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Getting a Grip on Your Feelings: Effects of Action Orientation and External Demands on Intuitive Affect Regulation

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The authors propose that volitional action is supported by *intuitive affect regulation*, defined as flexible, efficient, and nonrepressive control of own affective states. Intuitive affect regulation should be most apparent among action-oriented individuals under demanding conditions. Consistent with this, a demanding context led action-oriented individuals to down-regulate negative affect in self-reports (Study 1), in an affective Simon task (Study 2), and in a face discrimination task (Study 3). In line with the idea that intuitive affect regulation is guided by top-down self-regulation processes, intuitive affect regulation in a face discrimination task was mediated by increases in self-accessibility (Study 3). No parallel effects emerged among action-oriented participants in a nondemanding context or among state-oriented participants.

People's feelings, their greatest passions and their deepest fears, are essential guides to behavior. As volumes of psychological research have testified, feelings prepare people to respond quickly and adaptively to potential risks and opportunities in their environment (Frijda, 1986). Moreover, a life without feelings would be dull beyond imagination, lacking the spice that imbues people's experiences with meaning and significance. Even so, when nothing keeps people's feelings in check, people risk becoming "hijacked" by their own emotions (Goleman, 1995; Kuhl, 1981). During an emotional hijacking, even the slightest setback may set off an immobilizing depression and the remotest fear can turn into overwhelming anxiety, just as a trivial irritation may trigger a raging bout of anger. To prevent such emotional hijackings, people need to actively regulate their own affective states, making sure that their feelings are appropriate to circumstance (Gross, 1999).

In the present article, we further elaborate on the link between affect regulation and volitional action control. On the basis of a recent theory of volition (Kuhl, 2000; Kuhl & Koole, 2004), we suggest that volitional action control is supported by *intuitive affect regulation*, a form of affect regulation in which high-level executive systems are closely coordinated with implicit affective processes. Consequently, individuals who are highly *action oriented* are likely to be especially skilled at intuitive affect regulation. By contrast, individuals who are low on action orientation—or *state-oriented* individuals—may be lacking in intuitive affect regulation skills. In the following paragraphs, we begin by reviewing the existing literature on volition and affect regulation. After this, we present three empirical studies that tested our theoretical analysis.

Volition and Affect Regulation

The road from wishes to action is often long and filled with many obstacles (Heckhausen & Kuhl, 1985). Indeed, modern theories of volition suggest that people must rely on specialized psychological mechanisms to ensure that their wishes and goals are translated into concrete actions (Gollwitzer, 1996; Kuhl, 1984, 2000). The strength of these volitional mechanisms is demonstrated by the fact that people can be highly persistent in their goal strivings, even in the face of considerable difficulties and repeated setbacks (Klinger, 1975; Wicklund & Gollwitzer, 1982). Of particular interest, people who are actively engaged in their goal pursuits manage to maintain a highly optimistic outlook on life, and display greater levels of emotional well-being than less active people (Kasser & Sheldon, 2004; Taylor & Gollwitzer, 1995). In light of these considerations, it seems plausible that volitional functioning is supported by a set of powerful affect regulation mechanisms. Aided by these affect regulation mechanisms, people may shield themselves against the aversive affect that arises as a result of demoralizing circumstances.

Prior research on affect regulation processes has primarily studied either deliberate affect regulation, such as suppression (Gross & John, 2003), or automatic affect regulation, such as repression (Langens & Mörth, 2003). Both deliberative and automatic affect regulation exert important influences on people's emotional lives. Nevertheless, the two types of affect regulation have only limited utility in volitional functioning. Deliberative affect regulation is closely connected with logical–analytic thinking and can thus be flexibly attuned to people's goals. However, deliberative affect regulation is also relatively slow and effortful. Because many action contexts are cognitively taxing and unpredictable, deliber-

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ative affect regulation is frequently incapable of supporting volitional action control. Automatic affect regulation, on the other hand, is relatively fast and efficient. However, automatic affect regulation is performed by low-level perceptual functions that are largely insensitive to the symbolic meanings of people's actions (Greenwald, 1988). Accordingly, automatic affect regulation is too rigid to be brought in line with people's higher order goals. Moreover, volitional functioning often necessitates the confrontation with aversive affect (e.g., taking steps to convert a threat into an opportunity), which renders immediate avoidance strategies inadequate.

In many demanding or threatening circumstances, neither deliberative nor automatic affect may be sufficient for attaining volitional action control. What additional processes might then be implicated? Recently, this issue has been addressed by personality systems interactions (PSI) theory (Kuhl, 2000; Kuhl & Koole, 2004). According to PSI theory, volitional functioning is facilitated by intuitive affect regulation processes. Intuitive affect regulation is defined as an implicit form of affect regulation that is nonetheless under the control of central executive (i.e., volitional) mechanisms. Intuitive affect regulation shares characteristics with both deliberative and automatic affect regulation processes. In terms of its efficiency, intuitive affect regulation is similar to automatic affect regulation. In being flexibly attuned to people's ongoing goal pursuits, intuitive affect regulation is similar to deliberative affect regulation. However, unlike automatic or deliberative affect regulation, intuitive affect regulation is controlled neither by low-level reflexes nor by explicit intentions. Accordingly, intuitive affect regulation represents a qualitatively distinct form of affect regulation.

The functional basis for intuitive affect regulation is provided by *extension memory*. Extension memory is a hypothetical construct specific to PSI theory that refers to a central executive system that supports an intelligent form of intuition (Baumann & Kuhl, 2002). The workings of extension memory are largely implicit, because the system functions are presumably carried out by parallel-distributed processors that are capable of handling vast amounts of complex information at speeds that greatly exceed the capacity of the conscious mind. Extension memory thus builds on the kinds of processes specified by parallel-distributed processing models (Read, Vanman, & Miller, 1997; Rumelhart, McClelland, & the PDP Research Group, 1986). Extension memory is conceived of as an implicit representational system that provides integrated knowledge about the self and the environment. This knowledge base includes extended networks of relevant semantic meanings; remote action alternatives; and self-aspects, including the person's needs, motives, and autobiographical experiences. Because extension memory promotes integrative cognitive activity, activation of extension memory will facilitate autonomous functioning. The concept of extension memory thus provides a functional explanation for complex motivational phenomena such as authenticity and free will (Koole & Kuhl, 2003; Kuhl & Koole, 2004).

According to PSI theory, extension memory can acquire affect regulation functions when the system develops connections with lower level affective systems (Kuhl, 2000). This assumption is consistent with evidence for the importance of interconnectivity between neocortical regions and limbic networks for the regulation of action (Chambers, Taylor, & Potenza, 2003; Mayberg et al., 1999; Tucker et al., 2003). Once appropriate corticolimbic connections have been established, extension memory can regulate the person's affective states in a highly efficient manner. For instance, when external performance pressures give rise to feelings of tension, extension memory may use its connections with the affect systems to activate relaxing feelings. Because of extension memory's vast integrative powers, intuitive affect regulation has no need to rely on suppression or avoidance mechanisms. Instead, intuitive affect regulation functions like an "inner democracy" that considers many "voices" (e.g., gut reactions, needs, motives, contextual constraints, and abstract goals) in controlling the person's affective states.

Intuitive Affect Regulation and Action Orientation

Intuitive affect regulation skills may be acquired as a result of people's social interaction experiences (Kuhl, 2000; for empirical evidence, see Kopp, 1989; Schore, 1994; Schulte, Hartung, & Wilke, 1997). When the social environment is autonomy supportive, extension memory is able to develop strong connections with the affective systems. By contrast, when the social environment is hostile, indifferent, or controlling, extension memory becomes inhibited and thus less able to connect with the affective systems. Given the natural variation in social environments, individual differences in intuitive affect regulation skills are likely to arise.

Although intuitive affect regulation skills are largely inaccessible to introspection, people may learn about their intuitive affect regulation skills indirectly by observing the consequences that these skills have for their volitional goal pursuits (Kuhl & Koole, 2004). Individuals with strong intuitive affect regulation skills are able to pursue their goals in a highly efficient, unhesitating manner, even under highly stressful circumstances. Accordingly, strong intuitive affect regulation skills should go hand in hand with an action-oriented style of self-regulation. By contrast, individuals with weak intuitive affect regulation skills are vulnerable to uncontrollable ruminations and hesitation, especially under stressful circumstances. Weak intuitive affect regulation skills should thus be associated with a state-oriented style of self-regulation. On the basis of this conceptualization, Kuhl (1981, 1994) has developed a self-report scale for assessing variations in action versus state orientation.

Action orientation is defined as a *metastatic* mode of control, in which the enactment of change-oriented intentions is facilitated (Kuhl, 1984). By contrast, state orientation is defined as a *catastatic* model of control, which preserves the status quo by inhibiting the enactment of change-oriented intentions (Kuhl, 1984). A schematic model of action orientation and intuitive affect regulation is shown in Figure 1. We provide this model to organize our hypotheses, not because we aim to test it in its entirety. According to the model, action orientation regulates how people cope with their initial affective responses. Under stressful conditions, action-oriented individuals mobilize central executive systems (i.e., extension memory) and engage in implicit down-regulation of negative affect. To the extent that this down-regulation is successful, action-oriented individuals will display mood improvements and facilitated self-regulation under stressful conditions. By contrast, state-oriented individuals under stressful conditions either refrain from affect regulation or engage in relatively ineffective forms of affect regulation. Consequently, state-oriented individuals will respond to stressful conditions with persistent negative affect, neg-

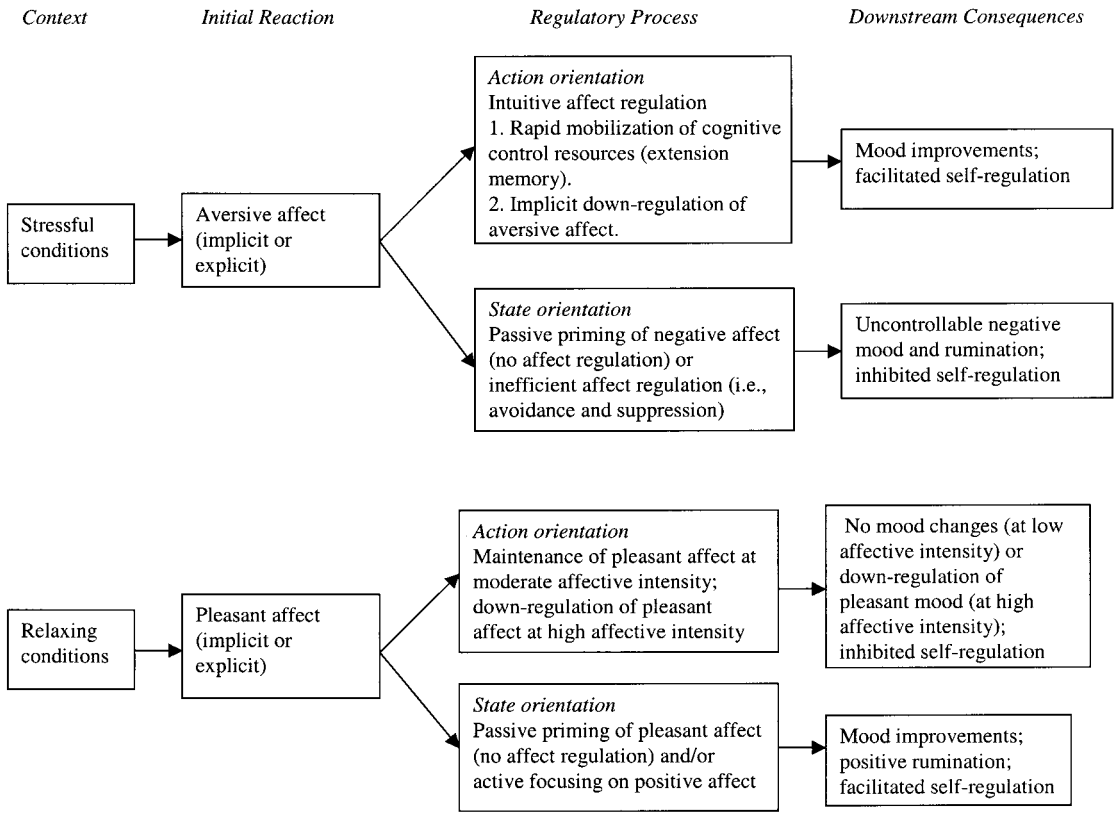

Figure 1. Model of action orientation and intuitive affect regulation.

ative rumination, and inhibited self-regulation. Notably, the aforementioned differences between action- versus state-oriented individuals should only emerge under stress. Under relaxing conditions, state-oriented individuals may even display better moods and self-regulation than action-oriented individuals (Koole, Kuhl, Jostmann, & Vohs, in press).

To date, more than 40 published studies have supported the validity of the action orientation construct (for reviews, see Diefendorff, Hall, Lord, & Strean, 2000; Koole et al., in press; Kuhl & Beckmann, 1994). In an early study among hospitalized patients, action-oriented patients reported less subjective pain, lower use of painkillers, and reduced fear compared with state-oriented patients after surgery (Kuhl, 1983). A subsequent prospective study found that stressful life events had a more adverse impact on depression among state-oriented individuals than among action-oriented individuals (Rholes, Michas, & Shroff, 1989). Experimental research has similarly supported a link between action orientation and powerful affect regulation skills. Brunstein and Olbrich (1985) showed that repeated failure inductions led state-oriented participants to report more negative affect and self-blame. By contrast, the same repeated failures caused action-oriented participants to engage in motivating self-instructions and reaffirmations of their sense of personal mastery. In a related vein, Heckhausen and Strang (1988) found that performance pressure led to reliable increases in physiological arousal and lower performance among state-oriented athletes. Action-oriented athletes, however, maintained constant levels of physiological arousal and performance even under high performance pressure. The finding that action orientation has reliable physiological effects is remarkable, given that automatic and deliberative affect regulation tend to have little impact on physiological functioning (Gross, 1998; Paulhus, Fridhandler, & Hayes, 1997).

More recently, research has explored the role of extension memory in intuitive affect regulation. Baumann and Kuhl (2003) showed that action-oriented individuals are more capable of judging their own emotional preferences than state-oriented individuals, especially under high negative affect (see also Kazén, Baumann, & Kuhl, 2003; Kuhl & Kazén, 1994). Because extension memory is presumed to underlie people's emotional preferences, these findings support the notion that action-oriented individuals access extension memory in coping with negative affect. This conclusion was further supported by Baumann and Kuhl (2002), who found that action-oriented individuals are better able to provide complex intuitive judgments than state-oriented individuals. Again, the effects of action orientation emerged only when negative affect was high, suggesting that complex intuition among action-oriented individuals is closely associated with affect-regulation functions.

The Present Research and Hypotheses

We designed the present research to further examine the link between action orientation and intuitive affect regulation. In three studies, we primed a demanding versus a nondemanding context

among action- versus state-oriented participants. In Studies 1 and 2, we primed varying levels of demand by manipulating performance-contingent rewards (Deci, Koestner, & Ryan, 1999); in Study 3, we used a visualization procedure to prime a demanding versus an accepting relationship context (Baldwin & Sinclair, 1996). Study 1 focused on subjective mood changes, whereas Studies 2 and 3 examined two different indicators of implicit affective processing. In addition, Study 3 tested the mediating role of extension memory in intuitive affect regulation. Across all three studies, our general hypothesis was that priming a demanding context would trigger intuitive affect regulation among action-oriented participants but not among state-oriented participants.

According to PSI theory, important differences exist between demand-related action orientation (AOD) and threat-related action orientation (AOT; Kuhl, 2000).[1] AOD relates to the self-regulation of behavior (the "how" of action). Under demanding conditions, people are confronted with multiple goals that cannot be performed at once. Coping with demand thus involves the coordination between planning and behavioral output systems. AOD is most likely to develop when the social environment encourages the person to cope with stress by taking behavioral initiatives. AOT relates to the self-regulation of meaningful experience (the "why" of action). Under threatening conditions, people are confronted with negative or unexpected information that undermines their ability to make sense of the situation. Coping with threat thus involves the coordination between perceptual and high-level cognitive systems. AOT is most likely to develop when the social environment encourages the person to cope with stress by engaging in meaningful self-expressions, which allow for negative experiences to become integrated into the self. Given that the present research used manipulations of demand, we expected to find primarily effects of AOD in the present research.

Study 1

Study 1 examined the effects of action orientation and performance-contingent rewards on subjective mood changes. Past research has found that a consistent buildup of implicit affective reactions can have significant effects on subjective mood (Chartrand, Bargh, & Van Baaren, 2002). Consequently, if intuitive affect regulation mechanisms are sufficiently strong and consistent, they might become translated into subjective mood improvements. Previous investigations have indeed found effects of action orientation on subjective mood (Kuhl, 1983; Rholes et al., 1989). However, this research either examined mood changes over relatively long periods of time (i.e., days or weeks) or did not use standardized mood rating scales (Brunstein & Olbrich, 1985). Study 1 complemented and extended these studies by examining the effects of action orientation on moment-to-moment changes in subjective mood as rated on standardized and validated scales. More specifically, participants reported their moods at the beginning of the experimental session, immediately after a demand induction, and 10 min after the induction.

Theoretically, intuitive affect regulation processes should follow a rather specific time course. PSI theory argues that deliberative, explicit processing tends to inhibit extension memory (Kuhl, 2000). Thus, intuitive affect regulation may not emerge immediately after the demand induction, when the induction is still likely to be held in explicit awareness. Some time after the demand induction, however, the demand induction would be more likely to become processed on more implicit levels. From that moment on, intuitive affect regulation processes should begin to take effect. Consistent with this, prior research has shown that the effects of action orientation are often most pronounced after a time delay (Brunstein, 1989; Kazén et al., 2003).

On the basis of the foregoing considerations, we predicted that action-oriented participants would mainly display mood improvements 10 min after the demand induction. Among state-oriented participants, we predicted no delayed mood improvements under high demand, in view of these individuals' lack of intuitive affect regulation skills. Under low demand, however, we did expect state-oriented individuals to display significant mood improvements. This prediction was based on observations that state-oriented individuals are usually able to benefit from a supportive environment. Indeed, research suggests that state-oriented individuals benefit even more from emotional support than action-oriented individuals (cf. Nolen-Hoeksema & Davis, 1999). Accordingly, down-regulation of negative affect in response to a nondemanding context was not expected to occur to the same degree among action-oriented individuals.

To induce a demanding context, we manipulated performance-contingent rewards, a well-studied type of external demand that is important in many real-life contexts (Deci et al., 1999). Performance-contingent rewards provide an incentive for meeting a set criterion, norm, or level of competence (Ryan, Mims, & Koestner, 1983). People may experience the reception of performance-contingent rewards as positive, because such rewards convey that the recipient is skillful or competent at the activity. However, performance-contingent rewards also have a controlling aspect, because they pressure people toward specified outcomes. Indeed, research has shown that performance-contingent rewards can give rise to feelings of tension (Ryan et al., 1983). If reward-induced tension is not kept under control, it can lead to "choking" effects (Baumeister & Showers, 1986; Heckhausen & Strang, 1988). Consequently, we predicted that action-oriented individuals in Study 1 would down-regulate their tension levels in response to performance-contingent rewards.

Besides tension levels, we also assessed changes in participants' level of depression, anger, fatigue, and vigor. However, because our reward manipulation was mainly relevant to the regulation of tension (Ryan et al., 1983), we did not expect action orientation to affect these other types of mood. We thus predicted that the effects of action orientation in response to performance-contingent rewards would be specific to participants' tense moods.

Method

Participants and Design

Eighty-two paid volunteers at the Free University Amsterdam (34 men and 48 women, average age 21 years) participated in the experiment. The

[1] Kuhl (1994) introduced the labels "failure-related" and "decision-related" action orientation to what the present research refers to as "threat-related" and "demand-related" action orientation, respectively. This departure from the previous terminology is preferred because the latter terms are more directly related to relevant constructs within PSI theory (e.g., Kuhl, 2000).

experimental design consisted of a 2 (AOD: action vs. state; between participants) × 2 (reward type: performance contingent vs. noncontingent; between participants) × 3 (mood assessment: before, immediately after, or 10 min after the reward manipulation; within participants) design. The main dependent variable consisted of participants' feelings of tension.

Procedure

On arrival in the laboratory, participants were led to individual cubicles, each containing an Apple Macintosh (iMac) computer. The experimenter explained that the remaining instructions would be administered via a computer program, and left. Participants were first informed by the program that the investigation would consist of a number of unrelated studies, which were supposedly administered together for efficiency reasons. Participants then moved to the first study, which contained our assessment of individual differences. After this, participants rated their feelings on a series of mood adjectives. Participants then moved on to the next study, which consisted of the manipulation of performance pressure. Immediately afterward, participants rated their feelings for a second time. Next, participants proceeded with some filler tasks that together lasted about 10 min. Following this filler task, participants rated their moods for a third time. Subsequently, participants were probed on their beliefs regarding the purpose of the experiment, answered some manipulation check questions, and were asked to supply some biographical information. Finally, participants were thanked for their efforts, debriefed, and paid by the experimenter.

Independent Variables

Individual differences. To assess individual differences in action orientation, we used a Dutch translation of the Action Control Scale (ACS-90; see the Appendix for sample items). The ACS-90 has been developed and extensively validated by Kuhl and others (for reviews, see Diefendorff et al., 2000; Kuhl & Beckmann, 1994; Kuhl & Koole, 2004). We administered two 12-item subscales of the ACS-90, which measured AOD and AOT. AOD and AOT have empirically emerged as separate dimensions in factor-analytic studies (e.g., Diefendorff et al., 2000). Furthermore, conditions that involve only high demand or high threat can selectively trigger AOD and AOT, respectively (for a review, see Koole et al., in press). Effects of action orientation have been found across a wide range of different measures and domains, including intention memory, physiological arousal, medicine intake, therapeutic outcomes, athletic performance, and work psychology. Action orientation thus appears to be a global construct that operates over and above domain-specific processes. Moreover, research has established that the effects of action orientation are not due to self-efficacy or control expectations (Kuhl, 1981), achievement motivation (Heckhausen & Strang, 1988), neuroticism (Baumann & Kuhl, 2002), extraversion (Koole, 2004b), self-esteem (Koole, 2004c), or conscious emotion-regulation strategies (Koole, 2004c) and occur over and above the effects of the Big Five personality dimensions (Diefendorff et al., 2000).

AOD and AOT items were intermingled and presented in a different random order for each participant. Each of the items of the ACS-90 describes a stressful situation and an action- versus state-oriented way of coping with the situation. For each item, participants were asked to select the response that best described their own reaction to the situation. Notably, the ACS-90 does not ask participants to provide introspective judgments of their volitional abilities but rather asks participants to report on the consequences that these volitional abilities have for their behavior. Action-oriented choices were coded as 1 and state-oriented choices were coded as 0 and summed for the entire subscale. Participants who made seven or more action-oriented choices on AOD were assigned to the action-oriented group; participants who made six or fewer action-oriented choices were assigned to the state-oriented group.[2] The same procedure was followed for the AOT scale.

Our assessment also included Dutch translations of the Rosenberg Self-Esteem Scale (Rosenberg, 1965) and the Emotion Regulation Questionnaire (Gross & John, 2003). One subscale of the Emotion Regulation Questionnaire measures chronic reliance on cognitive reappraisal strategies to regulate one's emotions (six items); a second subscale measures chronic reliance on emotional suppression strategies (four items). Respective Cronbach's alphas for AOD, AOT, self-esteem, reappraisal, and suppression were .79, .80, .89, .87, and .76.

Reward manipulation. After the individual differences assessment, participants were asked to solve a number of arithmetic sums. During each sum, participants were to add up three one- or two-digit numbers and type in the correct response. Participants first practiced solving one sum and were then given 2.5 min to complete as many sums as possible. During the entire task, the remaining time was visually displayed on the computer screen by means of a small alarm clock on the computer screen. After 2.5 min had passed, participants received feedback regarding the number of sums that they had solved correctly. Following this feedback, the reward manipulation was introduced.

Participants in the performance-contingent reward condition were informed that there would be a second block of arithmetic sums. It was stressed that the level of difficulty and the amount of time for the second block of sums would be identical to the first block. However, this time, participants would be able to earn a bonus. If participants succeeded in solving at least 10% more sums than during the first block, they would earn a bonus of €1.00. (Note that at the time of the study, €1.00 = approximately US$1.00.) If participants succeeded in solving at least 25% more sums than during the first block, they would earn a bonus of €2.50. Participants were further told that the second block of arithmetic sums would be preceded by a few unrelated studies, allegedly "to avoid fatigue." These "unrelated studies" contained the second and third administrations of the Profile of Mood States (POMS), separated by a filler task of about 10 min. Participants in the noncontingent reward condition were informed that they had solved more sums than the average participant within the same amount of time. Accordingly, they were given an extra bonus of €2.50. The positive feedback and unexpected bonus were meant to induce a positive, rewarding context and to allow the overall financial compensation for the arithmetic task to be equal across experimental conditions. Research indicates that unexpected rewards of this kind are generally not experienced as controlling (Ryan & Deci, 2000). To ensure that participants were not provided with an uncompleted intention, no mention was made of a second block of sums in the noncontingent reward condition (Kuhl & Helle, 1986).

Mood assessment. During the three consecutive mood assessments, participants rated their feelings on 32 mood adjectives that were drawn from the shortened version of the POMS (Shacham, 1983) and translated into Dutch (Van den Berg, Koole, & Van der Wulp, 2003). The 32 mood

[2] In Studies 1–3, we always performed the median split at the conceptual midpoint of the AOD and AOT scales. The conceptual midpoint of these scales was also found to be empirical midpoint in Studies 1–3, and it was the normative midpoint in a large-scale study among Dutch university students (N = 1,457; cf. Koole, 2003). We further examined our data in Studies 2 and 3 using a regression approach (this approach was not feasible in Study 1, which had a three-level within-participants variable). The results showed that the critical AOD × Reward Type interaction on the affective Simon effect for negative target words in Study 2 was significant, $\beta = -.25$, $t(53) = -2.07$, $p < .05$. In Study 3, the AOD × Visualization interaction was similarly significant on happy among angry faces pop-out (HAFPO; see Study 3), $\beta = .25$, $t(67) = 2.19$, $p < .04$, and on speed of self-evaluation, $\beta = -.25$, $t(67) = -1.99$, $p = .05$. Thus, a regression approach yielded results equivalent to the analysis of variance (ANOVA) approach. Because a regression approach made it impossible to inspect the absolute means in Studies 2 and 3, we report the ANOVA results in the main body of this article.

items formed five subscales, which assessed feelings of depression (*unhappy, sad, blue, hopeless, discouraged, miserable, helpless, worthless*), anger (*angry, peeved, annoyed, resentful, bitter, furious*), fatigue (*exhausted, tired, worn out, spent, dead-beat, washed out*), vigor (*lively, active, energetic, cheerful, full of pep, vigorous*), and tension (*tense, on edge, uneasy, restless, nervous, anxious*). Respective Cronbach's alphas for these POMS scales were .91, .83, .90, .84, and .85 during the first assessment; .96, .84, .92, .76, and .83 during the second assessment; and .95, .86, .92, .86, and .85 during the third assessment.

Results

Mood Ratings

Participants' average tension ratings were subjected to a 2 (AOD) × 2 (reward type) × 3 (time of measurement) ANOVA with repeated measures on the last factor. This analysis yielded a main effect of AOD, $F(1, 78) = 9.81$, $p < .003$, which indicated that overall, action-oriented participants experienced less tension than state-oriented participants ($M = 1.34$ vs. $M = 1.73$). The analysis also revealed an effect of time, $F(2, 77) = 3.05$, $p = .053$, indicating that on average, participants experienced more tension at the time of the first mood measurement ($M = 1.59$) than during the second and third mood measurements (Ms = 1.52 and 1.49, respectively). Finally, the analysis produced the predicted three-way interaction between AOD, reward type, and time, $F(2, 77) = 3.56$, $p < .04$. Relevant means are displayed in Table 1.

To further unpack this three-way interaction, we examined our results separately for action- and state-oriented participants. Among state-oriented participants, the analysis revealed a marginal two-way interaction between reward type and time, $F(2, 37) = 3.08$, $p = .058$. In the noncontingent reward condition, state-oriented participants experienced a decrease in tension immediately after the manipulation, $F(1, 21) = 4.85$, $p < .04$ ($M_{\text{Time 1}} = 1.97$ vs. $M_{\text{Time 2}} = 1.74$). This decrease was still marginally reliable 10 min after the introduction of noncontingent rewards, $F(1, 21) = 3.24$, $p = .086$ ($M_{\text{Time 1}} = 1.97$ vs. $M_{\text{Time 3}} = 1.77$). In the performance-contingent reward condition, state-oriented participants displayed no reliable changes in tension (Fs < 2, ps > .10).

Among action-oriented participants, the analysis revealed a main effect of time, which indicated that action-oriented participants on average experienced less tension with each mood measurement, $F(2, 39) = 4.68$, $p < .02$ ($M_{\text{Time 1}} = 1.39$ vs. $M_{\text{Time 2}} = 1.33$ vs. $M_{\text{Time 3}} = 1.28$). In addition, the analysis yielded the predicted two-way interaction between reward type and time, $F(2, 39) = 3.56$, $p < .04$. In the noncontingent reward condition, action-oriented participants experienced no reliable changes in tension (Fs < 1). By contrast, in the contingent reward condition, action-oriented participants showed highly reliable changes in tension between the different mood measurements, $F(2, 44) = 5.64$, $p < .008$. Immediately after the introduction of contingent reward, action-oriented participants experienced no meaningful changes in tension, $F(1, 22) = 1.22$, $p = .281$ ($M_{\text{Time 1}} = 1.43$ vs. $M_{\text{Time 2}} = 1.36$). However, some 10 min later, action-oriented participants in the contingent reward condition experienced a significant drop in tension, $F(1, 22) = 6.89$, $p < .02$ ($M_{\text{Time 2}} = 1.36$ vs. $M_{\text{Time 3}} = 1.25$).

Average depression, anger, and fatigue ratings failed to yield any effects of AOD. This pattern was as anticipated, given that the manipulation of performance-contingent rewards was mainly relevant to the regulation of tense mood.

Table 1
Average Tension Ratings as a Function of AOD, Reward Type, and Time (Study 1)

	State orientation			Action orientation		
Reward type	Time 1	Time 2	Time 3	Time 1	Time 2	Time 3
Noncontingent						
M	1.97	1.74	1.77	1.34	1.30	1.32
SD	0.67	0.58	0.76	0.56	0.55	0.55
Contingent						
M	1.61	1.68	1.65	1.43	1.36	1.25
SD	0.74	0.74	0.73	0.59	0.42	0.40

Note. Tension scores ranged from 1 (*not at all*) to 9 (*very much*). AOD = demand-related action orientation; Time 1 = before the reward type manipulation; Time 2 = immediately after the reward type manipulation; Time 3 = 10 min after the reward type manipulation.

Supplementary Analyses

AOD was positively correlated with AOT, $r(82) = .51$; self-esteem, $r(82) = .53$; and reappraisal, $r(82) = .33$ (all ps < .003). No relation between AOD and suppression was found, $r(82) = .04$, $p = .71$. AOT, self-esteem, reappraisal, or suppression did not yield effects comparable to those obtained for AOD.

Discussion

The results of Study 1 confirmed that action- versus state-oriented individuals have strikingly different mood dynamics under varying levels of demand. In response to performance-contingent rewards, action-oriented participants displayed significant down-regulation of tense mood. This down-regulation was not so much apparent immediately after the reward induction but rather when moods were assessed 10 min afterward. No similar drops in tension were found among action-oriented participants in response to noncontingent rewards. This pattern supports PSI theory, which argues that the intuitive affect regulation strategies of action-oriented individuals are characterized by efficient down-regulation of negative affect, which grows stronger over time.

As expected, state-oriented participants showed no evidence of down-regulation of tension in response to performance-contingent rewards. However, state-oriented participants did show down-regulation of tension in response to noncontingent rewards. This pattern fits with Kuhl's (2000) suggestion that state-oriented individuals may reap substantial emotional benefits from a supportive environment. This type of externally supported affect regulation does not depend so much on the person's own inner resources and, consequently, should be a more immediate function of the environment. In line with this, noncontingent rewards led to immediate down-regulation of tension among state-oriented participants. Notably, state-oriented participants were able to maintain this mood benefit at least for another 10 min. This pattern suggests that once state-oriented individuals are induced to feel better, these individuals are capable of holding on to their improved moods. State-oriented individuals' maintenance of positive affect may be ex-

plained by either passive affective priming processes (Fazio, 2001) or by more active positive ruminations (Oettingen & Mayer, 2002).

Finally, a noteworthy finding in Study 1 is that performance-contingent rewards produced no increases in tension among either state- or action-oriented participants, even though the same manipulation reliably induced down-regulation of tension among action-oriented participants. Given the explicit nature of the tension measurement, it is conceivable that participants were unwilling or unable to report increases in tension (Nisbett & Wilson, 1977). A further possibility is suggested by Ryan et al. (1983), who argued that the effects of performance-contingent rewards are motivationally complex because they combine controlling aspects with a positive informational value (i.e., they communicate one's level of competence). Accordingly, the positive informational value of performance-contingent rewards may have compensated the controlling aspect of performance-contingent rewards in participants' subjective experience. On a more implicit level, however, the controlling aspect of performance-contingent rewards was still processed by action-oriented participants, resulting in down-regulation of tension within this group. Taken together, these various considerations suggest that intuitive affect regulation may be particularly apparent on implicit levels. We further examined this notion in Studies 2 and 3.

Study 2

Recent research on implicit affective processes has led to the development of some powerful new paradigms for investigating implicit affective processes (Fazio, 2001; Greenwald & Banaji, 1995). In Studies 2 and 3, we adapted some of these paradigms to the study of intuitive affect regulation. Because we were mainly interested in the down-regulation stage of intuitive affect regulation, we administered a brief filler task after the stress induction in Studies 2 and 3. After this filler task, action-oriented participants were presumably ready to move beyond the confrontation stage.

In Study 2, we used the affective Simon task (De Houwer & Eelen, 1998) to study intuitive affect regulation. In this task, participants are asked to provide a positive or negative response to a target stimulus on the basis of a nonaffective stimulus feature (the relevant stimulus feature). For instance, participants might be required to say "positive" when a target stimulus is an adjective and "negative" when the target stimulus is a noun. In judging a nonaffective feature of a target stimulus (such as grammatical status), the affective meaning of the presented stimulus is objectively irrelevant. Even so, participants find the task easier (as indicated by faster response times and lower error rates) when there is a match between the valence of the response and the (irrelevant) valence of the stimulus. For instance, participants find it easier to say "positive" to positively valenced words and "negative" to negatively valenced words than to say "positive" to negatively valenced words and "negative" to positively valenced words. This affective matching phenomenon has become known as the *affective Simon effect* (De Houwer & Eelen, 1998).

The affective Simon effect represents an instance of unintentional affective processing, because the effect occurs when the affective meanings of the target words are objectively irrelevant. Indeed, the affective Simon effect occurs even when participants are explicitly instructed to ignore the affective meanings of the target stimuli (De Houwer & Eelen, 1998). In addition, the affective Simon effect qualifies as an instance of efficient affective processing, because the effect occurs despite the fact that participants are simultaneously engaged in another resource-demanding task (e.g., judging the grammatical category of target words). Finally, because the task-irrelevant valence and the relevant feature are aspects of the same target stimulus in the affective Simon task, they have an onset asynchrony of 0 ms. Therefore, the observation of affective Simon effects is indicative of fast affective processing. Thus, the affective Simon task provides a suitable paradigm to study intuitive affect regulation.

To establish a demanding context in Study 2, we used the same manipulation of performance-contingent rewards as in Study 1. Because Study 1 showed that this manipulation primarily involves regulation of negative affect (i.e., tension), participants' responses to negatively valenced words were of primary interest to us. In response to performance-contingent rewards, action-oriented individuals were presumed to activate implicit volitional mechanisms that facilitate rapid and efficient switching from negative toward positive affect. Consequently, we expected that saying "positive" to negative targets would become facilitated for action-oriented individuals in the performance-contingent reward condition. Conversely, performance-contingent rewards might cause action-oriented individuals to inhibit negative affect, making it more difficult for them to activate negative responses. As a result, saying "negative" to negative targets might become more difficult for action-oriented individuals in the contingent rewards condition. Thus, we predicted that performance-contingent rewards would lead to attenuation or perhaps even a reversal of affective Simon effects for negative target words among action-oriented participants.

We predicted no moderation of affective Simon effects among action-oriented participants in response to noncontingent rewards, because action-oriented participants were not expected to activate their intuitive affect regulation skills in a low-demanding context. Finally, none of the aforementioned effects were predicted for state-oriented participants, because state-oriented individuals presumably do not possess strong intuitive affect regulation skills.

Method

Participants and Design

Sixty paid volunteers at the Free University Amsterdam (31 men and 29 women, average age 20 years) participated in the experiment. The experimental design was 2 (AOD: state vs. action) $\times$ 2 (reward type: contingent vs. noncontingent) between participants. The main dependent variable consisted of participants' responses in the affective Simon task.

Procedure

The equipment, measurement of individual differences, and reward manipulation were identical to Study 1. Respective Cronbach's alphas of AOD, self-esteem, reappraisal, and suppression were .69, .85, .71, and .79. The alpha of AOT was .46, which is below conventional standards. This probably was a chance finding, because the same AOT scale had acceptable reliabilities in Studies 1 and 3 and in previous research using this scale (see Koole et al., in press). After the manipulation of reward type, participants completed a filler task that lasted approximately 5 min. Participants then continued with the affective Simon task. Next, participants completed

a second block of arithmetic sums[3] as part of the reward manipulation and were asked to state why they would receive an extra bonus. All but 3 participants were able to answer this question correctly. The latter 3 participants (5% of the sample) were removed from the data set. Finally, participants were paid, debriefed, and thanked for their participation.

Affective Simon Task

The affective Simon task, adapted from De Houwer and Eelen (1998), was described to the participants as "a study on grammar." The computer presented a number of consecutive words on the screen, which consisted of various nouns and adjectives. Participants were to decide as quickly as possible whether the words were adjectives or nouns. If the word on the screen was an adjective, participants were to say the word *positive* and press the "A" key on the keyboard.[4] If the word on the screen was a noun, participants were to say the word *negative* and press the "6" key on the numeric pad of the keyboard. The assignment of response valences to the two grammatical categories was not counterbalanced, because past research has shown that affective Simon effects occur irrespective of the particular combination between grammatical category and response valence (De Houwer & Eelen, 1998).

To promote quick responding, participants were instructed to place their fingers on the appropriate response keys during the actual task. As in De Houwer and Eelen (1998), participants were explicitly instructed to ignore the affective meaning of the target words. Notably, the meaning of a word does not have to be processed in order to determine its grammatical status (Roelofs, 1992). For instance, a simple nonsemantic strategy is to assess whether an article such as *the* or *a* could be placed in front of the presented word in a sensible way. The latter strategy was explicitly pointed out to the participants. Before starting with the actual task, participants completed 10 test trials. During these test trials, the computer provided feedback regarding the accuracy of participants' responses. After this, participants proceeded with the actual task.

The affective Simon task began with 4 warm-up trials that were followed by 24 experimental trials. The experimental target words were presented in separate trials that were run in a different random order for each participant. Each trial consisted of the following sequence of events: a fixation asterisk (1,000 ms), a blank screen (500 ms), and a target word that remained on the screen until participants pressed a response key. The computer unobtrusively recorded participants' response latencies and key presses. All visual stimuli (the fixation asterisk and target words) were presented in the center of the computer screen. The next trial was initiated 2 s after participants had pressed a response key. During half of the experimental trials, adjectives were presented as targets; the other half of the trials had nouns as targets. In addition, half of the target words had a positive meaning, and half of the target words had a negative meaning. The target words were all intrinsically social (e.g., *friendly*, *lonely*, *hate*, *reward*), because PSI theory assumes that intuitive affect regulation is socially conditioned (Kuhl, 2000).

Results

Response Latencies

Before analyzing the response latency data, we removed erroneous responses and response latencies that were longer than 3,000 ms from the data set. In line with the affective Simon effect, participants' responses were generally quicker when target valence and response valence were congruent than when target valence and response valence were incongruent, $F(1, 56) = 17.36$, $p < .001$ ($M = 1{,}179$ vs. $M = 1{,}289$). (All reported means are milliseconds.) Given the specificity of our hypotheses, we proceeded by analyzing the effects of action orientation and performance pressure separately by negative and positive target valence.

Negative target words. Average response latencies for negative social target words were subjected to a 2 (AOD) × 2 (reward type) × 2 (response valence) ANOVA. The analysis revealed a two-way interaction between AOD and response valence, $F(1, 53) = 7.77$, $p < .008$, and the predicted three-way interaction between AOD, reward type, and response valence, $F(1, 53) = 4.85$, $p < .04$. Relevant means are displayed in Table 2.

To facilitate the interpretation of this three-way interaction, we computed difference scores by subtracting average response latencies for saying "negative" to negative target words from average response latencies for saying "positive" to negative target words. The resulting scores can be interpreted as an index of implicit negative affect, that is, an affective Simon effect for negative target words. A 2 (AOD) × 2 (reward type) ANOVA revealed a main effect of AOD, $F(1, 53) = 7.77$, $p < .008$. On average, action-oriented participants displayed weaker affective Simon effects for negative target words than state-oriented participants ($M = 47$ vs. $M = 247$). However, this main effect was qualified by the predicted two-way interaction between AOD and reward type, $F(1, 53) = 4.85$, $p < .04$. In the noncontingent reward condition, action- and state-oriented participants had similar affective Simon effects for negative target words ($F < 1$). In the performance-contingent reward condition, however, action-oriented participants had much smaller affective Simon effects for negative target words than state-oriented participants, $F(1, 53) = 12.91$, $p < .002$ ($M = -48$ vs. $M = 303$). Notably, action-oriented participants in the contingent reward condition displayed a (nonsignificant) reversal of the affective Simon effect for negative target words ($F < 1$). By contrast, the three other groups of participants displayed significant affective Simon effects for negative target words (all Fs > 5, all ps $< .05$).

Positive target words. A parallel 2 (AOD) × 2 (reward type) × 2 (response valence) ANOVA was run for positive target

[3] In Study 2, we also assessed and analyzed the number of correct solutions that participants had provided during the second block of arithmetic sums. To correct for differences in arithmetic ability, we subtracted performance during the first block from performance during the second block. Average increases in number of solved sums were subjected to a 2 (action orientation: action vs. state) × 2 (reward type: contingent vs. noncontingent) between-participants ANOVA. The analysis yielded a significant interaction between action orientation and reward type, $F(1, 53) = 9.61$, $p < .004$. Action-oriented participants displayed a smaller increase in the number of solved sums when rewards were performance contingent than when they were noncontingent, $F(1, 53) = 6.20$, $p < .02$ ($M = 1.50$ vs. $M = 4.39$). By contrast, state-oriented participants showed a marginally significant larger increase in the number of solved sums when rewards were performance contingent than when they were performance noncontingent, $F(1, 53) = 3.60$, $p = .063$ ($M = 3.75$ vs. $M = 1.56$). Presumably, the higher performance among state-oriented participants in response to performance-contingent rewards is reflective of these individuals' proclivity to identify themselves with unattractive tasks, especially under high negative affect (Baumann & Kuhl, 2003; Kazén et al., 2003).

[4] In the original De Houwer and Eelen (1998) paradigm, responses were assessed using a voice key. However, subsequent research has shown that affective Simon-type effects may also be obtained with button-pressing responses (De Houwer, 2003). Moreover, the affective Simon effects obtained in Study 2 could only have resulted from the overlap between the (objectively irrelevant) affective valence of the response and the valence of the target words (J. De Houwer, personal communication, April 29, 2003).

Table 2
Average Response Latencies (in Milliseconds) for Negative Target Words as a Function of Reward Type, AOD, and Response Valence (Study 2)

	Noncontingent reward			Contingent reward		
AOD	Positive response valence	Negative response valence	ASE	Positive response valence	Negative response valence	ASE
Action						
M	1,475	1,310	164	1,232	1,280	−48
SD	477	386	258	329	299	252
State						
M	1,340	1,135	205	1,379	1,076	303
SD	418	327	281	309	217	260

Note. AOD = demand-related action orientation; ASE = affective Simon effect (in milliseconds).

words. In line with the affective Simon effect, the analysis yielded an effect of response valence, $F(1, 53) = 2.91$, $p < .05$, one-tailed. Participants were on average slower to respond "negative" than "positive" to positive target words ($M = 1{,}349$ vs. $M = 1{,}203$). No significant effects emerged involving AOD or reward type (all ps $> .10$).

Error Rates

As with the response latency data, we first determined whether participants' average error rates showed an affective Simon effect. In line with the affective Simon effect, participants' error rates were generally lower when target valence and response valence were congruent than when target valence and response valence were incongruent, $F(1, 56) = 5.84$, $p < .02$ ($M = .09$ vs. $M = .14$). We computed participants' error rates by dividing their number of errors by the total number of responses. The analysis of error rates for negative target words revealed the predicted three-way interaction between AOD, reward type, and response valence, $F(1, 53) = 5.14$, $p < .03$. The analysis of error rates for positive target words again yielded no parallel effects.

Looking at the differences in error rates between saying "positive" versus saying "negative" to negative target words (i.e., the affective Simon effect for negative target words), AOD had no effect in the noncontingent reward condition ($F < 1$; $M = .09$ vs. $M = .04$). In the contingent reward condition, however, action-oriented participants had significantly lower affective Simon effects for negative target words than state-oriented participants, $F(1, 53) = 6.97$, $p < .02$ ($M = -.05$ vs. $M = .18$). Stated differently, state-oriented participants displayed a nonsignificant increase in affective Simon effects for negative target words due to contingent rewards, $F(1, 53) = 1.99$, $p = .16$ ($M = .04$ vs. $M = .18$). By contrast, action-oriented participants displayed a marginally significant decrease in affective Simon effects for negative target words due to noncontingent rewards, $F(1, 53) = 3.03$, $p = .088$ ($M = .09$ vs. $M = -.05$).

Supplementary Analyses

AOD correlated positively with AOT, $r(57) = .30$, $p < .03$, and self-esteem, $r(57) = .30$, $p < .03$, and negatively with suppression, $r(57) = -.28$, $p < .04$, and was uncorrelated with reappraisal ($r = -.12$, *ns*). As in Study 1, the analysis revealed no effects of AOT, self-esteem, suppression, or reappraisal that paralleled the effects of AOD.

Discussion

Study 2 confirmed that action orientation, in conjunction with reward type, was a strong moderator of affective Simon effects to negative target words. In the noncontingent reward condition, the response latencies of both action- and state-oriented individuals displayed a Simon effect for negative target words. Thus, both action- and state-oriented participants showed evidence of unintentional, efficient, and fast activation of negative affect in the absence of external stressors. However, this pattern was dramatically different in the contingent reward condition. In response to performance-contingent rewards, the response latencies of state-oriented participants still displayed a Simon effect for negative target words. The response latencies of action-oriented participants, however, showed a nonsignificant reversal of the affective Simon effect: In response to performance-contingent rewards, action-oriented participants were nonsignificantly quicker in saying "positive" than in saying "negative" to negative target words. A very similar pattern was obtained for error rates, attesting to the robustness of our findings. Notably, Study 2 again found only effects of AOD and no effects of AOT, in line with the notion that demanding conditions selectively trigger effects of AOD.

There is a notable difference between the effects of noncontingent rewards on state-oriented participants in Studies 1 and 2. In Study 1, state-oriented participants who had received noncontingent rewards displayed significant decreases in negative affect (i.e., tension). In Study 2, state-oriented participants who had received noncontingent rewards displayed automatic activation of negative affect, albeit to a lesser degree than state-oriented participants who had received performance-contingent rewards. This discrepancy may be explained by the different nature of the affect measures in Studies 1 and 2. In Study 1, negative affect was assessed via self-report, whereas in Study 2, negative affect was assessed via the affective Simon task. Self-reports of tension might easily be affected through passive priming mechanisms, such as the increased accessibility of an unexpected reward. By contrast, reduction of negative affect in the affective Simon task requires active cognitive control, given that the task itself automatically cues negative affect. Thus, the positive effects of noncontingent rewards on state-oriented participants may be primarily mediated by passive affective priming mechanisms.

Study 3

In Study 3, we sought to replicate and extend the findings of Study 2 in three ways. First, we used a visualization task rather than performance-contingent rewards to induce high levels of demand. The validity of the visualization paradigm has been established in prior research on interpersonal relations (Baldwin & Sinclair, 1996). The underlying idea is that visualizing past relationship experiences implicitly activates the interaction patterns and psychological responses that individuals experienced within a specific relationship context. We assumed that visualizing a demanding relationship would prime a host of unfulfilled goals,

expectations, and other regulatory standards (Shah, Kruglanski, & Friedman, 2003), thereby invoking a psychological context of high demand. Similar to the performance-contingent rewards in Studies 1 and 2, a demanding relationship also involves a controlling aspect in that demanding relationship partners pressure people toward particular behaviors.

Second, we used a nonverbal paradigm to assess intuitive affect regulation: the affective processing of facial stimuli. The human face is an exceptionally powerful affect-eliciting stimulus (Zajonc, 1998). Of particular interest is evidence that human responses to threatening faces are mediated by specialized neural circuitry (Morris, Öhman, & Dolan, 1998) that largely operates on nonconscious levels. Our measure of intuitive affect regulation was based on work by Öhman, Lundqvist, and Esteves (2001). In this paradigm, participants are asked to identify a face with a discrepant emotional expression among a crowd of otherwise identical faces. Detecting a happy target face among an angry crowd requires participants to switch their attention from a negative affective context (an angry crowd) toward a positive affective stimulus (a happy face). This attentional switching might be facilitated by intuitive affect regulation processes. In particular, intuitive affect regulation may enhance the efficiency with which individuals are able to detect a happy target face among a crowd of angry distractor faces. We thus predicted that action-oriented participants under high demand would display a recognition advantage for happy faces that were embedded in crowds of angry faces.

Besides providing a nonverbal measure of intuitive affect regulation, the face discrimination task affords a test of the nonrepressiveness of intuitive affect regulation. Past research on face detection has found evidence for a recognition advantage of discrepant angry faces, which are detected more efficiently than discrepant happy or neutral faces (Öhman et al., 2001). The latter effect has been interpreted in terms of automatic vigilance for negative affect. Because automatic vigilance is presumably mediated by bottom-up visual attention mechanisms, it is functionally distinct from intuitive affect regulation (which relates to top-down attention control). We therefore hypothesized that the recognition advantage of angry target faces would emerge in action-oriented participants independently of any recognition advantage of happy target faces among angry crowds. Past research has indicated that repression does interfere with automatic vigilance for negative affect (Langens & Mörth, 2003). Consequently, finding a dissociation between intuitive affect regulation and automatic vigilance for negative affect would further support the distinction between intuitive affect regulation and repression.

Third and last, Study 3 sought to test a potential mediator of intuitive affect regulation. According to PSI theory, intuitive affect regulation skills are controlled by extension memory (Baumann & Kuhl, 2002). Extension memory has a number of cognitive signatures, including facilitation of complex coherence judgments (Baumann & Kuhl, 2002), access to emotional preferences (Kuhl & Kazén, 1994), and autonomous implicit self-evaluations (Koole, 2004c). In the present research, however, we focused on extension memory's significance for accessing self-knowledge. PSI theory argues that one important indicator for the activation of extension memory is the efficiency with which individuals are able to access self-knowledge (Koole & Kuhl, 2003).[5] This variable can be operationalized as speed of responding in a me/not-me self-evaluation task. Self-evaluation in this type of task involves corticolimbic processing (Tucker et al., 2003). In addition, speed at self-evaluation has been related to intuitive self-knowledge (Koole, Dijksterhuis, & Van Knippenberg, 2001) and the possession of clear and certain self-knowledge (McGregor & Marigold, 2003). Accordingly, speed at self-evaluation provides a valid marker of extension memory activation.

We predicted that the demanding visualization would lead to faster self-evaluations among action-oriented participants, an effect that was not predicted for state-oriented participants. This self-activation effect was expected to occur for both negative and positive self-evaluations because PSI theory assumes that extension memory contains both positive and negative self-representations. Extension memory activation thus should be distinguished from self-enhancement processes (Sedikides & Strube, 1997). Finally, we hypothesized that increases in self-activation would mediate intuitive affect regulation among action-oriented participants in the face discrimination task.

Method

Participants and Design

Seventy-one paid volunteers at the Free University Amsterdam (37 men and 34 women, average age 21 years) participated in the experiment. The experimental design was 2 (AOD: state vs. action) × 2 (visualization: demanding vs. accepting) between participants. The main dependent variable consisted of participants' response latencies in detecting smiling faces embedded in matrices of angry faces.

Procedure

The equipment and first part of the procedure were similar to that of Study 1. Participants first answered a few questionnaires assessing individual differences in action AOD, AOT, and self-esteem (respective alphas were .70, .76, and .87). Participants then moved on to a visualization exercise that contained the demand priming manipulation. Next, participants proceeded with a filler task of about 3 min followed by a self-evaluation task, which was designed to assess momentary variations in self-accessibility. After completion of the self-evaluation task, participants went on with the face discrimination task. Before the end of the experiment, participants answered some manipulation check questions and were probed on their beliefs regarding the purpose of the experiment.

Visualization Manipulation

The visualization was closely modeled on prior research (Baldwin & Sinclair, 1996). The procedure was described to the participants as a "visualization exercise" during which they were requested to visualize a particular person from their own life. Participants in the demanding visualization condition were asked to think of a person who was highly demanding of them and to type in this person's initials. These initials were

[5] The astute reader may wonder whether the predicted self-activation effect should not occur for AOT, given our earlier argument that AOT is relevant to self-expression. However, the self-accessibility measure in Study 3 is conceptually related to the certainty with which self-evaluations are held (Campbell, 1990). Self-certainty maps onto the executive functions of the self, because the possession of certain self-knowledge helps guide people toward a clear course of action in conflicted situations (McGregor & Marigold, 2003). AOT is theoretically related to the structural variables of self that are indicative of deep cognitive elaboration, such as self-complexity (Linville, 1985).

used throughout the visualization exercise in referring to the visualization target. Subsequent instructions encouraged participants to vividly imagine being with this person and to reexperience their thoughts and feelings associated with this person. At various stages during the visualization exercise, participants were asked to type in the experiences that were aroused by the visualization. To bolster the credibility of the cover story, participants rated their ease of visualization at the end of the exercise. Participants in the accepting visualization condition went through the same procedure, but were asked instead to visualize a person who was highly accepting of them.

Dependent Measures

Face discrimination task. Participants were shown a series of matrices that were composed of nine schematic faces that were taken from Öhman et al. (2001). The size of each individual face was 3.5 × 4.0 cm. Each set of nine faces was arranged in a 3 × 3 matrix. Half of the matrices were composed of faces that all had the same emotional expression (i.e., happy, angry, or neutral). In the other matrices, one target face had a different emotional expression from that of the background distractors. The target could occur at any of nine positions in the matrix. Thus, there were 54 different matrices containing a target. In addition, there were 3 different distractor matrices without targets (happy, angry, or neutral), each of which was shown 18 times to create an equal number of distractor matrices. The instructions explained to the participants that their task was to detect discrepant faces among the crowds of distractor faces that appeared on the computer screen. Participants responded by pushing either a "one face is different" or an "all faces are the same" button on the keyboard and were asked to keep their hands near the buttons throughout the task. The matrices always appeared on the center of the screen and remained on screen until participants pressed one of the response keys. After making a response, the screen went blank for 1.5 s before the next matrix appeared. With 54 target matrices and 54 distractors, each participant was exposed to 108 randomly ordered matrices.

Self-evaluation task. The self-evaluation task was based on Koole et al. (2001). Participants were informed that a number of trait words would be presented individually on the computer screen. Participants were to decide as quickly as possible whether they themselves possessed the trait or not by pushing either a "me" or a "not me" button on the keyboard. The self-evaluation task consisted of 30 trials. In 15 trials, the target trait was positive (e.g., *creative*, *reliable*), whereas in the remaining 15 trials, the target trait was mildly negative (e.g., *silent*, *impulsive*). To maximize variability in endorsements of these traits, we chose positive and negative traits that characterize most people some of the time. The presentation order of the items was randomized for each participant. The computer unobtrusively recorded each response (i.e., applies to me or not) and the corresponding latency of each response.

Results

Manipulation Check

At the end of the experimental session, participants rated how demanding and how accepting the person was whom they had visualized (1 = *not at all*, 9 = *very much*). These items were scored in the same direction and averaged (Cronbach's $\alpha = .63$). The person who was visualized in the demanding condition was perceived as much more demanding than the person who was visualized in the accepting condition, $F(1, 67) = 42.42$, $p < .001$ ($M = 4.41$ vs. $M = 2.61$). No effects of AOD were found on this index.

Face Discrimination Latencies

Given our hypotheses, we only discuss the results for the responses to crowds that contained a discrepant target face.[6] Notably, our results did not change when we statistically controlled for responses to crowds that contained only distractor faces. Before analyzing participants' response latencies in the face discrimination task, we first removed outliers (responses > 3,000 ms) and erroneous responses from the data set. After this, we computed participants' average latencies for responding to happy, angry, and neutral target faces in crowds with a different facial expression.

Happy among angry pop-out. Our primary interest was in participants' average latencies for detecting happy target faces among angry distractor crowds. To ensure that the results were specific to switches from negative toward positive affect, we controlled for participants' average latencies for detecting happy target faces among neutral distractor crowds. Accordingly, we subjected participants' average response latencies for detecting happy target faces to a 2 (AOD: action vs. state) × 2 (visualization: demanding vs. accepting) × 2 (distractor faces: angry vs. neutral) ANOVA with repeated measures on the last factor. Relevant means are displayed in Table 3. The analysis yielded a highly significant effect of distractor faces, $F(1, 67) = 174.72$, $p < .001$, which indicated that happy target faces were detected more quickly when they were placed among neutral distractor faces than when they were placed among angry distractor faces ($M = 1{,}167$ vs. $M = 1{,}499$). In addition, the analysis revealed a marginal two-way interaction between visualization and context, $F(1, 67) = 3.49$, $p = .066$, and the predicted three-way interaction between AOD, visualization, and context, $F(1, 67) = 4.61$, $p < .04$.

To facilitate the interpretation of the obtained three-way interaction, we computed difference scores by subtracting participants' average response latencies for detecting happy target faces among neutral distractor faces from participants' average response latencies for detecting happy target faces among angry crowds. The resulting scores can be interpreted as an index of happy among

[6] Analysis of participants' average latencies of responding to crowds with only angry, happy, or neutral distractor faces revealed that responses to angry crowds were on average slower than responses to happy and neutral crowds ($M = 1{,}877$ vs. $M = 1{,}620$). Although unanticipated, this effect is consistent with the perseverating, attention-holding qualities of negative affect (Fiske, 1980). Van der Wulp and Semin (2004) suggested that negative affect has perseverating effects when the context is predominantly negative (as is the case for all-angry crowds). Consistent with this interpretation, a 2 (action orientation) × 2 (visualization target) × 2 (facial expression) ANOVA yielded a three-way interaction between action orientation, visualization target, and facial expression, $F(1, 67) = 4.84$, $p < .04$. To interpret this effect, we subtracted average response latencies for happy and neutral faces from average response latencies for angry faces. The resulting scores can be interpreted as an index of the attention-holding qualities of angry faces. State-oriented participants were slower to respond to all-angry crowds when they had visualized a demanding target than when they had visualized an accepting target ($M = 302$ vs. $M = 216$). By contrast, action-oriented participants were quicker to respond to all-angry crowds when they had visualized a demanding target than when they had visualized an accepting target ($M = 213$ vs. $M = 334$). Thus, visualizing a demanding relationship increased perseveration of negative affect among state-oriented participants and decreased perseveration of negative affect among action-oriented participants.

Table 3
Average Response Latencies for Detecting Happy Faces Among Angry or Neutral Crowds (in Milliseconds) as a Function of Visualization and AOD (Study 3)

	Accepting visualization			Demanding visualization		
AOD	Angry distractors	Neutral distractors	HAFPO	Angry distractors	Neutral distractors	HAFPO
Action						
M	1,533	1,108	425	1,422	1,203	220
SD	353	226	239	180	254	148
State						
M	1,498	1,151	347	1,570	1,208	362
SD	225	276	247	202	144	187

Note. AOD = demand-related action orientation; HAFPO = happy among angry faces pop-out (in milliseconds).

angry faces pop-out (HAFPO), with lower values indicating relatively greater speed of detecting happy target faces among angry crowds. Among action-oriented participants, visualizing a demanding relationship led to a faster HAFPO as compared with visualizing an accepting relationship, $F(1, 67) = 8.26$, $p < .006$ ($M = 220$ vs. $M = 425$). Among state-oriented participants, there was a nonsignificant trend in the opposite direction ($F < 1$; $M = 362$ vs. $M = 347$). Another way of interpreting this interaction is to note that there was no difference in HAFPO after participants had visualized an accepting relationship ($F < 1$). After participants had visualized a demanding relationship, however, action-oriented participants had a significantly faster HAFPO than state-oriented participants, $F(1, 67) = 4.46$, $p < .04$.

Angry faces pop-out. We further examined whether we replicated the recognition advantage of angry target faces (Öhman et al., 2001). Accordingly, we conducted an analysis on response latencies for angry, happy, and neutral target faces, with facial expression as a three-level within-subjects variable. Note that this analysis aggregated the results across different distractor crowds. Because the aggregated analysis revealed no effects of AOD and visualization, these factors were dropped from the analysis. The analysis revealed a highly significant effect of facial expression, $F(2, 69) = 15.38$, $p < .001$. Specifically, happy target faces were detected more quickly than neutral target faces, $F(1, 70) = 17.63$, $p < .001$ ($M = 1,333$ vs. $M = 1,420$). Angry target faces, in turn, were detected more quickly than happy target faces, $F(1, 70) = 4.24$, $p < .001$ ($M = 1,299$ vs. $M = 1,333$). Thus, we replicated automatic vigilance for angry faces.

Self-Evaluation Latencies

To remove statistical outliers, response latencies longer than 3,000 ms were excluded from the analyses. Preliminary analyses revealed that similar findings were obtained regardless of whether participants had endorsed the traits or not. In addition, similar findings were found for positive and negative traits. Accordingly, self-evaluation latencies were aggregated across endorsed versus nonendorsed and positive versus negative traits (Cronbach's $\alpha = .81$). We then subjected participants' self-evaluation latencies to a 2 (AOD: action vs. state) × 2 (visualization: demanding vs. accepting) between-participants ANOVA. This analysis yielded the predicted two-way interaction between action orientation and visualization target, $F(1, 67) = 5.11$, $p < .03$. As can be seen in Table 4, action-oriented participants evaluated themselves more quickly after they had visualized a demanding relationship compared with when they had visualized an accepting relationship, $F(1, 32) = 5.10$, $p < .04$ ($M = 1,271$ vs. $M = 1,533$). By contrast, state-oriented participants evaluated themselves nonsignificantly more slowly after they had visualized a demanding relationship compared with when they had visualized an accepting relationship, $F(1, 35) < 1$ ($M = 1,405$ vs. $M = 1,356$). It is important to note that the obtained effects on self-evaluation latencies remained significant when we statistically controlled for participants' trait endorsements in the self-evaluation task.[7]

Mediation Analysis

We have established that demand priming led to self-activation (i.e., greater speed of self-evaluation) and intuitive affect regulation (i.e., HAFPO) among action-oriented participants. Were these patterns mutually related to each other? To examine this issue, we conducted a series of path analyses to establish mediation (Kenny, Kashy, & Bolger, 1998). In the analysis, we focused only on action-oriented participants, given that state-oriented participants showed no effects of demand priming on either self-activation or intuitive affect regulation. To increase the sensitivity of the mediation analysis, we used response latencies for happy faces among neutral crowds as a covariate in predicting response latencies for happy faces among angry crowds rather than using difference scores. The relevant relationships can be seen in Figure 2. The direct relationship between demand level and intuitive affect regulation was significant, $\beta = .35$, $t(32) = 2.79$, $p < .01$. In addition, demand level was predictive of self-activation, $\beta = .37$, $t(32) = 2.26$, $p < .04$. Finally, when intuitive affect regulation was regressed on demand and self-activation, self-activation had a significant effect, $\beta = .43$, $t(32) = 2.73$, $p < .02$, and the effect of demand became smaller and marginally significant, $\beta = .22$, $t(32) = 1.81$, $p = .080$. According to the Sobel test for mediation, this mediation effect was significant ($Z = 1.92$, $p = .04$, one-tailed). Note that a one-tailed Sobel test was appropriate because the direction of the mediation effect was predicted a priori. Moreover, the Sobel test provides a rather conservative estimate of the size of a mediation effect when the mediator is measured with less than perfect reliability (Kenny et al., 1998).

[7] We also examined whether action orientation and visualization influenced the contents of participants' self-evaluations. This analysis revealed no effects on participants' endorsement of positive self-evaluations. For negative self-evaluations, the analysis revealed a main effect of action orientation, $F(1, 67) = 3.94$, $p = .051$, and a marginal interaction between action orientation and visualization, $F(1, 67) = 3.46$, $p = .067$. State-oriented participants endorsed more negative traits after they had visualized a demanding relationship than when they had visualized an accepting relationship, $F(1, 67) = 5.92$, $p < .02$ ($M = 12.00$ vs. $M = 10.78$). Action-oriented participants were not reliably affected in their endorsements of negative traits by the visualization manipulation, $F(1, 67) < 1$ ($M = 12.40$ vs. $M = 12.05$). The observed shift toward more negative self-evaluations might reflect the tendency among state-oriented individuals to internalize the negative expectations of others (Kuhl & Kazén, 1994).

Table 4
Average Self-Evaluation Latencies (in Milliseconds) as a Function of Demand Priming and AOD (Study 3)

	Demand priming	
AOD	Low	High
Action		
M	1,533	1,271
SD	415	257
State		
M	1,356	1,405
SD	227	227

Note. AOD = demand-related action orientation.

Supplementary Analyses

AOD was weakly correlated with self-esteem, $r(71) = .24$, $p < .05$, and uncorrelated with AOT ($r = .12$, *ns*). The analysis revealed no effects of AOT and self-esteem that paralleled the effects of AOD.

Discussion

As predicted, visualizing a demanding relationship caused action-oriented individuals to become quicker in detecting happy faces among angry crowds. No such effect was apparent among state-oriented individuals. Presumably, visualizing a demanding relationship led action-oriented participants to activate some of the intuitive affect regulation skills that they had previously used in coping with demanding interaction partners. Indeed, Study 3 observed effects of AOD and no effects of AOT in response to the demanding visualization. Because only AOD relates specifically to people's habitual manner of coping with demand, the unique effects of AOD fit with the notion that the demanding visualization triggered participants' habitual styles of coping with demand. Presumably, action-oriented individuals' intuitive affect regulation skills facilitated rapid and efficient switching from negative to positive affect, thereby leading to quicker detection of happy faces among angry crowds. As such, the results of Study 3 support the notion that action-oriented individuals possess well-developed intuitive affect regulation skills.

Alternatively, it could be argued that action-oriented participants consciously sought to improve their moods by diverting their attention toward happy faces. However, if these participants had really tried to do so, a more straightforward strategy would have been to spend more time looking at the all-happy crowds. Our results, however, found no evidence for such a pattern (see Footnote 6). Moreover, the detection of happy among angry faces was not facilitated among state-oriented participants who had visualized a demanding person. Past research has established that state-oriented individuals are equally as motivated to experience positive affect as action-oriented participants (Brunstein & Olbrich, 1985; Kuhl, 1981). Accordingly, the lack of effects among state-oriented participants fits with the notion that facilitation of detecting happy faces in an angry crowd was mediated by intuitive volitional mechanisms.

As predicted, the attention-grabbing effect of discrepant angry faces (Öhman et al., 2001) was not moderated by action orientation. Consequently, priming a demanding context did not lead action-oriented individuals to become less vigilant in detecting negative affect. This finding is consistent with other research showing that vigilance toward negative affect is functionally independent of intuitive affect regulation (Koole, 2003; Rosahl, Tennigkeit, Kuhl, & Haschke, 1993). Moreover, this finding further distinguishes intuitive affect regulation from repression, which is associated with reduced vigilance toward negative affect (Langens & Mörth, 2002).

Finally, Study 3 found that visualizing a demanding relationship caused action-oriented participants to become quicker in providing self-evaluations. It is of particular interest that this self-activation effect was found to mediate intuitive affect regulation among action-oriented individuals in the face discrimination task. These findings thus provide the first empirical evidence for the mediating role of extension memory in intuitive affect regulation. It is important to note that our theoretical perspective does not hold that there was something about the particular contents of action-oriented participants' self-evaluations that promoted intuitive affect regulation. Indeed, the mediation effect of self-activation held across both positive and negative traits and across both endorsed and nonendorsed traits, suggesting that the contents of self-evaluation mattered little in the effect. Rather, we suggest that self-activation provides a marker of the involvement of extension memory, the central executive system that drives intuitive affect regulation. This line of reasoning is consistent with prior research, which has interpreted response latencies on the me/not-me task as indicative of access to clear and certain self-definitions (McGregor & Marigold, 2003).

General Discussion

In the present research, we have suggested that action-oriented individuals are capable of intuitive affect regulation, that is, a form of top-down affect regulation in which high-level intuition (extension memory) modulates the person's affective states so that they become congruent with the person's motives, contextual constraints, and goal intentions. To test this line of theorizing, we conducted three studies that focused on the effects of demand-

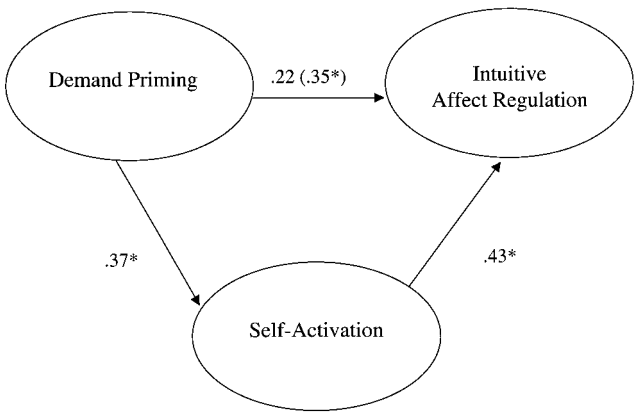

Figure 2. Path analyses testing the mediating role of self-activation in the effects of social demands on intuitive affect regulation (action-oriented participants only; Study 3). The standardized beta value for the direct path is given in parentheses. *$p < .05$ (one-tailed).

related action orientation (AOD) on intuitive affect regulation. Across all three studies, we observed that the experimental induction of demands leads to down-regulation of negative affect among action-oriented individuals, as evidenced in self-reported mood changes (Study 1), in the affective Simon task (Study 2), and in a face discrimination task (Study 3). None of these three studies observed any parallel effects among state-oriented individuals. Taken together, the present research found strong evidence that action orientation is associated with powerful intuitive affect regulation skills.

The intuitive affect regulation skills of action-oriented individuals display a distinctive functional profile. First, intuitive affect regulation is highly sensitive to context, and only becomes triggered when the situation is potentially stressful (Studies 1–3). Second, intuitive affect regulation is efficient, given that it is capable of moderating affective Simon effects (Study 2). Third, intuitive affect regulation is nonrepressive, because it does not interfere with automatic vigilance for negative affect (Study 3). Fourth, intuitive affect regulation is accompanied by a highly accessible self (Study 3). These four characteristics—context sensitivity, efficiency, nonrepressiveness, and self-accessibility—render intuitive affect regulation a highly adaptive volitional tool. Context sensitivity may help action-oriented individuals to shield themselves against aversive affect only when this is required by the current situation. Efficiency is useful when action-oriented individuals must cope with rapidly unfolding, unexpected affect-eliciting events under highly demanding circumstances. Nonrepressiveness allows action-oriented individuals to remain sensitive toward potentially threatening events. Finally, self-accessibility may allow action-oriented individuals to maintain self-integrity under stressful circumstances (McGregor & Marigold, 2003).

In view of the considerable advantages of intuitive affect regulation, one might wonder why state-oriented individuals are lacking in these skills. One reason may be that some social environments are not conducive to the development of intuitive affect regulation skills. The development of intuitive affect regulation functions is inhibited by autonomy-undermining social interactions (Kuhl, 2000). Conditions similar to those that were studied in the present research (i.e., performance-contingent rewards, demanding relationship partners) are thus likely to foster state orientation when these conditions become chronic aspects of people's lives. Past research has shown that autonomy-undermining experiences are associated with reduced affective well-being (Reis, Sheldon, Gable, Roscoe, & Ryan, 2000; Sheldon, Ryan, & Reis, 1996). From the present perspective, this association may arise because autonomy-undermining experiences inhibit the development of intuitive affect regulation skills and thus promote the development of state orientation. Finally, it is important to keep in mind that state-oriented individuals function quite adequately when they are provided with a supportive emotional climate. State-oriented individuals may thus remain relatively free from functional impairments as long as they can manage to stay clear from stressful situations (see Koole et al., in press).

Limitations and Future Perspectives

The present research is still preliminary and thus leaves a host of questions open for further scrutiny. First, in the present research, AOD and AOT emerged as relatively independent facets of action orientation. AOD and AOT were not consistently correlated with one another, and the effects of AOD were not obtained with AOT. The present findings and conclusions thus do not generalize to all types of action-oriented individuals. The specificity of the present findings to AOD may be due to our focus on coping with demand, which theoretically should evoke the AOD type of action orientation. Previous research indeed suggests that AOT is linked to intuitive affect regulation in response to threat (Koole, 2004a, 2004b; Kuhl, 1981; Rholes et al., 1989). Future research should thus explore the effects of action orientation under threatening circumstances, which theoretically should invoke effects of AOT on intuitive affect regulation. Second, the present research used relatively mild stress inductions of a type presumably encountered in many everyday situations. Past research has suggested that action orientation also shields people against more extreme stressors such as repeated failure (Brunstein & Olbrich, 1985; Kuhl, 1981), surgery (Kuhl, 1983), and exposure to phobic stimuli (Schulte et al., 1997). Still, it is vital to conduct further research on the role of intuitive affect regulation in coping with more severely stressful situations.

Third, the present research only focused on down-regulation of negative affect. Although this focus is consistent with the bulk of prior affect regulation research, it is plausible that volitional affect regulation processes will sometimes run counter to (immediate) hedonistic concerns. For instance, Oettingen and Mayer (2002) have shown that indulging in positive fantasies can undermine a person's goal strivings in the absence of a clear action plan. As such, it seems likely that action-oriented individuals would eschew this kind of positive rumination. Given the great theoretical interest in volitional disengagement from positive affect, future research should pay more attention to this issue.

Finally, the present research established the affect regulation functions of action orientation independent of the effects of self-esteem and chronic reappraisal or suppression tendencies. Documenting the unique empirical contribution of action orientation is important, because this highlights the explanatory value that is gained by the construct. However, we do not mean to imply that other individual differences have no effect on affect regulation. Indeed, prior research has established the affect regulation functions of individual differences such as self-esteem (e.g., Greenberg et al., 1992) and chronic reappraisal and suppression (Gross & John, 2003). A major challenge for future research lies in spelling out the functional mechanisms that mediate these and related individual differences in affect regulation.

Concluding Remarks

Volitional control over one's own affective states is a remarkable human achievement. Through this capacity, people can use their feelings wisely and discriminately and thus avoid becoming enslaved by their own passions (Goleman, 1995). On the basis of the present research, it appears that people's potential for volitional affect regulation may be even greater than has been previously assumed. Indeed, the present research found consistent evidence that action-oriented individuals can down-regulate unwanted affect in a highly efficient, nonrepressive, and flexible manner. As such, action orientation represents a vital resource in getting a grip on your feelings.

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(*Appendix follows*)

Appendix

Illustrative Items of the ACS-90 (Kuhl, 1994)

Demand-Related Action Orientation (AOD)

When I know I must finish something soon:

A. I have to push myself to get started

B. I find it easy to get it over and done with*

When I am getting ready to tackle a difficult problem

A. It feels like I am facing a big mountain I don't think I can climb

B. I look for a way to approach the problem in a suitable manner*

When I have a boring assignment:

A. I usually don't have a problem getting through it*

B. I sometimes just can't get moving on it

Threat-Related Action Orientation (AOT)

When I have lost something that is very valuable to me and I can't find it anywhere:

A. I have a hard time concentrating on anything else

B. I put it out of my mind after a little while*

If I've worked for weeks on a project and then everything goes completely wrong with the project:

A. It takes me a long time to adjust myself to it.

B. It bothers me for a while, but then I don't think about it anymore*

When I am being told that my work is completely unsatisfactory:

A. I don't let it bother me for too long*

B. I feel paralyzed

Note. Action-oriented responses are marked with an asterisk.

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