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Subliminal Affect Regulation:

The Moderating Role of Action versus State Orientation

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Abstract

Past research has linked action orientation to intuitive affect regulation (Koole & Jostmann, 2004; Kuhl, 1981). The present research examines whether action orientation can regulate subliminally activated affect. In an experimental study, action- versus state-oriented participants were exposed to subliminal primes of schematic faces with an angry, neutral, or happy expression. Participants subsequently rated their affect on a basic affect measure. The results showed prime-congruent effects among state-oriented individuals: subliminal angry primes led to lower basic affect compared to subliminal happy primes. Action-oriented participants were not influenced by the subliminal priming in their basic affective reactions. The authors conclude that action orientation is a regulator of basic affective responses, even when these responses are triggered outside of conscious awareness.

Keywords: Affect regulation, Subliminal priming, Action orientation, State orientation

People sometimes feel good or bad without knowing exactly where these feelings come from. As experimental research suggests, affective reactions can be triggered by subliminal stimuli that are presented entirely outside of conscious awareness (Zajonc, 2000). Subliminally triggered affect has been found to exert a pervasive influence on mood, evaluative judgments, social information processing, and behavior (Chartrand, Bargh, & Van Baaren, 2003; Stapel, Koomen, & Ruys, 2002; Winkielman, Berridge, & Wilbarger, 2005). Given that affective reactions sometimes interfere with people's goal pursuits (Carver & Scheier, 1990), however, it seems important that people are able to regulate their affective reactions even if these are triggered subliminally. In the present article, we examine the role of action vs. state orientation (Kuhl, 1981) in the regulation of subliminally triggered affect. Specifically, we test the notion that action-oriented individuals are better able to resist the influence of subliminally triggered affect compared to state-oriented individuals.

Feelings without a Cause: Evidence from Subliminal Priming Research

In recent years, it has become increasingly evident that affective reactions can be based on only minimal cognitive processing and often even elude people's conscious awareness. Several lines of investigation have demonstrated that such "basic affective reactions" (Winkielman et al., 2005) can be triggered by subtle changes in the environment (Duckworth, Bargh, Garcia, & Chaiken, 2002), simple body movements (Cacioppo, Priester, & Berntson, 1993), or physical postures (Stepper & Strack, 1993). Throughout these different kinds of affect inducements, people typically remain unaware of the source of their affective reactions. Indeed, it appears that basic affective reactions are often diffuse and free-floating, and "spill over" into people's experience of other stimuli that happen to come along (Zajonc, 2000). Moreover, basic affective reactions can influence behavioral initiative (Hertel & Hardin, 1990), or direct behavioral tendencies towards approach and avoidance (Chen & Bargh, 1999; Gray, 2001; Neumann, Förster, & Strack, 2003).

Some of the most compelling demonstrations of basic affective reactions can be found in the literature on subliminal affective priming (for recent reviews, see Berridge & Winkielman, 2003; Zajonc, 2000). In subliminal affective priming research, participants are first exposed to positive or negative affective stimuli for very brief durations that preclude conscious detection. After this initial exposure, participants' affective reactions are assessed. A pioneering set of studies on subliminal affective priming was conducted by Murphy and Zajonc (1993). In these studies, participants were subliminally primed with human faces expressing either happiness or anger. Following exposure to these subliminal primes, participants had to express their preferences for unfamiliar Chinese ideographs. Results showed that participants rated ideographs more favorably when the prime was a happy rather than an angry face. Notably, no affective priming effects occurred when participants could consciously perceive the happy and angry face primes.

The foregoing paragraphs suggest that the affective system is functionally different from, and operates independently of, conscious cognitive processing. In line with this notion, psychological and neurophysiological research has established that basic affective reactions occur early on in the information processing sequence, and can be triggered with minimal stimulus input (Berridge & Winkielman, 2003; Zajonc, 2000). Moreover, subliminal affective priming effects seem to be resistant to attempts at conscious control (Winkielman, Zajonc, & Schwarz, 1997).

The theoretical relevance of subliminal affective priming research extends beyond the laboratory. In everyday life, people often do not recognize the causes of their affective reactions. For instance, people show clear affective reactions in response to the weather, even though they often fail to identify the weather as a cause of their reactions (Schwarz & Clore, 1983). In principle, people can realize that stimuli such as the weather have influenced their affective states. Oftentimes, however, the causes of people's affective reactions remain inaccessible to them (Wilson & Dunn, 2004). People's minds would possibly be overstrained if the causes for each separate affective reaction had to be processed on a conscious level. In real life, therefore, it seems likely that people experience many affective states without knowing their cause. Subliminal affective

priming research may thus provide a window into the nature of basic affective reactions that are common in everyday life.

Research further suggests that subliminal affective priming can have important downstream consequences. In many cases, subliminally triggered basic affect does not outlive a second or so (Murphy & Zajonc, 1993). However, when people encounter sequences of stimuli that are more consistently positive or negative, subliminal affective priming may accumulate and thereby become more durable (Chartrand et al., 2003, Stapel et al., 2002; Winkielman et al., 2005). Furthermore, the effects of subliminal affective priming extend to cognitive and behavioral processes. For instance, subliminal affective priming has been found to influence stereotyping (Chartrand et al., 2003), as well as motivational responses such as consumption behavior (Winkielman et al., 2005). Taken together, these findings suggest that subliminally triggered affect plays an important role in guiding cognition and behavior.

Action Orientation and Affect Regulation

It is conceivable that basic affective reactions that are triggered by subliminal affective priming may sometimes impede goal-directed behavior (cf. Carver & Scheier, 1990). To the extent that basic affect triggers behavioral tendencies (e.g., approach or avoidance) that are incompatible with people's current goals, it is important for people to exert some level of control over this type of affect. For instance, worsened basic affect may activate behavioral avoidance tendencies (Gray, 2001) that interfere with the person's intention to take initiative (Hertel & Hardin, 1990). Shielding one's intentions thus seems to require some form of volitional control over one's basic affective reactions.

How might people control subliminally triggered affect? Given the unconscious nature of basic affect, it is likely that its regulation also largely operates at unconscious levels. From this perspective, volitional control of subliminally triggered affect may be achieved when automatic affective responses (e.g. dejection caused by a rainy morning) can be overridden in favour of a more adaptive affective response (e.g., cheering up to

get a hard day's work done). Similar to the volitional regulation of behavior (Norman & Shallice, 1986), the regulation of basic affect requires the activation of higher cortical functions (e.g., prefrontal cortex) in order to override inappropriate affective reactions (Kuhl, 2000).

The regulation of basic affect has been addressed by Personality Systems Interactions (PSI) theory (Kuhl, 2000). According to PSI theory, people are capable of regulating basic affective reactions, even when they are unaware of their precise causes. This type of affect regulation is referred to as intuitive affect regulation (Koole & Jostmann, 2004). PSI theory further suggests that the functional basis for intuitive affect regulation is provided by extension memory, which is conceived of as a central executive system linked to the prefrontal cortex that provides integrated knowledge about the self and the environment. If the person responds to worsened basic affect with the activation of extension memory, affect becomes modulated so that it is congruent with the person's current goal intentions, personal motives, and contextual constraints. Because extension memory provides rapid processing of vast amounts of complex information, its workings do not necessarily require the involvement of the conscious mind. In principle, intuitive affect regulation pertains to both positive and negative affect. However, since goal-directed behavior is most impeded by negative affect (Simon, 1967), intuitive affect regulation is likely to be stronger when basic affect is worsened rather than when it is improved.

Aided by intuitive affect regulation processes, people can pursue their goals even in the face of worsened basic affect. However, people do not invariably engage in intuitive affect regulation. According to PSI theory (Kuhl, 2000), worsened basic affect triggers either a metastatic (change-oriented) or a catastatic (change-preventing) mode of regulation. During the metastatic mode of regulation, individuals are likely to activate central executive functions that promote intuitive affect regulation and goal-directed action. Therefore, the metastatic mode is referred to as action orientation. By contrast, during the catastatic mode, central executive functions and intuitive affect regulation are likely to be inhibited. Instead, individuals are more likely to become preoccupied with their current states while in a catastatic mode. The catastatic mode is therefore referred

to as state orientation. Taken together, action versus state orientation are mutually exclusive regulatory modes that become triggered under conditions of worsened basic affect.

Whether a person is more likely to become action-oriented or state-oriented in response to worsened basic affect depends in part on stable individual differences (Kuhl, 2000). Based on their prior experiences with situations that cause significant changes in basic affect (i.e., demanding or threatening situations), some individuals may have learned to react in a predominantly action-oriented manner under conditions of worsened basic affect. By contrast, other individuals may have developed a tendency to react in a state-oriented manner when basic affect becomes more negative. In line with this reasoning, Kuhl (1981, 1994) developed a self-report scale to assess individual differences in action versus state orientation. Based on their scores, some people can be characterized as predominantly state-oriented, whereas others can be characterized as predominantly action-oriented (for reviews and construct validity, see Diefendorff, Hall, Lord, & Strean, 2000; Kuhl & Beckmann, 1994).

Research has gathered ample evidence that individual differences in action versus state orientation are closely linked to intuitive affect regulation. A first line of research has addressed the physiological and behavioral consequences of intuitive affect regulation. For instance, Heckhausen and Strang (1988) observed increased physiological response (i.e., lactate concentration) and decreased athletic performance among state-oriented basketball players under performance pressure, whereas action-oriented players displayed no such effect in response to performance pressure. In a similar vein, Kuhl (1981) found performance decrements on a complex cognitive task after repeated failure experiences among state-oriented but not among action-oriented participants. Furthermore, a negative mood impaired complex coherence judgments among state-oriented but not among action-oriented individuals (Baumann & Kuhl, 2002). Finally, Jostmann and Koole (2005) demonstrated that the induction of mild stress diminished cognitive control, as indicated by the performance on the Stroop color naming task and related paradigms, among state-oriented individuals but not among action-oriented individuals.

A second line of research has focused more directly on the affective consequences of action orientation. Specifically, action-oriented individuals reported less unpleasant feelings in response to repeated failure experiences (Brunstein & Olbrich, 1985). In a similar vein, action-oriented individuals showed less depressive symptoms compared to state-oriented individuals, especially when levels of stress were high (Rholes, Michas, & Shroff, 1989). Furthermore, increases in action orientation predicts whether phobic patients can overcome their phobic fears (Schulte, Hartung, & Wilke, 1997).

Koole and Jostmann (2004, Study 1) examined the temporal dynamics of affect regulation in action- versus state-oriented individuals. In line with prior research (e.g., Brunstein & Olbrich, 1985), action-oriented participants displayed significant down-regulation of tense mood after the induction of mild stress. More important, however, this down-regulation was not so much apparent immediately after the induction of stress, but rather when moods were assessed 10 minutes afterwards. No similar decreases in tension were found when no stress was induced or among state-oriented participants. This finding supports the notion that action orientation entails efficient down-regulation rather than a decreased sensibility towards aversive affect.

Finally, research has begun to investigate how action orientation regulates basic affective reactions without relying on explicit affect measures. Specifically, Koole and Jostmann (2004, Study 2) examined the effects of action orientation in an affective Simon task. In this task, participants were required to provide a positive or negative response to a target stimulus on the basis of a non-affective stimulus feature (e.g., grammatical status). Although the valence of the target stimulus was irrelevant and should be ignored during the task, participants displayed an "affective Simon effect" (De Houwer & Eelen, 1998), i.e., they gave faster responses and made less errors when the valence of the target stimulus was congruent with the valence of the response. However, when the affective Simon task was preceded by the induction of mild stress, action-oriented participants were faster and made less errors compared to state-oriented participants on trials that required them to give positive responses to negative targets. This effect was interpreted as an up-regulation of worsened basic affect evoked by the prior induction of

mild stress. Taken together, these findings suggest that action orientation can regulate basic affective reactions. It remains to be seen, however, whether action orientation can also regulate basic affective reactions that are triggered subliminally.

The Present Research and Hypotheses

We designed the present research to examine the link between action orientation and regulation of subliminally triggered basic affect. To address this issue, we used a subliminal parafoveal priming paradigm (Chartrand & Bargh, 1996) to prime action-oriented and state-oriented participants with schematic drawings of angry, neutral, or happy human faces (Öhman, Lundqvist, & Esteves, 2001). These stimuli are displayed in Figure 1.

Insert Figure 1 about here

We assumed that the schematic faces have an intrinsic affective value to people that is similar for action- and state-oriented individuals. To test this assumption, we conducted a pilot study (N = 59). In this study, action-oriented and state-oriented participants indicated to what extent they perceived the happy, neutral, and angry faces as being negative, disapproving, and aggressive (1 = not at all, 9 = very much). Action-oriented and state-oriented participants' evaluations of the happy and angry faces did not differ, all Fs < 1. Furthermore, the two groups evaluated the neutral face similarly as negative and disapproving, Fs < 1. The only statistically detectable difference lies in the perceived aggressiveness of the neutral face, $F(1, 57) = 4.85$, $p < .05$. State-oriented participants found the neutral face more aggressive than action-oriented participants, M = 5.00 vs. M = 3.97, respectively. Overall, we concluded that action-oriented and state-oriented individuals do not differ in their evaluation of the prime stimuli.

In the parafoveal priming task, participants were subliminally exposed to angry, or neutral, or happy schematic faces. The exposure time for each face was 30 ms, which

has been shown to be below the level of conscious awareness in this task (Chartrand & Bargh, 1996). After the subliminal priming task, participants completed a preference judgment task to measure basic affect (Tesser, Millar, & Moore, 1988).

Our main hypothesis was that action orientation would regulate the effects of subliminal affective priming on basic affective reactions. More specifically, we expected that subliminal affective primes would evoke congruent reactions among state-oriented participants, such that subliminal priming of angry faces would lead to lower basic affect compared to subliminal priming of happy faces. By contrast, we expected no such priming effects among action-oriented participants. As regards subliminal priming of neutral faces, we expected that basic affective reactions in response to those faces would lie in between responses to angry and happy faces.

Method

Participants and Design

Ninety-two paid volunteers at the Free University of Amsterdam (33 men and 59 women, average age 20) participated in the study. The design was 2 (action orientation: action vs. state; between participants) x 3 (prime valence: happy vs. neutral vs. angry; between participants). Participants were randomly assigned to the experimental conditions (happy: $\underline{N} = 31$; neutral: $\underline{N} = 30$; angry: $\underline{N} = 31$). The dependent variable consisted of participants' mean ratings on the basic affect measure.

Procedure

Upon arrival in the laboratory, participants were led to individual cubicles each containing an Apple Macintosh (iMac) computer. Experimental instructions were administered via computer-program. Participants were first informed that they would complete a series of unrelated tasks, which were ostensibly administered together for efficiency rea-

sons. Participants first completed a study on 'personality', which contained a Dutch translation of the Action Control Scale (ACS90; Kuhl, 1994). The ACS90 served as our measure of individual differences in action versus state orientation. On completion of the ACS90, participants moved on with a parafoveal priming task, in which happy, angry, or neutral faces were presented outside of conscious awareness. Participants were told that very brief flashes would appear at unpredictable places and times, and that their task was to decide whether a flash appeared on the left side or the right side of the screen. Immediately after the parafoveal priming task, participants completed a preference judgment task to measure basic affect. Next, participants moved on to some unrelated filler tasks, which lasted about fifteen minutes. Finally, participants continued with a funneled debriefing procedure (Chartrand & Bargh, 1996), after which they were thanked for their efforts and paid.

Independent Variables

Action Orientation

The ACS90 (Kuhl, 1994) measures two interrelated but conceptually independent types of action versus state orientation: first, the capacity to initiate goal-directed action under high demands (demand-related action orientation, AOD), and second, the capacity to engage in goal-directed action in response to threatening experiences (threat-related action orientation, AOT)[1]. According to PSI theory (Kuhl, 2000), threat and demand represent qualitatively different types of aversive affective states, each requiring a specific form of intuitive affect regulation.

In the present research, we administered two 12-item subscales of the ACS90, which respectively measure AOD and AOT. The items of both subscales were intermingled and presented in a different random order for each participant. Each of the items describes a stressful situation, and an action-oriented versus state-oriented way of coping with that situation. For each item, participants were asked to select the response

that best described their own reaction to that situation. An example item of the AOD subscale is "When I know that I must finish something soon: A. I have to push myself to get started. B. I find it easy to get it done and over with". An example item of the AOT subscale is "When I am being told that my work is completely unsatisfactory: A. I feel paralysed. B. I don't let it bother me for too long." In both example items, A represents a state-oriented response, and B represents an action-oriented response. Action-oriented responses were coded as "1", whereas state-oriented responses were coded as "0". Scores were then summed for each subscale. Participants who gave 7 or more action-oriented responses on the AOD scale were classified as action-oriented (N = 45), whereas participants with less then 7 action-oriented responses were classified as state-oriented on that subscale (N = 47). An identical procedure was followed for the AOT scale, N = 34 vs. N = 58, respectively[2].

A priori, we had no strong predictions on whether the subliminal priming procedure would primarily evoke effects of AOD or AOT. To the extent that the angry faces would be perceived as threatening (Öhman et al., 2001), we would expect to find effects of AOT rather than AOD. However, the angry faces that were used in the present study had a closed mouth with a downward curve, whereas threat is much more strongly associated with an open mouth with bared teeth (Aronoff, Barclay, & Stevenson, 1988). A closed mouth in a downward curve has been found to signal strong negativity but only moderate activity (Lundqvist, Esteves, & Öhman, 1999). In view of these considerations, it seems possible that the angry faces would signal disapproval rather than threat, which would lead one to expect effects of AOD rather than AOT. In the remainder of this article, we will generally refer to the broader term "action orientation" rather than to its specific subcategories unless a more precise distinction is required for clarification.

Subliminal Affective Priming

The parafoveal priming task was modelled after Chartrand and Bargh (1996). The priming task was introduced to participants as a study on reaction speed to visual stimuli. We instructed participants to react as quickly and as accurately as possible to brief flashes

that appeared at various locations on the computer screen. When a flash appeared on the left side of the screen, participants were to press a green key on the left side of the keyboard. When a flash appeared on the right side of the screen, they were to press a red key on the right side of the keyboard. Participants were told that the flashes would appear at unpredictable times and locations, and that the best strategy would be to keep their eyes on a fixation point in the center of the screen. Before participants started with the actual task, they were given five practice trials. During the practice trials, no faces were primed. During the following 24 experimental trials, participants were subliminally primed with happy, or angry, or neutral faces. Each face prime was presented for 30 ms, and was immediately followed by a 100 ms mask consisting of dots and lines. No feedback was given to the participants regarding their performance during the parafoveal priming task (for more details regarding the parafoveal priming task, see Chartrand & Bargh, 1996).

Basic Affect Measure

Our measure of basic affect was adapted from Tesser et al. (1988). Participants were informed that the next study was on the aesthetic evaluation of words. They were to evaluate the pleasantness of some non-existing words on a scale ranging from 1 (unpleasant) to 7 (pleasant). Only the two anchors of the scale were labeled. Participants were told that the experimenters had chosen non-existing words in order to avoid disturbing influences of word meaning. Participants were instructed not to spend too much time on the evaluation and to simply report their first reactions. The three non-existing words ("pleban", "lempon", "tokitorer"; Stapel, 2002) were shown in random order for each participant.

Awareness Check

At the end of the experimental session, we assessed whether participants had been aware of the priming procedure. We used a funneled debriefing procedure (Chartrand &

Bargh, 1996) in which participants were asked questions about the study with increasing specificity. First, participants had to indicate what they thought had been the purpose of the tasks they had performed. Next, they were asked to indicate whether they thought that the tasks were related to each other, and whether anything about the study seemed strange or suspicious to them. Finally, participants were asked to indicate what they had seen during the flashes. No participants guessed the real purpose of the experiment, neither did they report being suspicious about the priming procedure. The majority of participants (92.4 % of the entire sample) reported to have seen something unrelated to the prime stimuli (e.g., a pattern of lines). Seven participants (7.6 % of the entire sample), however, reported that they had seen a head, a face, or a smile during the flashes. These participants were excluded from further analysis.

Results

Reliability coefficients for AOD (Kuder-Richardson (KR) 20 coefficient = .70) and AOT (KR 20 coefficient = .73) were satisfactory. We only report effects on AOD, since all effects on AOT were non-significant (all Fs < 1). Reliability for our basic affect measure was unacceptably low (Cronbach's alpha = .21). Therefore, we decided to conduct both multivariate analyses with the three single implicit affect items as separate dependent variables, as well as univariate analyses with the averaged overall basic affect scale as a dependent variable[3].

Both analytic strategies yielded similar results. Specifically, a 2 (action orientation: action vs. state; between participants) x 3 (prime valence: angry vs. neutral vs. happy; between participants) multivariate ANOVA with three basic affect scores as dependent variables yielded a significant interaction between action orientation and prime valence, $F(6, 154) = 2.56$, $p < .03$, $\square^2 = .09$, $\square = .84$. Likewise, a 2 (action orientation: action vs. state; between participants) x 3 (prime valence: angry vs. neutral vs. happy; between participants) univariate ANOVA with participants' averaged basic affect ratings as dependent variable revealed a significant interaction between action orientation

and prime valence, $F(2, 79) = 4.46$, $p < .05$, $\square^2 = .08$, $\square = .75$. To facilitate the interpretation of the effect, however, we report only the simple analyses on the averaged overall basic affect scale. Relevant means are displayed in Table 1.

Insert Table 1 about here

LSD post hoc analyses revealed that prime valence had a significant effect on basic affect among state-oriented participants, $F(2, 79) = 4.40$, $p < .05$, $\square^2 = .07$, $\square = .74$. More specifically, subliminal priming with happy faces resulted in higher basic affect compared to subliminal priming with neutral ($p < .05$), or angry faces ($p < .01$), $M = 4.24$ vs. $M = 3.44$ vs. $M = 3.17$, respectively. However, prime valence had an opposite, albeit nonsignificant, effect on basic affect among action-oriented participants, $F(2, 79) = 1.01$, $p > .2$. Subliminal priming with happy faces resulted in slightly lower basic affect among action-oriented participants compared to subliminal priming with neutral or angry faces, $M = 3.50$ vs. $M = 3.71$ vs. $M = 4.04$, respectively.

An alternative way to interpret the results is to note that subliminal priming with angry faces resulted in lower basic affect among state-oriented participants compared to action-oriented participants, $F(1, 79) = 4.76$, $p < .05$, $\square^2 = .04$, $\square = .58$. By contrast, subliminal priming with neutral faces did not yield any differences in basic affect between state-oriented and action-oriented participants, $F < 1$. Finally, subliminal priming with happy faces resulted in marginally higher basic affect among state-oriented participants compared to action-oriented participants, $F(1, 79) = 3.86$, $p = .053$, $\square^2 = .03$, $\square = .49$.

Additional analyses revealed that performance during the parafoveal priming task had no effect on basic affect ratings. More specifically, when we reran the analyses with the average number of incorrect responses during the parafoveal priming task (3.8

%) and participants' mean response times for each trial (334 ms) as covariates, all results remained intact, all Fs < 1.

Discussion

Past research has shown that subliminal affective priming can have a significant impact on people's basic affective reactions (Chartrand et al., 2003; Murphy & Zajonc, 1993; Stapel et al., 2002; Winkielman et al., 2005). In the present article, we explored whether action-oriented individuals are capable of regulating subliminally triggered basic affect. Our results showed that subliminal affective priming effects were only found among state-oriented participants. By contrast, action-oriented participants' basic affective responses were not influenced by subliminal affective priming. Indeed, action-oriented participants displayed higher basic affect compared to state-oriented participants in response to priming with angry faces. Taken together, the present research provides evidence that action-oriented individuals are able to regulate subliminally triggered basic affect.

The present findings add to prior research that has demonstrated efficient down-regulation of basic affect among action-oriented individuals (Koole & Jostmann, 2004). In this prior demonstration, however, the affect eliciting stimuli were consciously accessible to the participants. The present study is thus the first to show that action orientation promotes affect regulation even when the source of the affective reaction remains unrecognized. This finding is notable because prevalent theorizing has suggested that subliminal affective reactions unfold early during stimulus perception and relatively unimpeded by top-down processes (Zajonc, 2000). Moreover, prior research has shown that subliminally elicited basic affect resists conscious interventions (Winkielman et al., 1997).

How can we reconcile the present findings with existing ideas about the nature of subliminally elicited basic affect? PSI theory (Kuhl, 2000) suggests that action-oriented individuals regulate their affective states so that affect facilitates goal-directed

behavior. Goal-directed behavior is served best when individuals do not suppress any affective signal that comes along but remain susceptible to potential opportunities and dangers (Carver & Scheier, 1990). In line with this assumption, prior research has shown that intuitive affect regulation among action-oriented individuals does not interfere with automatic vigilance for negative affect (Koole & Jostmann, 2004, Study 3). Consequently, the present finding does not challenge the idea that basic affective reactions unfold early during stimulus perception (Zajonc, 2000). However, the present finding does suggest that people are able to exert volitional control over these basic affective reactions. This volitional control over basic affect is likely to rely on unconscious control processes (Kuhl, 2000) rather than on conscious attribution (Winkielman et al., 1997).

Subliminal affect regulation seems adaptive for several reasons. First, subliminal affect regulation allows people to control basic affective reactions without knowing their cause. Second, subliminal affect regulation presumably does not rely on the limited capacity of the conscious mind. As a consequence, people are likely to regulate affective reactions that are triggered by more than one single cause. The present research has shown that action-oriented individuals can regulate affective reactions that are caused by repeated subliminal exposure to the same (aversive) stimulus. Although it remains to be examined by future research, we can speculate that action orientation may not only shield against the affective consequences of a rainy morning (Schwarz & Clore, 1983), but also against the scowling faces caught up in the same morning's traffic jam.

Limitations and Future Perspectives

The present research is still preliminary and leaves several questions unanswered. First, in line with PSI theory (Kuhl, 2000) our suggestion was that action-oriented participants actively regulate their basic affective reactions. Although this assumption has been confirmed in prior research (Koole & Jostmann, 2004), it was not directly tested in the present investigation. Future research on subliminal affect regulation should therefore in-

clude more direct measures of affective regulation (e.g., affective Simon task) as well as pretest measures of basic affect.

Second, the present findings differ from prior research, which has consistently found main effects of subliminal affective priming rather than an interaction between subliminal affective priming and action orientation (e.g., Murphy & Zajonc, 1993; Stapel et al., 2002). Prior research has not controlled for individual differences in action orientation, which renders speculations about its role during these studies difficult. One possible explanation for the inconsistency between studies is that prior research has unwittingly relied on observations of predominantly state-oriented samples. This corresponds with the significant main effect of prime valence among state-oriented participants in the present research.

An alternative explanation would be that the difference between our reseach and prior work is due to differences in the situational context in which the priming took place. According to PSI theory (Kuhl, 2000), action-oriented individuals are unlikely to regulate their affective states when the situational context endorses relaxation. In line with this assumption, basic affective reactions between action-oriented and state-oriented participants have been found to be similar under relaxing and accepting circumstances (Koole & Jostmann, 2004). Possibly, the context in which our research took place endorsed relaxation to a lesser degree compared to prior research. Further research is required to gauge the conditions under which subliminal affect regulation among action-oriented individuals takes place.

Concluding Remarks

Feelings sometimes arise without any obvious cause. Such basic affective reactions pose a challenge to people's affect regulation skills because they can be unpredictable and resistant to attempts at conscious control. Using a subliminal affective priming paradigm, the present research was able to show that action orientation may allow people to shield themselves against the intrusion of basic affective reactions. This capacity for

subliminal affect regulation seems a remarkable human achievement, which may pro-promote goal-directed action even when affect creeps in unnoticed.

Footnotes

1. The terms "threat-related" and "demand-related" action orientation were suggested by Koole and Jostmann (2004) as alternatives to Kuhl's (1994) original "failure-related" and "decision-related" action orientation, respectively. We believe that the new denotation fits better with relevant constructs within PSI theory (Kuhl, 2000).

2. The sample splits on the AOD and the AOT subscales were performed on the normative midpoints derived from a large-scale study among Dutch university students (N = 1,457; Koole, 2003; cf. Kuhl, 1994). We further examined our data using a regression approach. The results showed that the critical AOD X Prime Valence interaction on basic affect was significant, □ = - .242, $t(84) = -2.25$, $p < .03$. Thus, the regression and ANOVA approaches revealed equivalent results. We report the ANOVA results in the main body of this article to facilitate inspection of the absolute means.

3. We believe that the low reliability coefficient of the implicit affect measure can be explained by a peculiarity of our task. Specifically, task instructions informed participants that the experimenters were interested in why some combinations of letters were evaluated more positively than others. Presumably, these instructions had made participants believe that their preferences for some of the stimuli should be expressed in comparison to other stimuli. As a consequence, a relatively positive evaluation of a target stimulus might have been followed by a comparatively negative evaluation of a subsequently presented target stimulus. Given the random order presentation of the three stimuli, intercorrelations appeared to be rather weak.

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Table 1

Mean basic affect ratings as a function of orientation and subliminal affective priming (standard deviations appear in parentheses).

	Subliminal affective priming					
	Happy		Neutral		Angry	
Orientation	M (SD)	n	M (SD)	n	M (SD)	n
Action orientation	3.50 (1.29)	12	3.71 (1.10)	14	4.04 (.63)	18
State orientation	4.24 (.85)	18	3.44 (.96)	13	3.17 (1.37)	10

Note: Ratings were made on a scale from 1 = “unpleasant” to 7 = “pleasant”.

Figure captions

Figure 1

Experimental stimuli used as subliminal affective primes (Adapted from Öhman et al., 2001).

Angry Happy Neutral

Figure 1