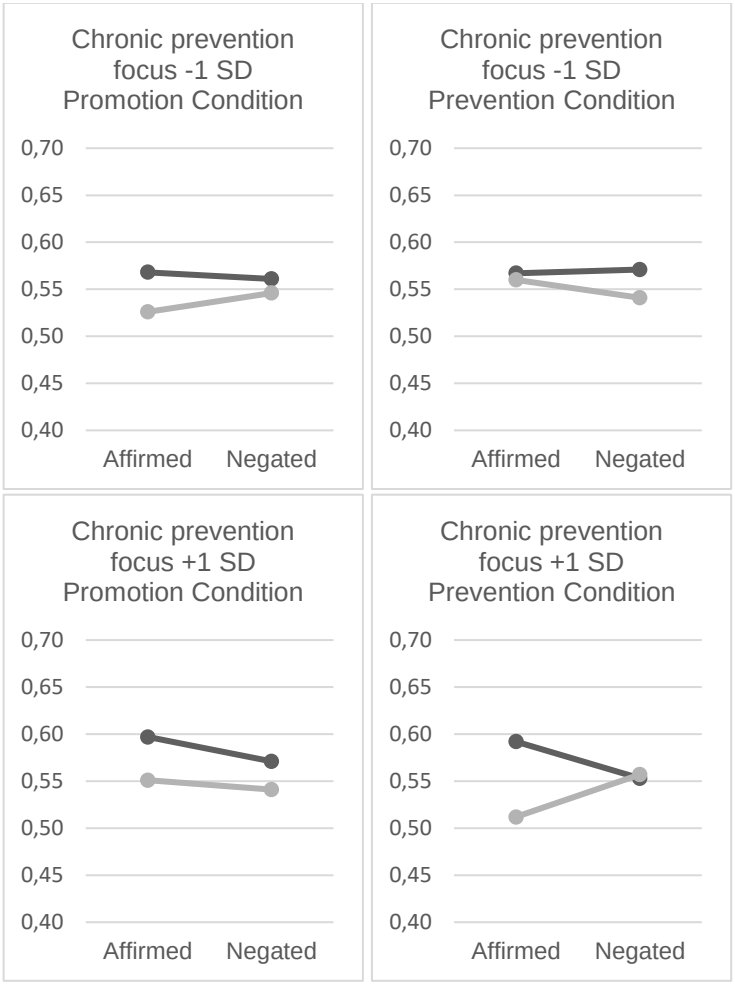


Figure 21. Estimates for positivity ratios, prevention focus interaction model, meta-analysis of Studies 5-7. Dark lines denote positive primes, light lines denote negative primes.

In the dispositional-situational interaction models, the promotion focus model adds no new effects to those found in the chronic promotion focus model (all $F \leq .900$, all $p \geq .343$). The promotion fit effects shown in the individual studies do not obtain when averaged over the entire set. However, in the prevention focus model, the three-way interaction from the chronic prevention focus model obtains and an additional marginal three-way interaction between chronic prevention focus, situational RF and negation is shown ($F(1,38138.823) = 3.181$, $p = .075$). These interactions are qualified by a four-way interaction with situational RF ($F(1,38138.324) = 8.781$, $p = .003$, see Figure 21). Although individuals with a weak chronic prevention focus still show a tendency towards negation effects under a situational promotion focus, the strongest such effects obtain in the prevention fit condition.

Discussion

The meta-analysis of Studies 4-7 shows convincing evidence for a consistent effect of prevention focus on negation. Participants show stronger negation effects if they have a strong chronic prevention focus. This effect seems particularly strong when participants are experiencing prevention fit, that is, when the situation is also conducive to activating a prevention focus. Importantly, the meta-analysis also provides no evidence for any of the other unexpected effects observed in the individual studies, strengthening the conclusion that they

are spurious. However, some caution must be exercised in interpreting these results. Although the paradigms used were similar from study to study, some important differences remain and may bias the results. The majority of the participants included in the meta-analysis responded under time pressure; therefore, any effects that are dependent on sufficient processing time will either be undetected or underestimated in their size. This can be seen in the weak, albeit still significant, negation-valence interaction. According to Deutsch and colleagues (2009), the strength of this interaction depends on time pressure in responses, so the actual size of this effect cannot be addressed by the meta-analysis. This may in turn influence the effect size of the prevention focus interaction. Insofar as the processes involved are contingent on time pressure, the empirical interaction effect size will drift away from the actual value. Whether they manifest only under time pressure or only without time pressure, the meta-analysis will underestimate the actual size of the effect due to the proportion of individuals who were in the study with the 'wrong' time pressure conditions. However, the individual studies show effects both under time pressure and without it, mitigating this problem somewhat.

An important aspect of the current set of studies is that they were designed to measure unintentional negation processing. In the AMP, participants were told to ignore the primes and to prevent them from affecting their judgments of the targets. If participants adhered to these

instructions, then they would have no need to process the full meaning of the primes and would in fact be motivated to actively avoid doing so. That primes and their negations were still processed under such circumstances implies that the processes involved were somewhat automatic. Specifically, they would be less intentional and less controllable than more "typical" reflective processing (Bargh, 1994). The fact that prevention focus influences the unintentional negation of primes indicates that it impacts reflective processing at a basic level. Negation is a fundamentally reflective process from the perspective of the RIM, as it assigns a relationship between two elements of the impulsive system which contains more information than a simple association. Viewed in this way, the current studies suggest that prevention focus may increase the impact of propositional transformations on subsequent judgment and behavior. This idea dovetails with previous research showing that individuals in a prevention focus rely on implicit attitudes less when formulating explicit preferences (Florack et al., 2010). From the current perspective, this effect might be explained not by motivated reasoning, but by differing impacts of reflective processing on the initial, implicit response.

General Discussion

The research presented in this dissertation has attempted to illuminate effects of RF on the most basic levels of information processing. Building on the RIM, model of basic social cognition, studies evaluated RF influences on semantic pre-activation, semantic priming, affective priming and basic propositional operations.

Regulatory Focus and Impulsive Processes

Although Study 1, the semantic pre-activation study, did not show any effects on this dimension, it did provide some evidence that the manipulation of RF used in more than half of these experiments, reward framing, exhibits some validity. Participants with a high chronic promotion focus responded faster and more eagerly, whereas participants with a high chronic prevention focus responded more slowly and with greater vigilance. The latter effect occurred only in the situational prevention focus condition, indicating that RF effects are not so simple to elicit. The context of reward framing is always somewhat gain-oriented, so it is not implausible that a prevention focus effect might only occur when individuals have a predisposition towards that RF.

However, in Study 2, which concerned itself with semantic priming effects, the opposite effect was found: participants with a strong chronic prevention focus responded faster. This may have been due to the

manipulation of RF, which in this study was achieved by priming participants with their ought or ideal-guides in an essay task, a system level manipulation (Scholer & Higgins, 2013). Such priming is not of direct relevance to the performance in the following task, unlike the strategic level of reward framing, and thus may show different effects on performance. For example, participants may have construed their performance in the experiment as irrelevant to their ought or ideal-guides and therefore not applied vigilant or eager means respectively. Furthermore, Study 2 showed specific effects of promotion and prevention focus on primes and targets in a LDT task. For prime processing, a strong chronic promotion focus was associated with faster responses after positive primes, which may indicate that primes that fit an individuals' RF result in greater feelings of familiarity or increased positive affect. However, this pattern was not mirrored with high chronic prevention focus individuals. These individuals showed no differences due to varying primes. It is possible that the negative affect associated with prevention primes in this design overshadowed the relevant metacognitive signals for faster responses to take place. Nonetheless, high chronic prevention focus individuals did respond faster to negative targets. One explanation suggested for this pattern was that such targets facilitate responses due to their fit specifically with prevention focus, for example by increasing arousal responses. Furthermore, this study also showed an effect specific to individuals experiencing

prevention fit, namely that priming effects were attenuated for them. This may be interpreted in terms of counter-regulation (Rothermund et al., 2008): individuals who are in a situational prevention focus, but do not have a strong chronic prevention focus might be more vulnerable to distraction due to positive primes than those with a strong chronic prevention focus.

In summary, Study 2 could not reach any firm conclusions, but provides impetus for further research investigating how RF may affect responses when elicited as task-relevant (such as by reward framing) or as task-irrelevant (such as by essay priming). It also provides tentative indications that RF might influence the consequences of processing related semantic targets, such as by increasing the feeling of familiarity evoked by such words or their effects on affect and arousal. Finally, the prevention fit results from Study 2 highlight the possible utility of including measures of chronic RF when investigating counter-regulation effects. Counter-regulation is conceptualized as a basic and ubiquitous phenomenon that occurs when individuals are focused on a positive or negative endstate (Koole, 2009; Rothermund, 2011; Rothermund et al., 2008; Schwager & Rothermund, 2013a; 2013b). The relationship between counter-regulation and RF is fundamental: both deal with expected positive or negative outcomes. This can be demonstrated by one of the first studies that demonstrated a counter-regulation effect, which approached the topic from a RF perspective (de Lange & van Knippenberg,

2007). In light of this close connection, it seems logical that dispositional RF might play a role in determining whether counter-regulation effects appear. Study 2 offers the first evidence that such an influence of dispositional RF may exist and suggests that chronic RF, the long-term orientation towards positive and negative endstates acquired early in development, may block counter-regulation. This idea resonates with the assumed ultimate explanation for counter-regulation phenomena, namely achieving homeostasis. Rothermund and colleagues (2008) explain counter-regulation as a bottom-up process that strives towards homeostasis by increasing the likelihood that stimuli counter to the current affective expectation are processed. In this way, the organism is more likely to experience affect that is opposed to the general affective state, thereby tending towards neutrality. However, chronic RF is conceptualized as a deeply situated trait acquired early in development (Higgins, 1998). Such a fundamental influence on an individual's development might well influence the 'base state' that homeostatic regulation strives towards. For example, an individual with a strong chronic prevention focus might experience homeostasis at a lower level of positive affect than an individual with a weak chronic prevention focus, due to the persistent expectation of possible negative outcomes such an individual experiences. If so, this would imply that a strong chronic RF may insulate an individual from counter-regulation effects at the same level of affect expectation at which an individual with a weaker chronic

RF might already experience counter-regulation. Such an explanation would fit the results of Study 2, but it is necessarily a post-hoc interpretation and requires confirmatory testing. Future counter-regulation studies might address this question and would certainly profit from including measures of dispositional RF.

Study 3 focused on affective priming. By implementing both the response-interference driven BFP and the response-interference independent AMP, specific effects of RF on affective responses to and affect elicitation by primes could be disentangled. The results showed that negative primes only facilitate responses to negative targets when the responding individual has a strong chronic prevention focus, although this effect was only marginally significant. However, in the AMP, negative primes did not cause a greater negative response with increasing chronic prevention focus, implying that this effect may have been driven by response facilitation rather than increased affective responses. Although the results in the AMP may have an alternative explanation based on the misattribution process it taps (see below), the implications of this are interesting. Given that there is no fit effect of chronic RF for targets, the contributing process seems to take effect after rather than during processing. If the primes themselves were processed faster, it would raise the question as to why the targets were not also processed faster. Instead, negative primes elicit faster responses to following negative targets under prevention fit, implying a reduced response threshold.

The pattern of these results mirrors that of increased salience of the prime's valence, which enhances response interference effects (Gawronski et al., 2008). This explanation would be consistent with the notion that chronic prevention focus increases the salience of negative valence.

The results on the AMP in Study 3, however, merit their own discussion. The main finding of Study 3 in the AMP was that situational prevention focus reduces the effect of primes on AMP responses. Although chronic prevention focus did not seem to influence priming effects, the situational-dispositional interaction analysis showed that it did have a weak effect in the situational promotion focus group, but that this tendency disappeared in the situational prevention focus group. Insofar as the AMP is a measure of affective response strength, these results seem strange, as they imply that individuals in a prevention focus experience weaker affective responses to stimuli. However, such a broad explanation of this effect seems untenable, as weaker affective responses in general should also have been visible in the BFP task. Instead, the specific characteristics of the AMP might underlie this effect. The targets in the AMP are selected to be neutral on average, so the major influence on responses is the misattributed affect from the prime. Clearly, for this affect to impact the judgment of the target, a misattribution must therefore take place. Payne and colleagues (2005) provide some evidence that this misattribution is unintentional and difficult to control (but

see Teige-Mocigemba, Penzl, Becker, Henn, & Klauer, 2016, for a critical position), whereas Gawronski and Ye (2014) provide evidence that the process involved is indeed misattribution. The most plausible explanation for the results observed in Study 3 in view of the BFP results is that this misattribution process was affected by prevention focus. Participants seem more able to discriminate between affect elicited by the prime and affect elicited by the target. Although Study 3 was not designed to test this hypothesis specifically, Payne and colleagues' (2010) use of process dissociation to identify a misattribution parameter in AMP studies provides an avenue for future research to do so. A prevention focus should specifically reduce this parameter while leaving the other components untouched. If this explanation for the observed effects holds, further questions remain as to how this reduction in misattribution occurs. Possibilities include an improvement in causal attribution of the prime valence (e.g. Oikawa, Aarts, & Oikawa, 2011) or a resistance to changes in the mental state of the participant (Gawronski & Ye, 2014). Either implies that a prevention focus might insulate individuals from the effects of incidental affective primes, which in turn would have broad consequences for fields such as conditioning research (Jones, Fazio, & Olson, 2009) and persuasion (Petty & Cacioppo, 1986) as well as provide new possible insights into the processes underlying the AMP, which are not yet well understood (Teige-Mocigemba et al., 2016).

Although these results of Study 3 for the AMP appear promising, there are grounds for caution. The priming insulation effect was only demonstrated for situational prevention focus. Chronic prevention focus appeared to have a similar (though weaker) effect in the situational promotion focus condition, but this tendency seemed to reverse in the situational prevention focus condition. Although this may be due to a ceiling effect and the reversal may be spurious, it is still surprising that the chronic RF variable, which tended to produce stronger effects and augment situational effects in the other studies in this series, did not do so in this case. Furthermore, the following studies, though primarily concerned with negation, did not replicate this general trend of weakened AMP effects for a prevention focus. A possible explanation for both of these issues might be that Study 3 employed an essay priming manipulation. Unlike most of the other studies in this series, the activation of a prevention focus was not tied to the task demands. Therefore, the AMP performance was irrelevant to achieving the activated prevention goals. Such an activation of prevention focus on the system level (Scholer & Higgins, 2013) corresponds more closely to what the LGRF measures as chronic prevention focus than an activation on the strategic level. Furthermore, the activation of ought self-guides via essay priming is presumably more likely to induce a system-level prevention focus than even individuals with a strong chronic prevention focus are to adopt it spontaneously.

Consequently, the likelihood of a ceiling effect that can explain the lack of prevention fit effects in Study 3 seems high. In addition, most of the following studies that also employed the AMP manipulated RF using a task reward framing. Although the two are conceptually related (Higgins, 1997, 1998; Scholer & Higgins, 2013), this difference along with the added interference from negation processes may have been sufficient to prevent the insulation effect from manifesting in subsequent studies. Only Study 7 also utilized an essay priming with an AMP procedure, but the possibility of interference remains in this study as well. In sum, although these results should be interpreted with caution, there is still good reason to investigate the possible insulating effects of prevention focus against primes further.

In general, Studies 1-3 show that although the effects of RF on impulsive processing are not clear and may depend on complex interactions, these effects do exist. In understanding how RF influences cognition, motivation, and behavior, the mechanisms behind the effects demonstrated in these studies may play a critical role. For example, if words that fit the current or chronic RF are indeed perceived as more familiar, this would have implications similar to an increase in processing fluency (Alter & Oppenheimer, 2009). Such a mechanism might underlie effects of regulatory fit (e.g. Lee & Aaker, 2004) as well as improved recall and recognition of episodes fitting a particular RF (Higgins, 1997; Jacoby, Kelley, Brown, & Jasechko, 1989). Furthermore, feelings of

familiarity may reduce perceived risk (Song & Schwarz, 2009), providing an explanation for why promotion focus is generally associated with more risky decision-making (Bryant & Dunford, 2008; Crowe & Higgins, 1997; Hamstra et al., 2011): when people in a promotion focus are confronted with a possible reward, they may feel more familiar with it and thus perceive it as less risky. Therefore, they are more likely to take a risk to attain it than individuals in a prevention focus, who do not benefit from feelings of increased familiarity with the possible reward and therefore evaluate it as more risky. This account also augments findings by Scholer and colleagues (2008) that prevention-focused individuals show more risky behavior when confronted with negative stimuli. Again, increased feelings of familiarity resulting from the fit of valence and RF can explain this reversal of the more typical promotion focus finding. Of course, such a mechanism need not necessarily supplant higher-level strategic concerns, which are often cited to explain such variations in risky behavior (Bryant & Dunford, 2008), but may complement them as an automatic, bottom-up process. Therefore, further research investigating this possible effect of RF would be a fruitful endeavor.

Regulatory Focus and Reflective Processing

Studies 4-7 concerned themselves with the effects of RF on low-level reflective processing. The core difference between propositional (reflective) and associative (impulsive) processing is the ability of

propositional links to carry more information than simple associative strength. One of the simplest propositional links that carries such unique information is that of negation. The specific pattern of activation associated with an element is inhibited while a converse pattern associated with the element's absence is activated. A consequence of negation with particular utility for differentiating between propositional and associative processing is that of valence change. Typically, if a stimulus is unambiguously positive, its negation (i.e. the implication of its absence) is negative and vice versa. This attribute of valence negation was exploited in order to serve as an index of reflective operation in studies by Deutsch and colleagues (2006, 2009). In turn, the studies in this dissertation applied the paradigm established by Deutsch et al. (2009) to investigating whether RF impacts reflective operation. Although Study 4 provided initial evidence that this might be the case, a more detailed picture emerged through aggregation with further studies. Chronic prevention focus did indeed increase the relative impact of propositions that integrated a qualifier with a target compared to simple associations with the target on responses. This effect was partially contingent on situational prevention focus. No effects could be found for promotion focus. Furthermore, Study 6 tested whether negation of neutral or nonwords was affected by RF in order to assess whether the mechanism was based on increased fluency of the negation process. Although the interaction was not statistically robust, trends within the

data suggested that negated neutral words were evaluated more negatively than affirmed neutral words only in the prevention focus group, while all other differences between negated and affirmed words or nonwords did not achieve significance. Although such a pattern is not indicative of greater ease of negation processing per se, as ease of processing generally results in more positive judgments, it is consistent with a greater impact of the negation process on the final response. Finally, Study 7 showed that this bolstering of the impact of negation persists even when participants are not constrained by time pressure, thereby implying that the process involved is relatively automatic and is not corrected for when the opportunity arises.

The question arises as to what precise effect prevention focus has on negation processing to produce such an increased impact. One possibility is improved outcome matching. Individuals in a prevention focus might have a stronger conceptual activation of the opposite of stimuli they process, implying an 'expectation of negation'. When negated stimuli are processed, the result of the negation process matches this expectation. Studies on conceptual priming have investigated similar ideas (e.g. Collins & Loftus, 1975) and newer work on fluency has connected such expectation matching to various consequences, including increased confidence in the following judgment (Alter & Oppenheimer, 2009; Topolinski & Strack, 2009). Such confidence effects in turn might explain the pattern of results observed in the

current studies, where negated valence judgments are exacerbated in a prevention focus. This explanation is supported by research on counterfactual thinking, which has shown that individuals in a prevention focus are more prone to subtractive counterfactual thinking, in which they consider how events would have been if they had not performed some action. A promotion focus, on the other hand, is more conducive to additive counterfactual thinking, in which people consider how things would have been if they had taken some action that they in reality did not (Pennington & Roese, 2003; Roese, Hur, & Pennington, 1999). Subtractive counterfactual thinking is akin to negation, as it deals with suppressing the consequences of a given event while activating the consequences of its absence, and is in some ways a retrospective reflection of the error of commission, which is more relevant to prevention focused-individuals. Due to their consideration of possible negative consequences of their actions, it seems likely that prevention-focused individuals might develop a degree of mental 'preparedness' to negate. If so, such an explanation could also cover the trends observed in Study 6: meaningful negations (i.e. of neutral, but meaningful words) only reduced positive judgments in the prevention focus group.

This increased likelihood to negate may also play a role in explaining the positive effects of promotion focus on creativity (Friedman & Förster, 2001). Previous explanations for this effect have focused on reduced perseverance in following a specific idea (Friedman &

Förster, 2001) or reduced self-censorship (Herman & Reiter-Palmon, 2011). However, the current research offers a new facet which may augment existing explanations. If individuals in a prevention focus are more likely to unintentionally negate concepts, this will increase the likelihood that aspects opposed to their spontaneously generated ideas will come to their attention. More specifically, the outcomes associated with not applying the generated idea will come to their minds more easily and be weighted more, leading to positive outcomes of not implementing the idea gaining more influence. This will lead them to reject new ideas with greater probability, also increasing the accuracy of their judgments of the quality of their ideas, consistent with Herman and Reiter-Palmon's findings (2011). Furthermore, such processing is inherently more resource-intensive and requires more elaboration of the idea, thereby increasing perseverance in following a single idea relative to a promotion focus, which fits the explanation of Friedman and Förster (2001). In addition, this offers an explanation for the finding that a prevention focus leads to more generated categories for target individuals when information on them is abundant, but contradictory than when it is sparse, but consistent (Molden & Higgins, 2004). For abundant information, bolstered negation processing will lead to more different possibilities as individual pieces of information are evaluated and put in context with the whole. However, a relative lack of information requires participants to

generate further potential information in order to come up with new categories, which would be affected by the aforementioned mechanisms that hinder creativity in more typical paradigms. An interesting implication of this line of thought is that prevention-focused individuals should be more capable in tasks that focus on creatively generating reasons not to adopt a specific course of action, implying that framing may moderate the effects of RF on creativity found up to now. Such a reversal has already been demonstrated for risky behavior by Scholer and colleagues (2008): when risks were framed in such a way as to accentuate the negative outcome of a miss, prevention-focused participants became less risk-averse. Analogous processes to those described for creativity may be in play in risky behavior, which has otherwise been shown to increase under a promotion focus (e.g. Crowe & Higgins, 1997; Hamstra et al., 2011). Prevention-focused individuals may perceive risks as greater due to the increased likelihood of them negating the positive outcome and thereby devaluing it, explaining the increased risk discounting found for prevention focus by Halamish and colleagues (2008).

Of course, the operation of negation was employed in these studies as an index of reflective processing (Deutsch et al., 2009; Strack & Deutsch, 2004). Although some of the explanations for the negation effects mentioned above might create the impression that they should be specific to only this operation, it is equally possible that prevention focus can bolster reflective

processing in general on a comparatively low level. Such a conclusion has implications for many fields of psychology, including impulse control (e.g. Metcalfe & Mischel, 1999) and attitude formation (e.g. Peters & Gawronski, 2011), to explore just two examples.

Impulse control is often conceptualized as the struggle between 'hot' automatic behavioral tendencies and 'cooler' long-term goals (Hofmann, Friese, & Strack, 2009). When considered from the perspective of dual-process models such as the RIM, this struggle is generally explained as the conflict between an automatic and a controlled system. Typically, the outcome of such a conflict is determined by situational moderators that affect the operating capacity of one or the other of the systems. Such moderators typically include self-regulatory resources, cognitive capacity, working memory capacity and situational motivation to control oneself (Hofmann et al., 2009; Strack & Deutsch, 2004). However, the current research suggests that RF might be added to this list. Although prevention focus generally implies increased motivation to act in accordance with one's standards, which are typically opposed to spontaneous impulses that cause self-control conflicts, the current research suggests that it might also directly affect the likelihood of reflective activation and therefore the likelihood of successful impulse control. Importantly, such activation need not be intentional or even aware according to the current analysis. Instead, prevention focus might act at the boundary of reflective operation,

increasing the likelihood that links between impulsive elements usually formed by the reflective system in active operation are activated even without conscious attention. This would increase the likelihood that cognitions relevant to impulse control become conscious and lead to reflective processing, but failing this, it would also increase the likelihood of relatively fast intuitive judgments leading in the same direction (e.g. Baumann & Kuhl, 2002; Kuhl, 2000), as the elements leading to such intuitive judgments would be closer to those activated in more elaborate consideration.

With regard to attitude formation, prevailing research has concentrated on attitude formation through associative processes such as evaluative conditioning[23] (e.g. De Houwer, Thomas, & Baeyens, 2001; Olson & Fazio, 2001) or through reasoning based on incoming information (e.g. Bohner & Dickel, 2011; Petty & Cacioppo, 1986). However, a branch of research in recent years has focused on how attitude formation is affected by the knowledge that some incoming information is false (e.g. Peters & Gawronski, 2011). Such work has particularly investigated how implicit attitudes are affected by false information. In general, false information is assimilated correctly in implicit attitudes (Mann & Ferguson, 2015; Peters & Gawronski, 2011).

[23] In recent years, controversy has arisen as to whether evaluative conditioning is (purely) associative. For a critcial opinion, see De Houwer, 2009.

However, when there is a delay between receiving the information and being notified of its inaccuracy, implicit attitudes do not always adapt, even though explicit attitudes do (Peters & Gawronski, 2011). A possible explanation for this dissociation was proposed by Zanon and colleagues (2014): participants encode incoming information on an attitude object as propositions in accordance with their interpretation of the relationship between the information and the object. This account is further bolstered by evidence that false information requires more cognitive resources to be classed as false (Boucher & Rydell, 2012). Based on the current research, individuals in a prevention focus should therefore show a weaker dissociation of implicit and explicit attitudes under most circumstances. Furthermore, as Mann and Ferguson (2015) show, individuals are capable of reversing their implicit evaluations of attitude targets when they are given new propositional information that changes the meaning of prior information, assuming they have cognitive resources available. This indicates that some reflective elaboration of the information is required for a reversal to take place. Therefore, it might be predicted that individuals in a prevention focus might be more prone to such a reversal, which carries the further possible implication that implicit attitudes may be more malleable due to propositional reasoning for individuals in a prevention focus.

Conclusion

The research presented in this dissertation opens up many new and intriguing questions about how RF may affect the basic building blocks of information processing. Beyond the previously discussed implications, questions have arisen about the equivalency of various manipulations of RF and the differences between chronic RF as an early acquired and deeply rooted trait vis-à-vis situational RF. Unfortunately, the studies presented here cannot answer as many questions as they raise. This, however, is in line with the goal of exploratory research. In many areas of psychology, existing theories leave gaps on a process level when it comes to explaining new findings (Strack, 2012). However, many existing models of cognition do offer sufficient scope to address such gaps – but they come from different traditions of research. Models of social cognition are difficult to apply to models of motivation, as the terminology, assumptions and paradigms in these two fields are vastly different. In such cases, building bridges between theories requires an extremely long and resource-intensive series of research in order to slowly narrow the cleft. Often, however, assigning resources to such efforts does not appear rational, as the chance of success on every step of the way is low. It is exactly in these cases that a series of bold exploratory studies can assist by pointing the way towards possible fruitful avenues of research, while at the same time making an important contribution as a springboard upon which further studies can base their theoretical

approaches. To extend the metaphor somewhat, exploratory research is the rough plank the builder stands on to raise a solid stone bridge, without which the endeavor would be impossible. This dissertation aimed to be the first step in integrating the broad findings of RF theory into a model more focused on basic cognitive processes, the RIM. In so doing, it has prepared the way for future researchers to draw these two disparate approaches closer together.

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Appendix A – Stimulus Prerating

This study aimed to establish a set of stimuli. The goal was to obtain a selection of words that are exclusively associated with either a promotion or a prevention focus and are either positive or negative.

Method

Sample Recruitment and Design. This study was conducted between September 2nd and 10th, 2014. Participants were recruited from the participant pool at the University of Würzburg. Demographic data could not be collected due to a computer error. All participants participated in exchange for monetary payment (7€). The study was conducted as a simple rating design.

Measures and Stimuli. The target stimuli in this survey were 80 emotional words. These words were preselected based on their theoretical fit to either a promotion or a prevention focus and their positive or negative valence. Promotion words included nouns and adjectives related to attaining or missing positive outcomes, joy or dejection emotions, or eagerness. Prevention words included nouns and adjectives related to avoiding or experiencing negative outcomes, quiescence or agitation emotions, or vigilance. Due to time constraints in the experimental session, each

participant rated only 40 randomly selected words from the full set of 80.

Participants were given an in-depth explanation of the terms "promotion focus" and "prevention focus" which explicitly explained that valence and RF were not the same. To illustrate the differences, they were told to imagine they had the prospect of moving to a new living space which was cheaper, better situated, nicer and in all respects better than their current living space. Words that described their behavior, feelings or thoughts in the situation of attaining the new living space or of being informed they would not attain the new living space were promotion-oriented words. Analogously, they were told to imagine being forced to move to a more expensive, worse situated, more unpleasant and generally worse living space or successfully avoiding such a prospect in order to assess whether a word fit a prevention focus.

They were then asked to rate 40 words randomly selected from a total set of 80 with regard to whether they fit a promotion or a prevention focus on a seven-point Likert scale (with the anchors "1 – definitely promotion focus" and "7 – definitely prevention focus"). In addition, participants were asked to rate the valence of each word a seven-point Likert scale from very negative to very positive. Target words were presented in randomized order.

Procedure. The survey took place as part of a roughly one-hour session of unrelated studies. The survey

itself took an average of ten minutes. Participants were seated in cubicles and read the instructions and explanation of RF terms at a computer workstation. They then rated each word from their assigned set on their RF fit and their valence. A reference sheet summarizing the core points of each RF and reiterating the "living space" example described above was available to participants at all times during the survey.

Results

Table A1 shows the rating results for each word on the dimensions of RF and valence. Unexpectedly, ratings of positivity and fit to a promotion focus correlated strongly ($r_{\text{mean ratings}} = .92$, $p < .001$), even though participants had been explicitly instructed that these two dimensions were unrelated. The goal of the pilot study could not be achieved. Participants were apparently unable to separate valence and RF in their ratings. However, this may reflect a closer connection between RF and valence than previously assumed. Therefore, the confound of valence with RF was accepted in the following studies in order to maximize the potential to find possible effects. Due to the exploratory nature of this work, it is reasonable to first increase the chances of discovering an effect before later attempting to deconfound the influences that cause it. The selection criteria for stimuli were average scores at most 2 scale points away from the extreme end of both the target

regulatory focus and the target valence (i.e. prevention/negative or promotion focus/positive).

Table A1

Stimulus ratings

Word	*N*	Valence *M (SD)*	RF *M (SD)*
Abwehr	46	3.89 (1.23)	5.85 (1.32)
angemessen	53	4.89 (1.17)	3.41 (1.47)
ängstlich	49	2.37 (1.17)	5.75 (1.13)
aufgewühlt	49	3.18 (1.11)	4.80 (1.33)
Ausbleiben	44	3.43 (1.07)	5.10 (1.45)
ausgewichen	50	3.86 (1.11)	5.81 (1.46)
aussichtslos	41	1.73 (1.20)	5.60 (1.69)
bedrohlich	43	1.86 (0.99)	6.15 (1.13)
bedrückt	51	2.63 (1.43)	5.55 (1.51)
Begehren	46	5.00 (1.40)	2.02 (1.31)
begeistert	53	6.09 (1.48)	2.07 (1.19)
Bestreben	48	4.96 (1.54)	2.29 (1.35)
eifrig	49	5.49 (1.10)	2.08 (1.06)
Eile	48	3.52 (1.13)	4.12 (1.55)
entgangen	48	3.33 (1.23)	4.81 (1.77)
entmutigt	46	2.17 (1.23)	5.06 (1.88)
entspannt	48	5.94 (1.44)	2.77 (1.81)
enttäuscht	49	2.12 (1.15)	5.07 (1.84)
Erfolg	50	6.44 (1.16)	1.88 (1.39)
erfüllt	48	5.71 (1.68)	2.20 (1.26)
Erhaltung	45	4.84 (1.33)	3.12 (1.50)
erreicht	49	6.12 (1.18)	1.85 (1.14)
fanatisch	48	2.81 (1.67)	3.83 (1.96)
Fehler	47	2.21 (1.30)	5.36 (1.46)
Fehlschlag	42	2.24 (1.12)	4.98 (1.75)
Fehltritt	49	2.33 (1.11)	5.19 (1.65)
Flaute	50	2.80 (1.39)	5.46 (1.36)
freudig	49	6.61 (1.00)	1.50 (0.80)
Frieden	48	6.31 (1.45)	2.38 (1.42)
fröhlich	46	6.87 (0.34)	1.65 (1.01)
Gefahr	48	1.88 (1.10)	6.33 (0.94)
gelassen	46	5.85 (1.09)	2.71 (1.35)
genau	53	4.91 (1.27)	3.46 (1.14)
Gewähr	48	4.25 (1.44)	4.27 (1.41)
Gewinn	49	5.86 (1.72)	1.79 (1.33)
glücklich	46	6.37 (1.36)	2.25 (1.48)
hastig	49	2.92 (1.00)	4.42 (1.54)
hetzend	38	2.47 (1.39)	4.94 (1.69)
Hoffnung	48	6.06 (1.16)	2.63 (1.75)
Irrtum	50	3.02 (1.35)	4.95 (1.35)

Stimulus ratings

Word	*N*	Valence *M (SD)*	RF *M (SD)*
kleinlich	46	2.46 (0.94)	4.81 (1.55)
Leistung	53	5.13 (1.18)	2.96 (1.35)
Misserfolg	49	1.80 (1.29)	5.52 (1.85)
müde	49	3.31 (1.18)	4.73 (1.18)
Nachteil	46	2.43 (1.19)	5.59 (1.23)
nervös	43	3.19 (1.01)	4.96 (1.36)
Niederlage	47	1.98 (1.29)	5.86 (1.43)
Niete	44	1.98 (1.19)	5.71 (1.61)
ordentlich	49	5.37 (1.56)	2.93 (1.44)
richtig	47	5.40 (1.60)	2.70 (1.35)
riskant	45	3.53 (1.18)	4.63 (1.55)
schuldig	49	2.00 (1.35)	5.55 (1.41)
Schutz	46	5.76 (1.16)	4.12 (2.23)
Schwermut	49	2.47 (1.28)	5.29 (1.29)
Sicherheit	51	5.80 (1.52)	2.73 (1.60)
Sieg	52	6.19 (1.27)	1.88 (1.24)
Sorge	45	2.76 (1.43)	5.25 (1.64)
sorgfältig	47	5.30 (1.55)	2.86 (1.52)
spießig	45	2.84 (1.09)	5.10 (1.42)
traurig	45	1.96 (1.28)	5.45 (1.49)
Triumph	52	5.90 (1.51)	2.23 (1.53)
Trübsal	49	2.51 (1.43)	5.32 (1.47)
Unruhe	51	2.49 (1.21)	5.11 (1.32)
Verfehlung	48	2.50 (1.30)	5.09 (1.79)
Vergehen	44	2.25 (1.14)	5.29 (1.60)
Verlangen	45	5.04 (1.09)	2.17 (1.25)
Verlust	46	2.07 (1.47)	5.38 (1.86)
Vermeidung	42	3.33 (1.22)	6.00 (1.56)
Versagen	47	1.87 (1.42)	5.36 (1.94)
Verstoß	42	2.26 (1.33)	5.58 (1.41)
Verzicht	42	3.19 (1.11)	4.73 (1.61)
verzweifelt	47	1.89 (1.29)	5.71 (1.26)
Vorbeugung	44	4.86 (1.34)	5.08 (1.97)
Vorsicht	49	4.37 (1.17)	4.90 (1.54)
Vorteil	48	5.96 (1.41)	1.85 (1.13)
wachsam	44	4.73 (1.35)	3.87 (1.70)
Wachstum	54	5.19 (1.18)	2.80 (1.38)
Wunsch	46	5.65 (1.34)	2.15 (1.63)
Ziel	54	5.39 (1.35)	2.34 (1.47)
zuverlässig	53	5.96 (1.47)	2.39 (1.60)

Note. Ratings of stimuli on valence (1 – very negative; 7 – very positive) and RF (1 – definitely promotion focus; 7 – definitely prevention focus)

Appendix B – Stimuli by Study

Study 1

The promotion/positive words used in Study 1 were BEGEHREN, BEGEISTERT, EFIRIG, ERFOLG, ERFUELLT, ERREICHT, FREUDIG, FROEHLICH, GEWINN, GLUECKLICH, HOFFNUNG, LEISTUNG, RICHTIG, SIEG, TRIUMPH, VERLANGEN, VORTEIL, WACHSTUM, WUNSCH, and ZIEL.

The prevention/negative words used in Study 1 were AENGSTLICH, AUSSICHTSLOS, BEDROHLICH, ENTTAEUSCHT, FEHLER, FEHLTRITT, GEFAHR, MISSERFOLG, NACHTEIL, NIEDERLAGE, SCHULDIG, SORGE, SPIESSIG, UNRUHE, VERFEHLUNG, VERGEHEN, VERLUST, VERSAGEN, VERSTOSS, and VERZWEIFELT.

Example items for the LGRF included “Ich folge meinen Idealen” (I follow my ideals) or “Ich probiere gerne Neues aus” (I like trying new things) for the promotion focus subscale and “Wenn ich meine Ziele nicht erreiche, werde ich nervös” (I get nervous if I don’t achieve my goals) or “Ich bin keine vorsichtige Person” (I am not a careful person, reverse coded) for the prevention focus subscale.

Study 2

The promotion/positive primes used in Study 2 were BEGEISTERT, ERFUELLT, FREUDIG, GEWINN, GLUECKLICH, HOFFNUNG, SIEG, VORTEIL, WACHSTUM, and WUNSCH.

The promotion/positive targets used in Study 2 were BEGEHREN, EIFRIG, ERFOLG, ERREICHT, FROEHLICH, LEISTUNG, RICHTIG, TRIUMPH, VERLANGEN, and ZIEL.

The prevention/negative primes used in Study 2 were FEHLER, GEFAHR, NACHTEIL, NIEDERLAGE, SCHULDIG, SORGE, UNRUHE, SPIESSIG, VERLUST, and VERZWEIFELT.

The prevention/negative targets used in Study 2 were AENGSTLICH, AUSSICHTSLOS, BEDROHLICH, ENTTAEUSCHT, FEHLTRITT, MISSERFOLG, VERFEHLUNG, VERGEHEN, VERSAGEN, and VERSTOSS.

Study 3

The promotion/positive primes used in the BFP in Study 3 were BEGEISTERT, ERFOLG, ERREICHT, GLUECKLICH, HOFFNUNG, LEISTUNG, TRIUMPH, VERLANGEN, WACHSTUM, and ZIEL.

The promotion/positive targets used in the BFP in Study 3 were BEGEHREN, EIFRIG, ERFUELLT,

FREUDIG, FROEHLICH, GEWINN, RICHTIG, SIEG, VORTEIL, and WUNSCH.

The prevention/negative primes used in the BFP in Study 3 were AUSSICHTSLOS, BEDROHLICH, FEHLER, NIEDERLAGE, SCHULDIG, SORGE, VERFEHLUNG, VERLUST, VERSAGEN, and VERSTOSS.

The prevention/negative targets used in the BFP in Study 3 were AENGSTLICH, ENTTAEUSCHT, FEHLTRITT, GEFAHR, MISSERFOLG, NACHTEIL, SPIESSIG, UNRUHE, VERGEHEN and VERZWEIFELT.

All of the primes and targets for the BFP were also used as primes in the AMP.

Studies 4 and 5

Negative primes were BOMBE, KRANKHEIT, BEERDIGUNG, VIRUS, VERBRECHEN, GEFÄNGNIS, KAKERLAKE, MOSKITO, RATTE, and TOD, whereas positive primes were VERGNÜGEN, FREUND, URLAUB, PARTY, GESCHENK, BLUME, GENUSS, SCHOKOLADE, KUCHEN, and SOMMER.

Study 6

Positive and negative primes were the same as in Studies 4 and 5. Neutral primes were FOLGE, VERLAUF, EINWIRKUNG, FUSSKNÖCHEL,

PHASE, HAMMER, HINBLICK, MERKMAL, QUADRAT, and EPOCHE. Nonwords were BASSIM, GILERE, PEGGUT, KOOFOOP, BIPUP, KEEDOCKE, TOEGUDD, GISSAYBIF, BISIRREL, and KEEGULOL.

Study 7

The first set of positive primes was BEGEHREN, ERFOLG, GEWINN, HOFFNUNG, LEISTUNG, SIEG, VORTEIL, WACHSTUM, WUNSCH, and ZIEL. TTThe first set of negative primes was FEHLTRITT, GEFAHR, MISSERFOLG, NACHTEIL, NIEDERLAGE, SORGE, UNRUHE, VERFEHLUNG, VERGEHEN, and VERLUST.

The second set of positive primes was BEGEISTERT, EIFRIG, ERFUELLT, ERREICHT, FREUDIG, FROEHLICH, GLUECKLICH, RICHTIG, TRIUMPH and VERLANGEN. The second set of negative primes was AENGSTLICH, AUSSICHTSLOS, BEDROHLICH, ENTTAUESCHT, FEHLER, SCHULDIG, SPIESSIG, VERSAGEN, VERSTOSS, and VERZWEIFELT.

Appendix C – Multilevel Analysis Tables

Study 1

Results of linear mixed modeling for reaction time, chronic regulatory focus models, Study 1.

Type III tests of effects for chronic promotion focus model			
Parameter	Numerator *df* = 1 Denominator *df*	*F*	*p*
Intercept	595.958	203428.475	<.001
Word Frequency (log, control)	5223.000	360.472	<.001
Prevention Score (control)	131.000	4.259	.041[24]
Promotion Score	131.000	7.264	.008
Word Type	5223.000	8.925	.003
Promotion Score*Word Type	5223.000	.069	.793

Type III tests of effects for chronic prevention focus model			
Parameter	Numerator *df* = 1 Denominator *df*	*F*	*p*
Intercept	595.963	203427.510	<.001
Word Frequency (log, control)	5223.000	360.469	<.001
Promotion Score (control)	131.000	7.264	.008
Prevention Score	131.000	4.259	.041[25]
Word Type	5223.000	8.925	.003
Prevention Score*Word Type	5223.000	.023	.879

Note. Word Type coding: 0 indicates promotion/positive word, 1 indicates prevention/negative word.

[24] This effect becomes marginal (p = .065) if the entire sample is analyzed.

[25] This effect becomes marginal (p = .065) if the entire sample is analyzed.

Results of linear mixed modeling for reaction time, dispositional-situation interaction models, Study 1.

Type III tests of effects for promotion focus interaction model			
Parameter	Numerator *df* = 1 Denominator *df*	*F*	*p*
Intercept	584.183	202878.235	<.001
Word Frequency (log, control)	5221.000	360.409	<.001
Prevention Score (control)	129.000	4.864	.029[26]
Promotion Score	129.000	8.234	.005
Word Type	5221.000	9.214	.002
Regulatory Focus Condition	129.000	2.582	.111
Promotion Score*Word Type	5221.000	.027	.870
Promotion Score*RF Condition	129.000	.423	.517
Word Type*RF Condition	5221.000	.673	.412
Prom Score*Word Type*RF Cond	5221.000	.405	.525

[26] This effect becomes marginal (p = .063) if the entire sample is analyzed.

Type III tests of effects for prevention focus interaction model

Parameter	Numerator *df* = 1 Denominator *df*	*F*	*p*
Intercept	608.520	206759.001	<.001
Word Frequency (log, control)	5221.000	360.433	<.001
Promotion Score (control)	129.000	7.559	.007
Prevention Score	129.000	3.409	.067[27]
Word Type	5221.000	9.146	.003
Regulatory Focus Condition	129.000	2.536	.114
Prevention Score*Word Type	5221.000	.105	.746
Prevention Score*RF Condition	129.000	4.393	.038[28]
Word Type*RF Condition	5221.000	.740	.390
Prev Score*Word Type*RF Cond	5221.000	.748	.387

Note. Word Type coding: 0 indicates promotion/positive word, 1 indicates prevention/negative word. RF Condition coding: 0 indicates promotion focus condition, 1 indicates prevention focus condition.

[27] This effect is no longer significant if the entire sample is analyzed ($p = .106$).
[28] This effect becomes marginal ($p = .068$) if the entire sample is analyzed.

Study 2

Results of linear mixed modeling for reaction time, chronic regulatory focus models, Study 2.

Type III tests of effects for chronic promotion focus model			
Parameter	Numerator *df* = 1 Denominator *df*	*F*	*p*
Intercept	449.736	120365.092	<.001
Word Frequency (log, control)	3854.000	42.063	<.001
Prevention Score (control)	96.000	4.428	.038
Promotion Score	96.000	.104	.747
Prime Type	3854.000	2.844	.092[29]
Word Type	3854.000	9.568	.002
Promotion Score*Prime Type	3854.000	3.636	.057
Promotion Score*Word Type	3854.000	.017	.895
Prime Type*Word Type	3854.000	.876	.349
Promotion Score*Prime Type*Word Type	3854.000	.511	.475

[29] This effect is no longer significant if the entire sample is analyzed (p = .274).

Type III tests of effects for chronic prevention focus model

Parameter	Numerator *df* = 1 Denominator *df*	*F*	*p*
Intercept	449.372	120417.202	<.001
Word Frequency (log, control)	3854.000	42.096	<.001
Promotion Score (control)	96.000	.104	.747
Prevention Score	96.000	4.428	.038
Prime Type	3854.000	2.846	.092[30]
Word Type	3854.000	9.576	.002
Prevention Score*Prime Type	3854.000	.849	.357
Prevention Score*Word Type	3854.000	4.682	.031
Prime Type*Word Type	3854.000	.877	.349
Prevention Score*Prime Type*Word Type	3854.000	1.693	.193

Note. Word Type coding: 0 indicates promotion/positive word, 1 indicates prevention/negative word. Prime Type coding: 0 indicates promotion/positive prime, 1 indicates prevention/negative prime.

[30] This effect is no longer significant if the entire sample is analyzed (p = .271).

Results of linear mixed modeling for reaction time, dispositional-situation interaction models, Study 2.

Type III tests of effects for promotion focus interaction model			
Parameter	Numerator *df* = 1 Denominator *df*	*F*	*p*
Intercept	421.862	117966.346	<.001
Word Frequency (log, control)	3848.000	42.034	<.001
Prevention Score (control)	94.000	3.909	.051
Promotion Score	94.000	.053	.819
Prime Type	3848.000	2.865	.091
Word Type	3848.000	9.847	.002
Regulatory Focus Condition	94.000	.485	.488
Promotion Score*Prime Type	3848.000	3.162	.075
Promotion Score*Word Type	3848.000	.008	.929
Promotion Score*RF Condition	94.000	.011	.915
Prime Type*Word Type	3848.000	.987	.320
Prime Type*RF Condition	3848.000	1.674	.196
Word Type*RF Condition	3848.000	.004	.949
Promotion Score*Prime Type*Word Type	3848.000	.555	.456
Promotion Score*Prime Type*RF Condition	3848.000	.903	.342
Promotion Score*Word Type*RF Condition	3848.000	.503	.478
Prime Type*Word Type*RF Condition	3848.000	.013	.910
Prom Score*Prime Type*Word Type*RF Cond	3848.000	.235	.628

Type III tests of effects for prevention focus interaction model			
Parameter	Numerator *df* = 1 Denominator *df*	*F*	*p*
Intercept	427.771	118832.099	<.001
Word Frequency (log, control)	3848.000	42.098	<.001
Promotion Score (control)	94.000	.064	.800
Prevention Score	94.000	4.732	.032
Prime Type	3848.000	2.526	.112
Word Type	3848.000	9.763	.002
Regulatory Focus Condition	94.000	.433	.512
Prevention Score*Prime Type	3848.000	1.089	.297
Prevention Score*Word Type	3848.000	4.052	.044
Prevention Score*RF Condition	94.000	1.550	.216
Prime Type*Word Type	3848.000	.807	.369
Prime Type*RF Condition	3848.000	1.873	.171
Word Type*RF Condition	3848.000	.030	.863
Prevention Score*Prime Type*Word Type	3848.000	1.695	.193
Prevention Score*Prime Type*RF Condition	3848.000	3.441	.064
Prevention Score*Word Type*RF Condition	3848.000	.567	.451
Prime Type*Word Type*RF Condition	3848.000	.021	.884
Prev Score*Prime Type*Word Type*RF Cond	3848.000	.005	.944

Note. Word Type coding: 0 indicates promotion/positive word, 1 indicates prevention/negative word. Prime Type coding: 0 indicates promotion/positive prime, 1 indicates prevention/negative prime. RF Condition coding: 0 indicates promotion focus condition, 1 indicates prevention focus condition.

Study 3

Results of linear mixed modeling for reaction time, chronic regulatory focus models, BFP task, Study 3.

Type III tests of effects for chronic promotion focus model			
Parameter	Numerator *df* = 1 Denominator *df*	*F*	*p*
Intercept	436.822	110415.587	<.001
Target Word Frequency (log, control)	11172.463	44.468	<.001
Prevention Score (control)	115.855	1.936	.167
Promotion Score	115.883	2.279	.134
Prime Type	11118.182	2.082	.149
Target Type	11130.755	32.482	<.001
Promotion Score*Prime Type	11118.228	.062	.803[31]
Promotion Score*Target Type	11118.227	.029	.864
Prime Type*Target Type	11118.274	19.165	<.001
Promotion Score*Prime Type*Target Type	11118.280	.459	.498

[31] This effect achieves marginal significance (p = .085) if the entire sample is analyzed. Participants respond slower to prevention/negative primed trials with increasing chronic promotion focus.

Type III tests of effects for chronic prevention focus model			
Parameter	Numerator *df* = 1 Denominator *df*	*F*	*p*
Intercept	436.653	110421.991	<.001
Target Word Frequency (log, control)	11172.443	44.473	<.001
Promotion Score (control)	115.883	2.279	.134
Prevention Score	115.855	1.936	.167
Prime Type	11118.182	2.077	.150
Target Type	11130.754	32.431	<.001
Prevention Score*Prime Type	11118.164	.630	.427
Prevention Score*Target Type	11118.257	.193	.660
Prime Type*Target Type	11118.274	19.201	<.001
Prevention Score*Prime Type*Target Type	11118.229	2.780	.095[32]

Note. Word Type coding: 0 indicates promotion/positive target, 1 indicates prevention/negative target. Prime Type coding: 0 indicates promotion/positive prime, 1 indicates prevention/negative prime.

[32] This effect is no longer significant if the entire sample is analyzed (p = .130).

Results of linear mixed modeling for reaction time, dispositional-situation interaction models, BFP task, Study 3.

Type III tests of effects for promotion focus interaction model			
Parameter	Numerator *df* = 1 Denominator *df*	*F*	*p*
Intercept	421.981	109482.749	<.001
Target Word Frequency (log, control)	11165.324	44.333	<.001
Prevention Score (control)	113.855	1.881	.173
Promotion Score	113.877	2.329	.130
Prime Type	11112.173	2.041	.153
Target Type	11124.511	34.319	<.001
Regulatory Focus Condition	113.861	.138	.711
Promotion Score*Prime Type	11112.205	.103	.748
Promotion Score*Target Type	11112.206	.006	.936
Promotion Score*RF Condition	113.875	.247	.620
Prime Type*Target Type	11112.254	18.918	<.001
Prime Type*RF Condition	11112.171	2.291	.130[33]
Target Type*RF Condition	11112.205	.186	.666
Promotion Score*Prime Type*Target Type	11112.263	.421	.516
Promotion Score*Prime Type*RF Condition	11112.182	.061	.806
Promotion Score*Target Type*RF Condition	11112.226	10.562	.001
Prime Type*Target Type*RF Condition	11112.239	.025	.876
Prom Score*Prime Type*Target Type*RF Cond	11112.251	.225	.635

[33] This effect achieves significance (*p* = .020) if the entire sample is analyzed. Participants respond slower to prevention/negative primed trials in the situational prevention focus condition.

Type III tests of effects for prevention focus interaction model			
Parameter	Numerator *df* = 1 Denominator *df*	*F*	*p*
Intercept	423.950	109676.850	<.001
Target Word Frequency (log, control)	11165.104	44.221	<.001
Promotion Score (control)	113.879	2.260	.136
Prevention Score	11112.173	1.955	.165
Prime Type	11124.440	2.090	.148
Target Type	113.854	32.540	<.001
Regulatory Focus Condition	113.863	.136	.713
Prevention Score*Prime Type	11112.153	.615	.433
Prevention Score*Target Type	11112.249	.167	.683
Prevention Score*RF Condition	113.859	.342	.560
Prime Type*Target Type	11112.267	19.143	<.001
Prime Type*RF Condition	11112.176	2.233	.135[34]
Target Type*RF Condition	11112.212	.190	.663
Prevention Score*Prime Type*Target Type	11112.226	2.889	.089
Prevention Score*Prime Type*RF Condition	11112.130	.621	.431
Prevention Score*Target Type*RF Condition	11112.257	1.550	.213
Prime Type*Target Type*RF Condition	11112.249	.049	.825
Prev Score*Prime Type*Target Type*RF Cond	11112.217	1.792	.181

Note. Word Type coding: 0 indicates promotion/positive word, 1 indicates prevention/negative word. Prime Type coding: 0 indicates promotion/positive prime, 1 indicates prevention/negative prime.
RF Condition coding: 0 indicates promotion focus condition, 1 indicates prevention focus condition.

[34] This effect achieves significance if the whole sample is analyzed ($p = .027$).

Results of linear mixed modeling for judgments of positivity, chronic regulatory focus models, AMP task, Study 3.

Type III tests of effects for chronic promotion focus model			
Parameter	Numerator *df* = 1 Denominator *df*	*F*	*p*
Intercept	106.000	2957.750	<.001
Prevention Score (control)	106.000	.011	.916
Promotion Score	106.000	.083	.773
Prime Type	8609.000	14.132	<.001
Promotion Score*Prime Type	8609.000	.683	.409
Type III tests of effects for chronic prevention focus model			
Parameter	Numerator *df* = 1 Denominator *df*	*F*	*p*
Intercept	106.000	2957.750	<.001
Promotion Score (control)	106.000	.083	.773
Prevention Score	106.000	.011	.916
Prime Type	8609.000	14.132	<.001
Prevention Score*Prime Type	8609.000	.305	.581

Note. Prime Type coding: 0 indicates promotion/positive prime, 1 indicates prevention/negative prime. Dependent variable coding: 0 indicates negative judgment, 1 indicates positive judgment.

Results of linear mixed modeling for judgments of positivity, dispositional-situation interaction models, AMP task, Study 3.

Type III tests of effects for promotion focus interaction model			
Parameter	Numerator *df* = 1 Denominator *df*	*F*	*p*
Intercept	104.000	2921.465	<.001
Prevention Score (control)	104.000	.005	.944
Promotion Score	104.000	.060	.807
Prime Type	8607.000	13.531	<.001
Regulatory Focus Condition	104.000	.389	.534
Promotion Score*Prime Type	8607.000	.924	.336
Promotion Score*RF Condition	8607.000	.562	.455
Prime Type*RF Condition	8607.000	9.138	.003[35]
Promotion Score*Prime Type*RF Condition	8607.000	1.534	.216[36]

[35] This effect is reduced to marginal significance if the whole sample is analyzed (p = .081).

[36] This effect achieves significance if the whole sample is analyzed (p = .039). This effect is likely driven by participants for whom the essay priming did not work and will therefore not be further discussed.

Results of linear mixed modeling for judgments of positivity, dispositional-situation interaction models, AMP task, Study 3, continued.

Type III tests of effects for prevention focus interaction model			
Parameter	Numerator *df* = 1 Denominator *df*	*F*	*p*
Intercept	104.000	2910.860	<.001
Promotion Score (control)	104.000	.058	.810
Prevention Score	104.000	.010	.920
Prime Type	8607.000	13.07	<.001
Regulatory Focus Condition	104.000	.385	.536
Prevention Score*Prime Type	8607.000	.210	.647
Prevention Score*RF Condition	8607.000	.048	.827
Prime Type*RF Condition	8607.000	8.872	.003[37]
Prevention Score*Prime Type*RF Condition	8607.000	2.896	.089

Note. Prime Type coding: 0 indicates promotion/positive prime, 1 indicates prevention/negative prime. RF Condition coding: 0 indicates promotion focus condition, 1 indicates prevention focus condition. Dependent variable coding: 0 indicates negative judgment, 1 indicates positive judgment.

[37] This effect is reduced to marginal significance if the whole sample is analyzed (p = .075).

Study 5

Results of linear mixed modeling for judgments of positivity, chronic regulatory focus models, Study 5.

Type III tests of effects for chronic promotion focus model			
Parameter	Numerator *df* = 1 Denominator *df*	*F*	*p*
Intercept	86.687	3026.614	<.001
Prevention Score (control)	88.735	.008	.928
Promotion Score	88.327	.181	.672
Prime Valence	11015.312	1.855	.173
Negation	11010.565	1.017	.313
Promotion Score*Prime Valence	11015.870	.643	.423
Promotion Score*Negation	11012.204	.485	.486
Prime Valence*Negation	11012.837	.275	.600
Promotion Score*Prime Valence*Negation	11008.807	.301	.583

Results of linear mixed modeling for judgments of positivity, chronic regulatory focus models, Study 5, continued.

Type III tests of effects for chronic prevention focus model			
Parameter	Numerator *df* = 1 Denominator *df*	*F*	*p*
Intercept	86.695	3026.628	<.001
Promotion Score (control)	88.328	.179	.673
Prevention Score	88.758	.008	.929
Prime Valence	11015.304	1.823	.177
Negation	11010.562	.998	.318
Prevention Score*Prime Valence	11020.309	2.824	.093
Prevention Score*Negation	11011.519	1.291	.256
Prime Valence*Negation	11012.846	.276	.599
Prevention Score*Prime Valence*Negation	11013.754	5.294	.021

Note. Prime Valence coding: 0 indicates positive prime, 1 indicates negative prime.
Negation coding: 0 indicates affirmed, 1 indicates negated.
Dependent variable coding: 0 indicates negative judgment, 1 indicates positive judgment.

Results of linear mixed modeling for judgments of positivity, dispositional-situation interaction models, Study 5.

Type III tests of effects for promotion focus interaction model			
Parameter	Numerator *df* = 1 Denominator *df*	*F*	*p*
Intercept	84.886	3271.457	<.001
Prevention Score (control)	87.151	.144	.705
Promotion Score	86.892	.748	.389
Prime Valence	11009.958	2.235	.135
Negation	11005.052	1.043	.307
Regulatory Focus Condition	84.950	2.059	.155
Promotion Score*Prime Valence	11009.580	.607	.436
Promotion Score*Negation	11006.693	1.021	.312
Promotion Score*RF Condition	87.174	7.101	.009
Prime Valence*Negation	11008.054	.289	.591
Prime Valence*RF Condition	11010.072	4.411	.036
Negation*RF Condition	11005.081	.719	.396
Promotion Score*Prime Valence*Negation	11003.550	.450	.502
Promotion Score*Prime Valence*RF Condition	11009.840	.137	.711
Promotion Score*Negation*RF Condition	11006.726	3.578	.059
Prime Valence*Negation*RF Condition	11008.104	.246	.620
Prom Score*Prime Valence*Negation*RF Cond	11003.572	.467	.494

Results of linear mixed modeling for judgments of positivity, dispositional-situation interaction models, Study 5, continued.

Type III tests of effects for prevention focus interaction model			
Parameter	Numerator *df* = 1 Denominator *df*	*F*	*p*
Intercept	85.227	3106.611	<.001
Promotion Score (control)	86.874	.073	.788
Prevention Score	87.114	.009	.925
Prime Valence	11009.948	2.183	.140
Negation	11005.118	.703	.402
Regulatory Focus Condition	85.331	2.112	.150
Prevention Score*Prime Valence	11015.308	3.212	.073
Prevention Score*Negation	11006.216	1.173	.279
Prevention Score*RF Condition	87.381	2.264	.136
Prime Valence*Negation	11007.821	.274	.601
Prime Valence*RF Condition	11009.715	4.827	.028
Negation*RF Condition	11005.070	.880	.348
Prevention Score*Prime Valence*Negation	11007.980	5.638	.018
Prevention Score*Prime Valence*RF Condition	11015.637	.213	.644
Prevention Score*Negation*RF Condition	11006.271	6.159	.013
Prime Valence*Negation*RF Condition	11007.807	.401	.527
Prev Score*Prime Valence*Negation*RF Cond	11008.048	1.478	.224

Note. Prime Valence coding: 0 indicates positive prime, 1 indicates negative prime.
Negation coding: 0 indicates affirmed, 1 indicates negated.
RF Condition coding: 0 indicates promotion focus condition, 1 indicates prevention focus condition.
Dependent variable coding: 0 indicates negative judgment, 1 indicates positive judgment.

Study 6

Results of linear mixed modeling for judgments of positivity, chronic regulatory focus models, neutral-nonword comparison, Study 6.

Type III tests of effects for chronic promotion focus model			
Parameter	Numerator *df* = 1 Denominator *df*	*F*	*p*
Intercept	117.712	2457.216	<.001
Prevention Score (control)	116.824	.337	.563
Promotion Score	117.782	.089	.766
Word Type	15828.780	2.218	.136
Negation	15828.263	.945	.331
Promotion Score*Word Type	15827.827	2.158	.142
Promotion Score*Negation	15826.776	.111	.739
Word Type*Negation	15827.393	4.121	.042
Promotion Score*Word Type*Negation	15826.221	.143	.705

Results of linear mixed modeling for judgments of positivity, chronic regulatory focus models, neutral-nonword comparison, Study 6, continued.

Type III tests of effects for chronic prevention focus model			
Parameter	Numerator *df* = 1 Denominator *df*	*F*	*p*
Intercept	117.718	2458.646	<.001
Promotion Score (control)	117.788	.088	.768
Prevention Score	116.833	.337	.562
Word Type	15828.790	2.205	.138
Negation	15828.274	.939	.333
Prevention Score*Word Type	15827.273	.396	.529
Prevention Score*Negation	15826.836	.727	.394
Word Type*Negation	15827.406	4.117	.042
Prevention Score*Word Type*Negation	15826.425	.136	.713

Note. Word Type coding: 0 indicates nonword, 1 indicates neutral prime.
Negation coding: 0 indicates affirmed, 1 indicates negated.
Dependent variable coding: 0 indicates negative judgment, 1 indicates positive judgment.

Results of linear mixed modeling for judgments of positivity, dispositional-situation interaction models, neutral-nonword comparison, Study 6.

Type III tests of effects for promotion focus interaction model			
Parameter	Numerator *df* = 1 Denominator *df*	*F*	*p*
Intercept	115.774	2552.400	<.001
Prevention Score (control)	114.759	.261	.610
Promotion Score	115.163	.034	.853
Word Type	15823.180	2.105	.147
Negation	15822.547	1.089	.297
Regulatory Focus Condition	115.789	.806	.371
Promotion Score*Word Type	15822.090	1.642	.200
Promotion Score*Negation	15820.613	.289	.591
Promotion Score*RF Condition	114.892	6.736	.011
Word Type*Negation	15821.606	4.332	.037
Word Type*RF Condition	15823.195	.198	.656
Negation*RF Condition	15822.561	.017	.897
Promotion Score*Word Type*Negation	15820.174	.185	.667
Promotion Score*Word Type*RF Condition	15822.067	1.310	.252
Promotion Score*Negation*RF Condition	15820.607	2.494	.114
Word Type*Negation*RF Condition	15821.633	1.010	.315
Prom Score*Word Type*Negation*RF Cond	15820.185	.022	.881

Results of linear mixed modeling for judgments of positivity, dispositional-situation interaction models, neutral-nonword comparison, Study 6, continued.

Type III tests of effects for prevention focus interaction model			
Parameter	Numerator *df* = 1 Denominator *df*	*F*	*p*
Intercept	115.697	2511.233	<.001
Promotion Score (control)	115.612	.087	.769
Prevention Score	114.588	.435	.511
Word Type	15822.891	2.484	.115
Negation	15822.498	.974	.324
Regulatory Focus Condition	115.674	.779	.379
Prevention Score*Word Type	15821.175	.303	.582
Prevention Score*Negation	15820.974	.692	.405
Prevention Score*RF Condition	114.325	4.001	.048
Word Type*Negation	15821.365	4.406	.036
Word Type*RF Condition	15823.005	.244	.621
Negation*RF Condition	15822.500	.016	.901
Prevention Score*Word Type*Negation	15820.440	.103	.748
Prevention Score*Word Type*RF Condition	15821.175	4.232	.040
Prevention Score*Negation*RF Condition	15820.975	.339	.561
Word Type*Negation*RF Condition	15821.340	.951	.329
Prev Score*Word Type*Negation*RF Cond	15820.456	.435	.509

Note. Word Type coding: 0 indicates nonword, 1 indicates neutral prime.
Negation coding: 0 indicates affirmed, 1 indicates negated.
RF Condition coding: 0 indicates promotion focus condition, 1 indicates prevention focus condition.
Dependent variable coding: 0 indicates negative judgment, 1 indicates positive judgment.

Study 7

Results of linear mixed modeling for judgments of positivity, chronic regulatory focus models, Study 7.

Type III tests of effects for chronic promotion focus model			
Parameter	Numerator *df* = 1 Denominator *df*	*F*	*p*
Intercept	70.180	2280.282	<.001
Prevention Score (control)	71.081	.447	.506
Promotion Score	70.190	1.681	.199
Prime Valence	11351.787	18.640	<.001
Negation	11351.424	.335	.563
Promotion Score*Prime Valence	11351.501	3.561	.059
Promotion Score*Negation	11351.425	2.043	.153
Prime Valence*Negation	11351.561	6.516	.011
Promotion Score*Prime Valence*Negation	11351.674	1.692	.193

Results of linear mixed modeling for judgments of positivity, chronic regulatory focus models, Study 7, continued.

Type III tests of effects for chronic prevention focus model			
Parameter	Numerator *df* = 1 Denominator *df*	*F*	*p*
Intercept	70.176	2279.211	<.001
Promotion Score (control)	70.186	1.679	.199
Prevention Score	71.077	.449	.505
Prime Valence	11351.783	18.665	<.001
Negation	11351.421	.330	.565
Prevention Score*Prime Valence	11352.501	.003	.955
Prevention Score*Negation	11351.496	1.896	.169[38]
Prime Valence*Negation	11351.558	6.522	.011
Prevention Score*Prime Valence*Negation	11352.187	4.357	.037

Note. Prime Valence coding: 0 indicates positive prime, 1 indicates negative prime.
Negation coding: 0 indicates affirmed, 1 indicates negated.
Dependent variable coding: 0 indicates negative judgment, 1 indicates positive judgment.

[38] If the entire sample is analyzed, this effect achieves marginal significance (*p* = .085), such that negated primes are responded to less positively with increasing chronic prevention focus.

Results of linear mixed modeling for judgments of positivity, dispositional-situation interaction models, Study 7.

Type III tests of effects for promotion focus interaction model			
Parameter	Numerator *df* = 1 Denominator *df*	*F*	*p*
Intercept	68.173	2279.245	<.001
Prevention Score (control)	68.987	.148	.702
Promotion Score	68.203	1.749	.190
Prime Valence	11345.779	18.564	<.001
Negation	11345.423	.334	.563
Regulatory Focus Condition	68.171	.392	.533
Promotion Score*Prime Valence	11345.477	3.690	.055[39]
Promotion Score*Negation	11345.420	2.068	.150
Promotion Score*RF Condition	67.910	1.677	.200[40]
Prime Valence*Negation	11345.553	6.510	.011
Prime Valence*RF Condition	11345.771	.247	.619
Negation*RF Condition	11345.420	.005	.946
Promotion Score*Prime Valence*Negation	11345.683	1.602	.206
Promotion Score*Prime Valence*RF Condition	11345.480	.969	.325
Promotion Score*Negation*RF Condition	11345.412	.064	.801
Prime Valence*Negation*RF Condition	11345.555	.959	.327
Prom Score*Prime Valence*Negation*RF Cond	11345.697	1.244	.265

[39] This effect is no longer significant if the entire sample is analyzed (p = .116).

[40] If the entire sample is analyzed, this effect achieves marginal significance (p = .069), such that chronic promotion focus increases positivity when it fits situational regulatory focus, but decreases it when not.

Results of linear mixed modeling for judgments of positivity, dispositional-situation interaction models, Study 7, continued.

Type III tests of effects for prevention focus interaction model			
Parameter	Numerator *df* = 1 Denominator *df*	*F*	*p*
Intercept	68.062	2190.927	<.001
Promotion Score (control)	68.076	1.463	.231
Prevention Score	68.909	.295	.589
Prime Valence	11345.597	19.206	<.001
Negation	11345.330	.472	.492
Regulatory Focus Condition	68.082	.342	.561
Prevention Score*Prime Valence	11346.144	.005	.945
Prevention Score*Negation	11345.385	1.661	.198[41]
Prevention Score*RF Condition	68.616	.371	.544
Prime Valence*Negation	11345.587	5.381	.020
Prime Valence*RF Condition	11345.597	.220	.639
Negation*RF Condition	11345.334	.008	.931
Prevention Score*Prime Valence*Negation	11346.268	4.516	.034
Prevention Score*Prime Valence*RF Condition	11346.145	.605	.437
Prevention Score*Negation*RF Condition	11345.370	.758	.384
Prime Valence*Negation*RF Condition	11345.583	.473	.492
Prev Score*Prime Valence*Negation*RF Cond	11346.246	2.626	.105

Note. Prime Valence coding: 0 indicates positive prime, 1 indicates negative prime.
Negation coding: 0 indicates affirmed, 1 indicates negated.
RF Condition coding: 0 indicates promotion focus condition, 1 indicates prevention focus condition.
Dependent variable coding: 0 indicates negative judgment, 1 indicates positive judgment.

[41] If the entire sample is analyzed, this effect achieves marginal significance (p = .089). It is analogous to the effect in the chronic RF model.

Deutsche Zusammenfassung

Die Theorie des regulatorischen Fokus (RF; Higgins, 1997) ist eine einflussreiche Motivationstheorie, die im Wesentlichen vorhersagt, dass Menschen bei der Zielverfolgung unterschiedliche strategische Haltungen einnehmen können: die eines Annäherungsfokus, bei dem sie sich auf die An- und Abwesenheit von positiven Endzuständen ausrichten, oder die eines Vermeidungsfokus, bei dem sie sich auf die An- und Abwesenheit von negativen Endzuständen ausrichten. Die bisherige Forschung zum RF konnte sowohl in angewandter Forschung (z.B. in der Personalpsychologie oder der Konsumforschung) wie auch in grundlagenorientierteren Arbeiten (z.B. solcher zu Kreativität oder Erinnerungsvermögen) eine große Bandbreite an Effekten produzieren. Vor allem der Anspruch der RF-Theorie, ein chronischer RF würde sich bereits früh in der Entwicklung niederschlagen, lässt vermuten, dass auch andere grundlegende Informationsverarbeitungsprozesse sich davon beeinflussen lassen, die möglicherweise die bisher gefundenen Effekte genauer erklären können. Es ist jedoch bisher eine genauere Betrachtung der beim RF beteiligten Prozesse der Informationsverarbeitung ausgeblieben. Eine solche Untersuchung wäre notwendigerweise explorativ, da die sozial-kognitiven

und motivationalen Forschungstraditionen durchaus deutliche Unterschiede in ihrer Herangehensweise aufweisen, allerdings stellen solche explorative Arbeiten eine bedeutende Chance dar, bestehende Erkenntnisse zu integrieren und damit Brücken zwischen den Subdisziplinen zu schlagen.

Ziel dieser Arbeit ist daher, unter Anwendung des integrativen reflektiv[42]-impulsiven Modells (RIM) von Strack und Deutsch (2004) den direkten Einfluss des regulatorischen Fokus auf die beiden in jenem Modell postulierten Prozesse zu untersuchen. Das RIM sieht zwei grundlegende Prozesse der Informationsverarbeitung vor: eine schnelle, assoziative und automatische Verarbeitung im impulsiven System und eine langsamere, propositionale Verarbeitung im reflektiven System, bei der bloße Assoziationen zwischen Konzepten mit zusätzlicher Bedeutung versehen werden können (z.B. einem Wahrheitswert). Zu diesem Zweck wurden Studien durchgeführt, die impulsive und reflektive Operationen unter dem Einfluss von unterschiedlichen RF verglichen.

Zu ersteren Studien gehörten ein Experiment, das eine erhöhte Zugänglichkeit von RF-relevanten Begriffen im entsprechenden RF-Zustand prüfte (Studie 1), ein

[42] Der Begriff „reflective“ wird hier mit „reflektiv“ übersetzt, um eine Verwechslung mit dem englischen „reflexive“ zu vermeiden. Letzterer wird von verwandten psychologischem Modellen mit unterschiedlicher Bedeutung zu der aktuellen Verwendung benutzt, weswegen eine Abgrenzung nötig erscheint.

Experiment, das Veränderungen in semantischen assoziativen Strukturen abhängig vom RF beleuchtete (Studie 2) und eines, welches analog zur vorhergenannten affektive assoziative Strukturen untersuchte (Studie 3). Es konnte keine erhöhte Zugänglichkeit von spezifischen Konzepten im Sinne der ersten Studie festgestellt werden. Die zweite und dritte Studie lieferten zwar keine eindeutigen Ergebnisse, sie weisen jedoch darauf hin, dass RF (insbesondere chronischer RF) möglicherweise auf grundlegender Ebene die Salienz von passender Valenz erhöht. Das heißt, dass Menschen im Vermeidungsfokus negative Valenz als salienter erleben könnten, während Menschen im Annäherungsfokus stattdessen positive Valenz als salienter erleben. Die verwendeten Paradigmen in den Studien lassen darauf schließen, dass diese Salienzverschiebung schon bei der grundlegenden Verarbeitung von emotionalen Wörtern stattfindet und damit einen automatischen Prozess darstellt, der mögliche Erklärungen für andere bisher gefunden Effekte von RF bietet. Darüber hinaus lieferte Studie 3 Hinweise, dass ein situationaler Vermeidungsfokus möglicherweise den Einfluss von irrelevanten Bahnungsreizen bei darauffolgenden affektiven Urteilen mindert, wenn diese auf eine Fehlattribution des durch den Bahnungsreiz ausgelösten Affekts beruhen. Diese Erkenntnis könnte für die Forschung zur Einstellungsmessung und -änderung bedeutsam sein, insbesondere hinsichtlich des Effekts von eigentlich irrelevanten Informationen bei Einstellungen.

In den Folgestudien (4-7) ist untersucht worden, ob RF einen Einfluss auf grundlegende reflektive Operationen zeigt. Dies geschah am Beispiel von Negationen, einer reflektiven Operation, bei der die Assoziationen mit einem Konzept unterdrückt und dafür die Assoziationen mit seinem Nichtvorhandensein aktiviert werden müssen. Obgleich die Ergebnisse der einzelnen Studien etwas variierten, zeigte eine anschließende Meta-Analyse, dass der Vermeidungsfokus insgesamt Negationen förderte. Hierbei spielte der chronische Vermeidungsfokus die wichtigere Rolle, wobei der situational induzierte Vermeidungsfokus die Effekte des chronischen verstärkte. Studie 6 konnte darüber hinaus noch Belege liefern, dass diese Effekte nicht rein auf eine Erleichterung der Verarbeitung von Negationsreizen (wie NICHT oder KEIN) beruhen, sondern vielmehr eher eine verstärkte Gewichtung des Ergebnisses der Negationsoperation darstellen. Studie 7 zeigte außerdem, dass diese Effekte auch dann auftreten, wenn ProbandInnen Zeit haben, diese Verstärkung zu korrigieren, was darauf schließen lässt, dass diese verstärkte Gewichtung wenig intentional sein dürfte.

In der Summe weisen diese Ergebnisse darauf hin, dass der RF (insbesondere der chronische RF) durchaus auch auf der Ebene der grundlegenden Informationsverarbeitung eine Rolle spielt und nicht etwa eine rein strategische Ausrichtung ist, deren Auswirkungen nur bei intentionalen Entscheidungen und

erlebter Motivation eine Rolle spielt. Die im Einzelnen vorgeschlagenen Erklärungen für die Befunde bedürfen noch einer eigenen Überprüfung, jedoch bietet diese Arbeit die Grundlage und eine Blaupause für weitere Forschungsarbeiten mit diesem Ziel. Viele der gefundenen Ergebnismuster lassen sich z.B. damit erklären, dass der RF die Verarbeitung von Reizen mit passender Valenz erleichtert bzw. ein größeres Gefühl der Bekanntheit nach jener Verarbeitung auslöst. Eine solche Möglichkeit lässt sich in zukünftigen Arbeiten testen, sowohl durch direkte Replikation der vorliegenden Forschung wie auch durch konzeptuell eigens dafür eingerichtete Paradigmen, die präzisere Aussagen zulassen. Darüber hinaus sind die Implikationen der gefundenen Effekte, wenn sie stabil sein sollten, mannigfaltig, insbesondere für die Erklärung von schon beobachteten Phänomenen, die mit RF zusammenhängen.