

# Pushed by Symptoms, Pulled by Values: Promotion Goals Increase Motivation in Therapeutic Tasks

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While many therapies focus on the reduction of disturbing symptoms, others pursue behavior consistent with personally held values. Based on regulatory focus theory (Higgins, 1997), reducing symptoms is a type of *prevention goal* while pursuing values is a *promotion goal*. In the current study, 123 undergraduate students elicited a negative, self-focused emotion-laden cognition. They were then randomly assigned to construe their negative thought as either (a) an impediment to valued behaviors, (b) a cause of unpleasant symptoms, or to one of two control conditions: (c) distraction or (d) no intervention. Then, participants in all groups completed a series of repetitive therapeutic tasks that targeted their elicited negative cognitions. Results showed that participants who construed treatment in terms of valued behavior promotion spent more time on a therapeutic task than all other groups. The group in the unpleasant symptom promotion condition did not differ from either control group. The motivational advantage of value promotion was not accounted for by differences in mood. The present findings suggest that clients may be better motivated through value promotion goals, as opposed to symptom prevention goals.

*Keywords:* regulatory focus theory; cognitive behavior therapy; acceptance and commitment therapy; values; motivation in treatment

“Man is pushed by drives. But he is pulled by values.”

—Viktor Frankl (1969, p. 57)

Psychotherapies differ from each other in their therapeutic goals, but many aim for the reduction of suffering, typically by the prediction and control of psychological symptoms (Arch & Craske, 2008; Wampold, 2001). However, despite its prominent position in psychotherapy, the reduction of suffering derived from symptoms is not necessarily the most effective motivator of client behavior.

Higgins's (1997) regulatory focus theory suggests that a prevention goal (e.g., reducing the harm of symptoms) might be effective in certain contexts, but it is not the only one available. Self-regulation may be focused on goals oriented around avoiding negative experiences, or alternatively, around approaching positive ones. Thus, in therapy, clients may also benefit from promotion goals (e.g., pursuing one's chosen values; Wilson & Murrell, 2004). Prevention and promotion work along parallel regulatory systems (Higgins, 2000; Spiegel, Grant-Pillow, & Higgins, 2004), and may initiate two different patterns of client behavior. The aim of the current analogue study was to examine how setting treatment goals in terms of prevention

This research was supported by Israeli Science Foundation Grant 961/10 to Iftah Yovel.

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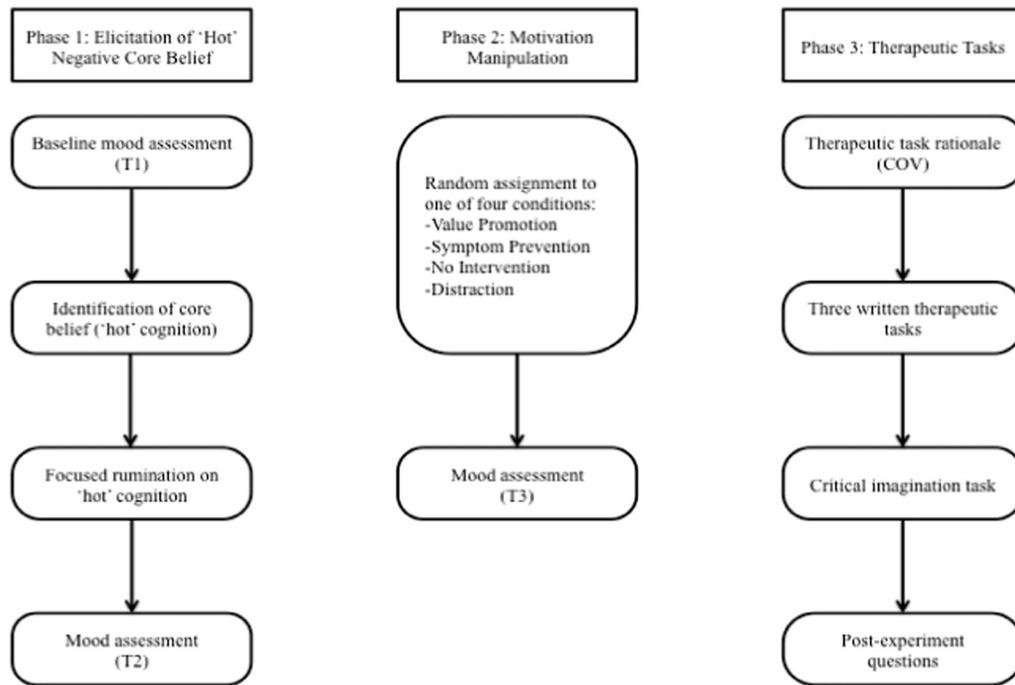


FIGURE 1 Schematic representation of experiment.

versus promotion goals would impact engagement in therapeutic interventions.

Regulatory focus theory (Higgins, 1997) suggests that motivation influences the orientation of cognitive, social, and emotional self-regulation. The *promotional goal* of increasing access to a desired end-state encourages an *approach orientation* of regulation, and is linked to proactive behaviors, such as taking a risk to ensure maximizing the amount of rewards received (Crowe & Higgins, 1997; Friedman & Förster, 2001). The *prevention goal* of decreasing exposure to an undesired end-state, on the other hand, encourages an *avoidance orientation* of regulation. Behavior becomes more reticent, with potential mistakes being evaluated as having a worse cost (Higgins, 2006). The two regulatory foci are effective for two distinct definitions of success. In an approach orientation, success is defined as receiving rewards, and incurred punishments are secondary costs. In an avoidance orientation, on the other hand, success is avoiding punishment, and potential rewards can be sacrificed as necessary.

Approach and avoidance orientations can be activated by an immediate incentive such as trying to either list the benefits of eating healthily or the costs of eating unhealthily (Spiegel et al., 2004). Alternatively, longer-term motivators such as personal values also play a role in regulatory orientation (Janoff-Bulman & Carnes, 2013). Due to their subjective importance and broad application, values can serve as powerful and effective motiva-

tors (Brekke, Kverndokk, & Nyborg, 2003). Values work, for example, has been found to be particularly effective in motivating persistence in pain tasks (Páez-Blarrina et al., 2008), even beyond the effect of commonly associated emotion regulation strategies (Branstetter-Rost, Cushing, & Douleh, 2009).

Although values may be applied in both approach and avoidance orientations, they have been primarily incorporated as ways to encourage more approach-oriented work, in therapeutic contexts (Wilson & Murrell, 2004). This is in opposition to most types of cognitive and behavioral approaches that have adopted the medical model for psychotherapy. These treatments typically define psychopathology in terms of categorized symptomatology, and therapy in terms of its ability to relieve those symptoms (Wampold, 2001). As such, cognitive behavioral therapies do integrate promotion goals into therapy, such as becoming more independent or improving social functioning (Heimberg & Magee, 2014). They often, however, focus on reducing negative affect in such situations, itself a prevention goal.

Normative functioning, however, extends beyond prevention goals, and contrary to conventional wisdom, negative affect is not always maladaptive (Bonanno, 2004). Victor Frankl (1969), for example, argued against the psychoanalytic standard of his time, stating that psychotherapy should aim higher than the mere reduction of psychosexual drives. In response, his logotherapy (1969) built upon the therapeutic potential of valued living. The beneficial

effects of client-selected value promotion have also been utilized in other therapies, such as Dialectical Behavior Therapy (Linehan, 1993), and in the motivational interviewing technique (W. R. Miller & Rose, 2009).

Acceptance and Commitment Therapy (ACT; Hayes, Strosahl, & Wilson, 2012) in particular was developed as a departure from the medical model and from its avoidance-focused orientation. ACT instead aims to help clients to frame their behavior around the promotion of their *personal values*, which are defined as deliberately constructed and organizing motivators (Wilson & Murrell, 2004). It is assumed in ACT that values function as continuous positive reinforcers for necessary therapeutic interventions, particularly when the short-term consequences are unpleasant, as is often the case in treatment (Wilson & Murrell, 2004).

The present study aimed to examine the role of regulatory focus in individuals' engagement in therapeutic tasks geared towards coping with negative thoughts. The experimental sequence consisted of three phases (see Figure 1 for a schematic summary of the experimental sequence). In Phase 1, participants identified and reexperienced a negative self-related negative cognition. In Phase 2, they received a motivation manipulation, framing different reasons to lessen the impact of the elicited "hot" cognition (four conditions). In Phase 3, participants completed repetitive therapeutic tasks with low face validity aimed at alleviating the emotional effects of these negative cognitions.

We expected that participants who framed their "hot" cognition in terms of approach-oriented value promotion would be more engaged in the therapeutic tasks, and therefore spend more time on them, than those who framed the cognition in terms of avoidance-oriented, symptom prevention. In addition, because the effects of regulatory focus have been observed to be independent of mood (Higgins, Idson, Freitas, Spiegel, & Molden, 2003), we expected that the likely short-term improvement in negative affect brought about by distraction (Nolen-Hoeksema, Wisco, & Lyubomirsky, 2008) would not improve task engagement.

## Method

### PARTICIPANTS

One hundred and twenty-three undergraduate students (87 females) at the Hebrew University of Jerusalem, all Caucasians between the ages of 18 and 34 ( $M = 23.25$ ,  $SD = 2.46$ ), were recruited through the Department of Psychology's participant matching website, as well as through printed fliers hanging around the university campus. Three participants (2.4%) were excluded due to an

unexpected decrease in negative affect between baseline mood (Time 1) and mood at the end of Phase 1 (Time 2), of more than 0.5  $SD$  of mood change across the whole sample (9.50 mm). This absence of adequate negative mood change indicated that participants did not generate an emotion-laden negative core belief necessary for the remainder of the experiment (see below). Analyses were based on the remaining 120 participants. The study was approved by the departmental Ethics Committee. All participants signed a consent form, and were either paid \$7 or received course credit for their participation.

## Materials

### Current Mood

Participants' negative affect was assessed using a self-report, visual analogue scale (VAS), a 12-item questionnaire derived from the Positive Affect-Negative Affect Scale (PANAS; Watson, Clark, & Tellegen, 1988). The items comprised eight negative affect adjectives (e.g., scared) and four reverse-coded positive affect adjectives (e.g., calm). Higher scores reflected greater negative mood. In the current study, this instrument showed high levels of internal consistency at all three assessment times (alphas ranged between 0.91–0.94).

### Manipulation Check Questions

To assess the subjective importance and relevance of the elicited basic negative cognition (see below), participants were asked to use 1–4 Likert scales to rate how central the cognition was to their self-image (*not at all central* to *very central*), and how often events trigger the elicited cognition (*almost none at all* to *almost every event*).

## PROCEDURE

The experiment contained three phases (see Figure 1): (1) eliciting a "hot" negative cognition, (2) manipulating motivation for treating this cognition, and (3) treating the cognition through a series of short therapeutic tasks. Time spent on one of these tasks served as the primary dependent variable.

### Phase 1: Elicitation of "Hot" Negative Core Belief

After completing a baseline VAS assessment of negative mood (T1), participants completed a paper-and-pencil workbook intended to help them arouse and identify a negative core belief they held about themselves (cf. Yovel, Mor, & Shkarov, 2014; see Supplemental Materials). To encourage candor, participants were guaranteed that all content written in the booklet would be shredded upon completion of the experiment. Participants were first instructed to describe in writing an unpleasant, nontraumatic event they had experienced that still triggers unpleasant

thoughts and feelings about themselves. Next, participants specified a negative thought that arose from the event. Participants were then instructed to think of a brief, basic, general thought that may be at the base of the specified thought they wrote (e.g., Adam thought: “*I’m not good enough*”).

After eliciting a negative self-focused cognition, participants completed a *focused rumination* task. This task is an adaptation of Nolen-Hoeksema and Morrow’s (1993) rumination induction procedure (Yovel et al., 2014; see Supplemental Materials). Participants were asked to think about the brief core belief they had generated. They then followed a set of 12 prompts each displayed individually on a computer screen for 25 seconds at a time. Each prompt directed them to focus on various aspects of the negative event and negative cognition in a self-immersed manner (Kross & Ayduk, 2008; e.g., “*Think: Did you handle the event in the best possible way*”). Upon completion of the focused rumination task, participants would have reexperienced their negative cognition in a live, “hot” manner. This “hot” cognition served as the focus of the motivational manipulation at Phase 2 and the target of therapeutic tasks at Phase 3. To examine effects of Phase 1 tasks on negative mood, participants completed a second VAS mood assessment (T2).

#### *Phase 2: Motivation Manipulation*

After eliciting a “hot” cognition, participants were randomly allocated to one of four groups: two experimental and two control conditions (see Supplemental Materials for full text of these manipulations). The two experimental conditions followed a similar structure of first selecting a relevant valued behavior or negative symptom, and then stating how mitigating the effects of the “hot” cognition would either help promote the valued behavior or prevent the symptom, respectively. One control condition followed a similar structure and was of similar length, but it did not focus on the negative cognition, and the other control group did not complete any Phase 2 procedure. Random allocation was accomplished by generating a list of the four conditions, randomly ordered, and appearing an equal number of times. Participants were assigned based on the next available condition on the list.

**Value Promotion (VP;  $n = 31$ ).** In this condition, coping with the “hot” cognition was presented as a step towards achieving personally meaningful areas in life (Hayes et al., 2012). Participants ranked the personal significance of 10 different value domains (e.g., intimate relations, health,

spirituality) taken from the Valued Living Questionnaire (Wilson, Sandoz, Kitchens, & Roberts, 2010). Participants then selected the one that was most significant for them. They then listed instances in which the negative self-focused belief they held prevented them from fulfilling their values to the best of their ability. Finally, they filled in four conditional sentences wherein they imagined how the mitigation of their negative thought could allow them to have a more value-driven life (e.g., “*If the thought [insert thought] weren’t such a problem for me, I would [complete using something important in your life your thought prevents you from accomplishing]*”).

**Symptom Prevention (SP;  $n = 29$ ).** In this condition, participants focused on reducing the negative emotions triggered by the negative core belief, and coping with the “hot” cognition was presented as a step towards reducing personal suffering. After ranking the personal relevance of 10 different types of negative emotions (e.g., nervous, irritable, hostile), participants selected emotions they ranked most negatively. They then listed instances in which their negative self-focused belief led to their experiencing the selected negative emotions. Finally, they filled in four sentences that explicitly related the mitigation of the negative thought with the reduction of negative emotions (e.g., “*If the thought [insert thought] weren’t such a problem for me, I would feel less [complete using negative emotion]*”).

**Distraction Control (DC;  $n = 30$ ).** Participants in this group followed a protocol of similar structure to the above experimental manipulations that was nevertheless unrelated to their core belief. First, participants rated a list of 10 different colors based on their personal preference. They then listed instances in which they came in contact with their favorite colors. Finally, they filled in three conditional sentences relating to the colors (e.g., “*If I knew how to paint well, I’d paint my bedroom [complete with color]*”).

**No Intervention (NI;  $n = 30$ ).** To control for the potential effects the manipulations had on mood, participants in this control condition started completing Phase 3 tasks immediately following Phase 1 procedures.

To assess the effects Phase 2 manipulations had on mood, participants in all groups (except the NI condition) completed a VAS mood assessment immediately following the experimental manipulations (T3).

**Phase 3: Therapeutic Tasks.** These tasks were identical across conditions. They were drawn from

Table 1  
Means and Standard Deviations of Negative Affect Between Groups

	Value Promotion ( <i>n</i> = 31)		Symptom Prevention ( <i>n</i> = 29)		Distraction Control ( <i>n</i> = 30)		No Intervention ( <i>n</i> = 30)		Total ( <i>n</i> = 120)	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
T1	26.19	14.60	27.30	14.64	24.26	15.81	25.26	13.99	25.74	14.63
T2	48.52	17.90	46.41	14.92	43.11	20.86	47.30	21.43	46.33	18.86
T3	43.10	21.14	43.38	18.00	25.31	12.71	---	---	37.19	19.40

actual therapeutic exercises constructed to help individuals gain distance from disturbing negative cognitions (Hayes & Smith, 2005). In order to create an analogue procedure that would enable the assessment of participants' engagement in therapy, we chose to use repetitive interventions that, based on earlier studies, are known to have low face validity (Forman et al., 2012; Yovel et al., 2014). These tasks were specifically selected for their low face validity in order to avoid ceiling effects and reduce subject-expectancy bias, while still maintaining ecological validity, as such tasks are commonly used in actual therapy. Instructions were displayed on a computer screen as participants performed the tasks.

First, participants read a short statement that briefly explained the rationale for the exercises, describing the ways in which the tasks would be able to mitigate the extent to which the "hot" cognition impacts their experience. Each task was then preceded by instructions for the task itself, but with no further rationale. Time spent on reading this rationale was measured, and it served as a covariate in the primary analysis to control for general reading speed. The first three tasks were paper-and-pencil tasks. Participants wrote their thought several times, and in each time the thought was preceded by the introductory clause, "It crossed my mind that...". They then wrote their thought multiple times with their nondominant hand and then again using capital letters.

The fourth and critical task was an imagination-based task. Participants read the following instructions: "Imagine your thought written in big bold letters on your shirt. Imagine yourself walking around wearing this shirt on a normal day. Close your eyes, and when you are finished, press the spacebar to continue." The amount of time participants spent on this task was measured by the computer. As task persistence reflects motivation levels (Förster, Grant, Idson, & Higgins, 2001; Förster, Higgins, & Idson, 1998), time spent on this task was used as the primary dependent variable for measuring participant engagement. Finally, participants answered manipulation-check questions, and were thanked and debriefed.

## Results

Table 1 presents descriptive statistics of the VAS negative mood ratings. In order to examine the effectiveness of the "hot" cognition procedure, a  $4 \times 2$  mixed-design analysis of variance (ANOVA) was conducted, with motivation condition (VP, SP, DC, NI) as the between-group factor, time (Time 1, Time 2) as the within-subject factor, and self-rated negative mood as the dependent variable. As expected, a main effect of time revealed a substantial increase in negative mood between Time 1 and Time 2,  $F(1, 116) = 195.02, p < .001, \eta_p^2 = .63$ . The main effect of Group,  $F(3, 116) = 1.06, p = .91, \eta_p^2 = .005$ , and the interaction of Group  $\times$  Time,  $F(3, 116) = .39, p = .76, \eta_p^2 = .01$ , were not significant. Thus, as expected, participants' negative mood increased over the course of the "hot" cognition elicitation procedure similarly across all groups.

Based on the manipulation-check questions, the majority of participants (75%) reported the thought they chose to be at least fairly central to the way they think about themselves. Ninety-five percent of participants confirmed they chose a thought triggered by a number of events. Univariate ANOVAs with condition as the grouping factor and self-rated centrality and frequency of thought as the dependent variables did not reveal significant differences between conditions ( $p$ 's  $> .2$ ). Thus, most participants did identify a central, frequently occurring core belief (Beck, 1995), with no significant differences observed between conditions.

Next, to examine whether Phase 2 manipulations changed participants' mood, a  $2 \times 3$  mixed design ANOVA was conducted, with the three relevant conditions (VP, SP, DC) as the between-group factor, time as the repeated-measures factor (Time 2, Time 3), and negative mood as the dependent variable (see Figure 2). Main effects were observed for Group  $F(2, 87) = 3.70, p = .03, \eta_p^2 = .08$ , as well as for Time  $F(1, 87) = 42.55, p < .001, \eta_p^2 = .33$ . More importantly, the interaction of Group  $\times$  Time was significant,  $F(2, 87) = 11.06, p < .001, \eta_p^2 = .203$ , indicating that the different motivation conditions varied in their effects on mood. To simplify interpretation of interaction effect, we performed a

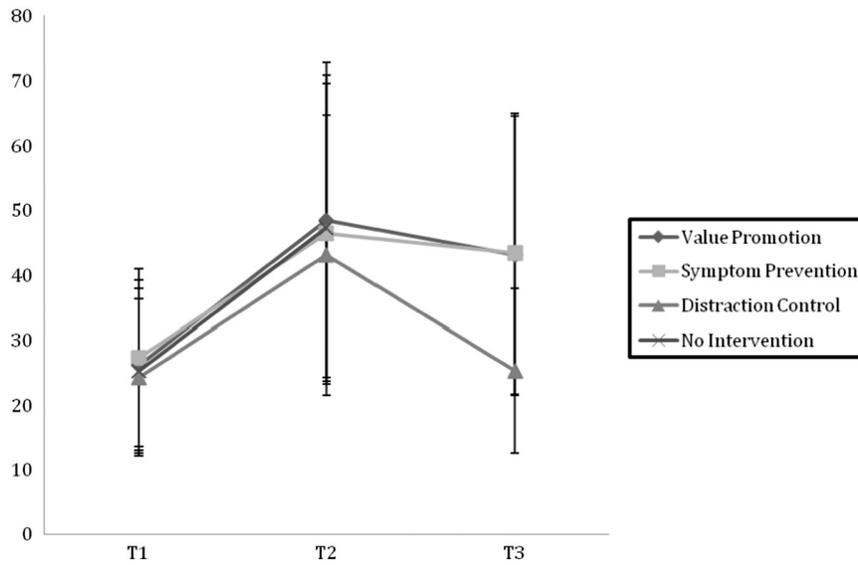
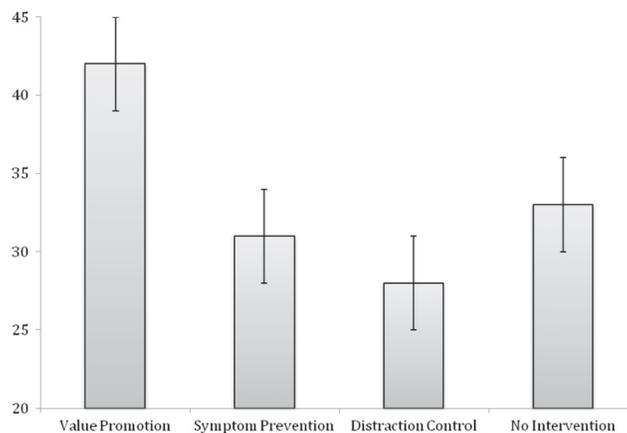


FIGURE 2 Mean self-rated negative affect across times in the different groups.

univariate ANOVA with condition as the grouping factor, and Time 2–Time 3 change score as the dependent variable. Simple group effects of these univariate ANOVAs are statistically identical to the Group × Time interaction effects in the parallel multivariate mixed model. Planned comparisons using Fisher’s least significant differences (LSD) revealed that reduction in negative mood in the DC condition ( $M = -2.07, SD = 1.74$ ) was found to be significantly greater than in the VP condition ( $M = -.59, SD = 1.70; p = .001, d = 0.86$ ), and the SP condition ( $M = -.37, SD = 1.43; p < .001, d = 1.07$ ), both with large effect sizes. The VP and SP groups did not differ from each other,  $p = .77, d = 0.14$ . Thus, as expected, participants in the distraction condition

experienced a substantial improvement in mood over the course of Phase 2 procedure. More importantly, mood change in Phase 2 was similar in the two experimental conditions.

In order to examine whether there were group differences in the amount of time spent on the critical imagination task, a univariate ANCOVA was performed, with motivation condition as the grouping factor, time (seconds) spent on this task as the dependent variable, and reading speed (based on time spent on reading the rationale at the outset of Phase 3) as covariate. Reading speed was included in order to account for the added variance of reading the instructions at the beginning of the task (G. A. Miller & Chapman, 2001). Analysis



Note. Error bars represent standard errors after controlling for reading time.

FIGURE 3 Time spent on the imagination task, by motivation condition.

indicated a significant difference among the four different conditions,  $F(3, 113) = 3.09, p = .03, \eta_p^2 = .08$  (see Figure 3). Planned comparisons using Fisher's LSD revealed that the VP group ( $M = 41.02, SD = 27.53$ ) spent significantly more time on the imagination task than the SP group ( $M = 30.34, SD = 15.82; d = 0.48, p = .01$ ), the DC group ( $M = 28.84, SD = 12.30; p < .005, d = 0.57$ ), and the NI group ( $M = 32.12, SD = 15.53; p < .05, d = 0.40$ ). All other comparisons were not significant (all  $p$ 's  $> 0.25, d$ 's  $< 0.11$ ). Thus, participants in the VP condition spent significantly more time on the imagination task than participants in all other conditions.

Finally, identification with distressing personal material measured by the relevant manipulation-check question correlated with time spent on the critical imagination task across all groups,  $r(118) = 0.34, p = .009$ . Thus, the subjective significance of the elicited distressing material was related to the amount of time participants invested in the imagination task, supporting the validity of the primary dependent measure.

### Discussion

In the present analogue study, we examined the effect of regulatory focus on individuals' engagement in therapeutic tasks, through the manipulation of motivation for treating distressing negative cognitions. A "hot" distressing cognition was constructed to be either a cause of negative affect or a barrier to valued behavior. Performing interventions designed to help coping with the cognition was either framed in terms of preventing negative affect or promoting valued behavior. Results showed that framing motivation for treatment in terms of promoting one's goals led to greater engagement in a subsequent therapeutic task. This finding could not be explained by the effect the manipulations had on participants' mood. The present findings indicate the possible utility of values-based, promotion goals for engagement in tasks used in psychotherapy, beyond that of focusing on the prevention of symptoms.

Earlier research has established a link between values-based promotion goals and persistence (e.g., Schmeichel & Vohs, 2009), particularly with regards to pain tolerance tasks (e.g., Páez-Blarrina et al., 2008). Importantly, in the present study, the utility of using promotion versus prevention goals was examined in the context of performing therapeutic interventions that focus directly on psychological processes (i.e., disturbing negative cognitions).

Based on the perspective of regulatory focus theory, the observed engagement utility of promotion goals may be a function of their impact on the subjective valuation of gain-loss scenarios (Higgins, 2000).

Focusing on the promotion of desired goals has been found to be associated with greater awareness and valuing of potential gains, and a lesser awareness and valuing of potential losses. In contrast, when the prevention of an undesired state is the focus, the reverse valuation biases are typically observed, wherein there is a greater awareness and valuing of potential losses, instead of gains (Cesario, Grant, & Higgins, 2004; Higgins, 1997). Based on this perspective, in the present study, individuals in the value promotion group with a promotion goal in mind may have been more prepared to undergo a tedious task in order to achieve potential gains. In contrast, those in the symptom prevention group were primed with the goal of avoiding unpleasant experiences, and in the short-term, investing in the therapeutic tasks may have run counter to that goal.

Törneke (2010) argued that values may serve as augmentals—abstract verbal rules—that continuously and consistently reinforce behavior, even in the case of failure. Others (Cohen, Garcia, Purdie-Vaughns, Apfel, & Brzustoski, 2009; Miyake et al., 2010) suggest that the consideration of values increases self-worth, especially in the face of tasks that arouse feelings of inadequacy. Schmeichel and Vohs, 2009 argued that affirming values increases self-control by promoting a higher level construal. Since an approach orientation is associated with both positive affect (Higgins, 1997) and higher construal level (Förster & Higgins, 2005; Lee, Keller, & Sternthal, 2010), each of these explanations is consistent with a regulatory focus formulation of values-based promotion motivation. Notably, in the present study, the theorized mood differential between symptom prevention and value promotion manipulations was not observed. Furthermore, in the distraction control group negative mood was substantially decreased, but this change was not accompanied by enhanced engagement in the critical therapeutic task. Thus, the present findings suggest that the observed utility of focusing on valued goals in treatment does not simply reflect a direct link between mood and increased engagement—a finding noted elsewhere as well (Higgins et al., 2003).

There are a number of limitations to this analogue study. First, the negative thoughts elicited by participants in the present study may be qualitatively different from negative disturbing cognitions experienced by clinically diagnosed individuals in terms of content and intensity. Second, although the therapeutic tasks we employed are commonly used in actual treatments (Hayes et al., 2012), in clinical practice they are offered in a more interpersonal and individualized atmosphere, and typically with an extended discussion of their theoretical underpinnings (Beck, 1995; Wilson & Murrell, 2004).

Examining the effects of regulatory focus in actual therapeutic settings is needed in order to clarify the clinical relevance of the findings obtained here. Third, the participants themselves were neither treatment-seeking nor assessed using clinical tools. Each of these limitations indicates the need for future research programs targeting clinical populations in clinical settings. Similarly, the predominantly female representation here may limit the generalizability of findings.

Finally, the design of the current study was based on a dichotomy of value-based versus symptom-based motivation that does not necessarily reflect actual clinical practice. Indeed, such clear-cut differentiation risks minimizing underlying similarities in therapies that follow value-informed behavior or symptom reduction, such as ACT and CBT, respectively (Arch & Craske, 2008). In practice, ACT takes symptom severity into consideration (Wilson & Murrell, 2004), and values may be enlisted in CBT, especially with more entrenched clients (Huppert & Baker-Morissette, 2003). Future research may examine whether promotion and prevention goals elicit added effects if appropriately fitted with individuals predisposed to an approach or avoidant orientation, respectively (Higgins, 2000).

In sum, the present study offers a unique formulation of therapeutic motivation in terms of regulatory focus theory. Our findings suggest that activation of an approach orientation through the setting of idiosyncratic promotion goals may lead to greater engagement in therapeutic tasks, compared with focusing on avoiding pain and suffering. Thus, the experience of disturbing symptoms may often push people to seek psychological treatment at the first place, but while in therapy, they may be best motivated by their personally selected values.

#### Conflict of Interest Statement

The authors declare that there are no conflicts of interest.

#### Appendix A. Supplementary Materials

Supplementary materials to this article can be found online at <http://dx.doi.org/10.1016/j.beth.2015.11.002>.

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RECEIVED: August 30, 2015

ACCEPTED: November 8, 2015

Available Online 14 November 2015