Research Article

Approach-Motivated Positive Affect Reduces Breadth of Attention

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ABSTRACT—*Research has found that positive affect broadens attention. However, these studies have manipulated positive affect that is low in approach motivation. Positive affect that is high in approach motivation should reduce the breadth of attention, as organisms shut out irrelevant stimuli as they approach desired objects. Four studies examined the attentional consequences of approach-motivated positive-affect states. Results were consistent with predictions. Participants showed less global attentional focus after viewing high-approach-motivating positive stimuli than after viewing low-approach-motivating positive stimuli (Study 1) or neutral stimuli (Study 2). Study 3 found that greater trait approach motivation resulted in less global attentional focus after participants viewed approach-motivating positive stimuli. Study 4 manipulated affect and approach motivation independently. Greater approach-motivated positive affect caused lower global focus. High-approach-motivated positive affect reduces global attentional focus, whereas low-approach-motivated positive affect increases global attentional focus. Incorporating the intensity of approach motivation into models of positive affect broadens understanding of the consequences of positive affect.*

Much research over the past 20 years has found that positive affect broadens cognition and attention (e.g., Rowe, Hirsh, & Anderson, 2006; for reviews, see Fredrickson, 2001, and Isen, 2000). Indeed, this result is considered "one of the most robust and widely confirmed findings in the affect literature" (Isen, 2002, p. 57).

Previous reports on positivity and broadening have used the term *affect* (Isen, 2002), *mood* (Gasper & Clore, 2002), or *emotion* (Fredrickson, 2001) to describe the positive state manipulated. Emotions are often viewed as phenomena comprising multiple moderately correlated components, including feelings of pleasure or displeasure, overt or covert motor behaviors, action readiness, physiological changes, and cognitive appraisals (Frijda, 1993; Lang, 1995). Moods are similar to emotions, except that moods are said to lack objects (Frijda, 1994). Although moods may be different from emotions, past research has found that positive moods and positive emotions have identical effects on broadening of cognition and attention.

Much work on emotions has emphasized that they have a number of underlying dimensions. Two dimensions that have received considerable attention are affective valence, the felt pleasure or displeasure, and motivational direction, the action tendency associated with a particular emotional state—approach or withdrawal. Approach motivation refers to an urge or action tendency to go toward an object, whereas withdrawal motivation refers to an urge or action tendency to move away from an object. Because the word *emotion* is often associated with discrete emotion words, such as *joy*, and because we focus on the dimensions underlying specific emotions, we use the term *positive affect* in this article.

In past studies on positivity and broadening, positivity was created by giving participants gifts, having them view funny films, or asking them to recall pleasant memories. These manipulations likely evoked low approach motivation; they involved emotions that were experienced after a goal was obtained or emotions that were not relevant to a goal. Positive affects, however, vary in the degree to which they are associated with approach motivation. Some positive-affect states are low in approach motivation (e.g., joy after watching a funny film),

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whereas others are higher in approach motivation (e.g., enthusiasm or desire while approaching an attractive object).

Given the importance of approach-motivated positive-affect states to biologically important outcomes such as reproduction, social attachment, and the ingestion of food and water, it seems likely that such states would not be associated with attentional and cognitive broadening. Rather, we would expect them to be associated with decreases in the breadth of attention, as organisms shut out irrelevant stimuli, perceptions, and cognitions as they approach and attempt to acquire the desired objects.[1]

The distinction between low- and high-approach positive affect bears similarity to other conceptual distinctions in the literature. For instance, Panksepp (1998) discussed a play emotive system that "may help animals project their behavioral potentials joyously to the very perimeter of their knowledge and social realities" (p. 283). He also discussed a second system, the seeking emotive system, "that leads organisms to eagerly pursue the fruits of their environment" (p. 145). The play system seems linked to broadening, whereas the seeking system seems linked to focusing. Other researchers have discussed appetitive or pregoal positive states as being different from consummatory or postgoal positive states (Knutson & Wimmer, 2007), or have discussed wanting as different from liking (Berridge, 2007). Pregoal and postgoal positive-affect states are associated with different neural structures and neurochemicals (Berridge, 2007; Harmon-Jones, 2006; Knutson & Wimmer, 2007; Panksepp, 1998). Seeking, pregoal, approach-motivated positive affects may have emerged to assist in promoting reward acquisition.

To expand understanding of the effects of positive affect on attentional processes, we designed four studies to examine the consequences of approach-motivated positive-affect states on attention. Whereas previous studies found that playful, low-approach positive affect (e.g., amusement) broadens attention, we predicted that seeking, high-approach positive affect (e.g., desire) would not broaden attention, but might instead reduce the breadth of attention, relative to neutral affect.[2]

STUDY 1

Method

Forty-two introductory psychology students participated in Study 1 in exchange for course credit. After receiving instructions for the local-global task (see the next paragraph), participants viewed a film that showed the outside of houses and was designed to make them feel neutral. Next, participants were randomly assigned to view one of two films designed to make them feel positive affect. Low-approach positive affect was evoked with a film that depicted cats in humorous situations. High-approach positive affect was evoked with a film that showed delicious desserts. All film clips lasted 1 min 39 s.

After viewing the positive-affect film, participants completed Kimchi and Palmer's (1982) 24-item local-global visual-processing task, which assesses breadth of attention (Fredrickson & Brannigan, 2005; Gasper & Clore, 2002). In each trial, three figures, each comprising three to nine local elements (triangles or squares), were presented. One figure, the standard, was positioned on top, and the two other figures, the comparisons, were positioned below. One of the comparison figures had local elements that matched the local elements of the standard, whereas the other comparison figure had a global element that matched the global element of the standard. Thus, judgments of which comparison figure was more similar to the standard figure could be based on either the global element of one comparison figure or the local elements of the other comparison figure. Participants were asked to press a key to indicate their "first and most immediate impression" as to which of the two comparison figures in each triad best matched the standard figure.

The score on this task was the number of times the participant chose the comparison figure with the same global element as the standard figure. Thus, higher scores indicate a more global focus. Because the scores were skewed, they were log-transformed to produce a more normal distribution.

Finally, participants rated how they felt during each film, using a scale ranging from 0 (*no emotion*) to 8 (*strongest feeling*; Ekman, Friesen, & Ancoli, 1980). The feelings assessed were amusement, anger, anxiety, contentment, desire, disgust, engagement, fear, happiness, interest, sadness, and serenity.

Results

Participants' attentional focus was more global after the cats film ($M = 2.04$, $SD = 0.93$) than after the desserts film ($M = 1.54$, $SD = 0.74$), $t(40) = 1.95$, $p_{rep} = .87$, $d = 0.31$.

We predicted that the positive-affect films would differentially affect amusement and desire. Ratings for all other positive-affect items were averaged to form a measure of general positive affect; ratings for the negative-affect items were averaged to form a measure of general negative affect. The cats film evoked more amusement ($M = 6.05$, $SD = 2.24$) and general positive affect ($M = 3.56$, $SD = 1.93$) than the houses film ($M = 0.70$, $SD = 1.13$, and $M = 1.28$, $SD = 1.44$, respectively), $t(19)$s > 5.00, p_{rep}s $= .99$, ds > 0.80. The desserts film evoked more desire ($M = 5.14$, $SD = 2.85$) and general positive affect ($M = 2.91$, $SD = 1.80$) than the houses film ($M = 2.57$, $SD = 2.42$, and $M = 1.88$, $SD = 1.81$, respectively), $t(21)$s > 3.60, p_{rep}s $= .98$, ds > 0.56.

Comparison of ratings for the two positive-affect films revealed that the cats film evoked more amusement ($M = 6.05$, $SD = 2.24$) than the desserts film ($M = 2.67$, $SD = 2.58$), $t(39) = 4.48$,

[1]Easterbrook's (1959) idea that emotional arousal causes a reduction in the "range of cue utilization" (p. 183) is consistent with our prediction. However, Easterbrook referred to drive, which he viewed as negative: Drive is "a dimension of emotional arousal or general covert excitement, the innate response to a state of *biological deprivation or noxious stimulation* . . . . The emotional arousal is greater in neurotic than in normal subjects . . ." (p. 184, italics added).

[2]We use the term *broadening*, as in past work (Fredrickson, 2001). We recognize that the concept of attentional broadening may be complex and involve several processes (Wachtel, 1967).

p_{rep} = .99. In contrast, the desserts film evoked more desire (M = 5.14, SD = 2.85) than the cats film (M = 1.00, SD = 1.65), $t(39) = 5.65$, p_{rep} = .99, d = 0.87. As expected, general positive affect and negative affect did not differ between the two positive-affect films, $t(39)$s < 1.11, p_{rep}s < .66.

Discussion

Study 1 found that attentional focus was broader when participants experienced low-approach positive affect (amusement) than when they experienced high-approach positive affect (desire). However, this study did not include a neutral comparison condition, so it did not indicate whether attentional focus is less broad when participants experience approach-motivated positive affect than when they experience neutral affect. Therefore, in Study 2, we included a neutral condition.

STUDY 2

Method

Thirty-two introductory psychology students (13 females, 19 males) participated in Study 2 for course credit. In this study, we used pictures to evoke approach-motivated positive affect and Navon's (1977) letters task to assess attentional breadth. On individual monitors, participants viewed 6 neutral practice trials (pictures of rocks) and then 64 experimental trials. Each experimental trial began with a fixation cross, which appeared for 500 ms. Next, a picture of a dessert or rock appeared for 6 s. Pictures were matched for color, brightness, and object size. After another 500-ms fixation cross, a stimulus from the letters task was displayed until the participant responded (see the next paragraph). If there was no response within 5 s, the next trial began. The intertrial interval was 18 to 20 s.

The stimuli in the letters task were large letters composed of smaller letters. Each vertical and horizontal line of a large letter was made up of five closely spaced local letters (e.g., an *H* made up of *F*s). Participants were asked to indicate "as quickly as possible" whether the picture contained the letter *T* or the letter *H*, by pressing the left shift key or the right shift key, respectively. Global targets were those in which a *T* or an *H* was composed of smaller *L*s or *F*s. Local targets were those in which a large *L* or *F* was composed of smaller *T*s or *H*s. Faster responses to the large than to the small letters indicated a global (broad) focus, whereas faster responses to the small than to the large letters indicated a local (narrow) focus. Thirty-two local and 32 global targets were presented in random order.

Finally, participants viewed the dessert and rock pictures (3 s each) again and indicated how pleasing (1 = *very pleasing*, 9 = *very unpleasing*) and arousing (1 = *exciting*, 9 = *calm*) each was, using the Self-Assessment Manikin (Bradley & Lang, 1994). Desire for each object pictured was also measured (1 = *really desired*, 9 = *did not desire*).

Results

Response times (RTs) on the letters task were logarithmically transformed. Trials with incorrect responses (4% of the sample) and trials on which the RT was more than 3 standard deviations from the mean for that stimulus (0.08% of the sample) were excluded from analyses (Fazio, 1990). A 2 (picture type: dessert or neutral) × 2 (target type: local or global) within-subjects analysis of variance (ANOVA) revealed a significant interaction, $F(1, 32) = 35.61$, p_{rep} = .99, η_p^2 = .53. RTs to global targets were slower after dessert pictures than after rock pictures, p_{rep} = .92. In contrast, RTs to local targets were faster after dessert pictures than after rock pictures, p_{rep} = .99. After rock pictures, participants responded more quickly to global targets than to local targets, p_{rep} = .99. The latter finding is consistent with Navon's (1981) results; participants generally show a global bias when in a neutral mood. After dessert pictures, RTs to global and local targets were similar, p_{rep} = .70 (see Fig. 1).

A 3 (rating: valence, arousal, or desire) × 2 (picture: dessert or rock) within-subjects ANOVA on the picture ratings revealed a significant interaction, $F(2, 66) = 16.99$, p_{rep} = .99, η_p^2 = .34. Dessert pictures were more pleasing (M = 3.38, SE = 0.17), arousing (M = 5.08, SE = 0.34), and desirable (M = 4.12, SE = 0.26) than rock pictures (M = 5.05, SE = 0.21; M = 7.43, SE = 0.23; and M = 7.15, SE = 0.28, respectively), p_{rep}s = .99. These self-reported responses to the pictures suggest that the dessert stimuli evoked approach motivation.

Discussion

Studies 1 and 2 revealed that high-approach positive affect reduced the breadth of attentional focus. To verify that approach motivation was responsible for the effects of our positive-affect manipulations on attentional broadening, we conducted Study 3, in which we measured individual differences in approach motivation and related them to attentional responses. We predicted

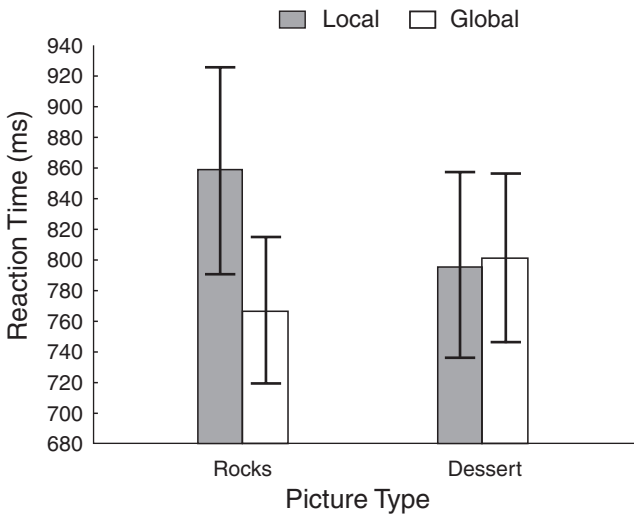

Fig. 1. Results from Study 2: reaction times for local and global targets as a function of picture type.

that individuals higher in trait approach motivation would respond with less broad attentional focus following approach-motivating stimuli, compared with individuals lower in trait approach motivation.

STUDY 3

Method

Two hundred thirty-nine introductory psychology students (110 females, 129 males) participated in Study 3 in exchange for course credit.[3] The methods in Study 3 were identical to those in Study 2, except for two changes. First, trait approach motivation was measured using Carver and White's (1994) behavioral inhibition/behavioral activation system (BIS/BAS) questionnaire. The BIS portion of this instrument measures reactions to the expectation of punishment; the BAS portion measures persistent pursuit of desired goals, positive responses to the occurrence or anticipation of reward, and a desire for new rewards and a willingness to approach rewarding events.

Second, two substudies were run. The first used the dessert pictures from Study 2, and the second used baby-animal pictures designed to evoke approach motivation. Different neutral pictures were shown in the two substudies; they were matched to the affective pictures, as in Study 2.

Results

In the first substudy, the interaction of picture type (dessert or neutral) and target type (local or global) was significant, $F(1, 135) = 30.13$, $p_{rep} = .99$, $\eta_p^2 = .18$. In the second substudy as well, the interaction of picture type (baby animal or neutral) and target type (local or global) was significant, $F(1, 112) = 24.77$, $p_{rep} = .99$, $\eta_p^2 = .18$. Because these substudies produced identical results, they were combined for further analysis. Decomposition of the interaction revealed that after viewing neutral pictures, participants responded more quickly to global targets than to local targets, $p_{rep} = .99$. In contrast, after viewing approach-motivating pictures, participants responded more quickly to local targets than to global targets, $p_{rep} = .99$. Also, RTs to global targets were slower after approach-motivating pictures than after neutral pictures, $p_{rep} = .99$. RTs to local targets were not significantly different after approach-motivating and after neutral pictures, $p_{rep} = .18$. As in Study 2, the picture ratings indicated that the high-approach positive stimuli evoked approach motivation.

To examine whether behavioral activation related to attentional responses, we conducted regressions in which RTs to targets following approach pictures were predicted by BAS scores and RTs to targets following neutral pictures. For global targets, higher BAS scores predicted slower responses, $\beta = .06$, $pr = .17$, $t(235) = 2.63$, $p_{rep} = .96$. For local targets, BAS score was a nonsignificant predictor. BIS score was not a significant predictor of RTs when analyzed in the same manner.

Discussion

Study 3 provided evidence supporting the hypothesis that the reduced breadth of attentional focus caused by appetitive stimuli is due to approach motivation, as individuals with higher BAS scores showed greater reductions in the breadth of attentional focus following appetitive stimuli.

We conducted a fourth study to further test whether approach motivation mediates the reduction in breadth of attentional focus following exposure to appetitive stimuli. As past research has suggested that the expectancy to act increases motivational intensity (for a review, see Brehm & Self, 1989), we manipulated the intensity of approach motivation by experimentally varying the expectancy to act. Specifically, we manipulated participants' expectation that they could consume the desserts they saw. In past work, participants who had the expectation of acting on their aroused anger exhibited increased relative left frontal cortical activation (Harmon-Jones, Lueck, Fearn, & Harmon-Jones, 2006), an activation pattern that reflects approach motivation. Moreover, this increased cortical activation was related to behavioral measures of approach motivation (Harmon-Jones, Sigelman, Bohlig, & Harmon-Jones, 2003). However, the expectancy did not affect self-reports of anger; that is, the anger manipulation resulted in equal increases in self-reported anger (relative to no-anger conditions) among participants given low expectation to act and those given high expectation to act.

For Study 4, we predicted that participants who viewed dessert pictures and expected to consume the desserts would have the least broad attentional focus. Participants who simply viewed the dessert pictures were expected to have a slightly less broad attentional focus than those in the neutral condition, and participants who viewed neutral pictures were expected to have the broadest attentional focus.

STUDY 4

Method

Forty-nine female introductory psychology students participated in Study 4 in exchange for course credit. They first indicated their feelings at the moment, providing ratings (1 = *not at all*, 7 = *extremely*) for the following items: afraid, angry, content, discouraged, disgusted, distressed, down, eager, enthusiastic, excited, frustrated, glad, gloomy, good mood, happy, interested, irritated, mad, nervous, pleasant, sad, satisfied, serene, and tranquil.

After viewing 6 neutral pictures, participants were randomly assigned to condition: Two thirds of participants viewed 36 dessert pictures, and one third viewed 36 neutral pictures (e.g., paper plates). Half the participants who viewed dessert pictures were given the expectation that they would be able to consume

[3]No significant effects of sex of subject emerged in this study.

the desserts; this manipulation was intended to increase approach motivation. The other half of the participants who viewed dessert pictures were not given this expectation. All participants who viewed the neutral pictures were given the expectation that they would be able to take the items pictured. Because the neutral items were not desirable, they were not expected to evoke approach motivation. We gave participants the expectation of obtaining the items by informing them, "At the end of the experiment, you will be presented with a large tray that contains most of the items you will see in the pictures. You will be able to take as many as you want." Each picture was displayed for 12 s and preceded by a 2-s fixation cross. The intertrial interval varied between 6 and 8 s.

After viewing the pictures, participants completed another emotion questionnaire. Then, they completed Navon's (1977) letters task, this time with 48 (24 local, 24 global) pictures presented in random order; the first 12 trials were practice. Finally, before being dismissed, participants in all conditions were allowed to take any desserts they wanted.

Results

RTs on the letters task were logarithmically transformed. Trials with incorrect (3.2%) and outlying (0.17%) responses were removed from analysis. Results from Studies 2 and 3 suggested that a contrast-coded local-minus-global difference score captures the outcome variable of interest. Given our prediction, conditions were contrast-coded from least to most approach-motivated positive affect. Therefore, assigned weights were −3 for the neutral condition, +1 for the dessert condition, and +2 for the dessert condition with expectation to consume. The latter two conditions were psychologically closer to each other than to the neutral condition and thus were assigned similar weights. As predicted, the contrast was significant, $F(1, 46) = 5.53$, $p_{rep} = .92$, $\eta_p^2 = .11$; it indicated that attention was least broad in the expectancy-to-consume/dessert-picture condition, followed by the dessert-picture-only condition, and then the neutral condition (see Fig. 2).

Ratings from the first emotion questionnaire were used as a covariate to control for baseline affect. For the high-approach positive-affect variables (i.e., excited and enthusiastic), the contrast-coded analysis of covariance (ANCOVA) was significant, $F(1, 45) = 5.82$, $p_{rep} = .93$, $\eta_p^2 = .12$, and $F(1, 45) = 6.33$, $p_{rep} = .93$, $\eta_p^2 = .12$. Excitement and enthusiasm increased from the neutral condition ($M = 1.88$, $SE = 0.44$; $M = 2.11$, $SE = 0.42$) to the dessert condition ($M = 2.87$, $SE = 0.44$; $M = 3.43$, $SE = 0.42$), and increased slightly from the dessert condition to the expectancy-to-consume/dessert condition ($M = 3.36$, $SE = 0.43$; $M = 3.45$, $SE = 0.42$).[4]

Because the other affect variables were not expected to show the same pattern across conditions, we conducted one-way ANCOVAs for general positive affect and general negative affect. Results for general positive affect revealed a significant difference among conditions, $F(2, 45) = 5.27$, $p_{rep} = .95$, $\eta_p^2 = .19$ (neutral: $M = 3.22$, $SE = 0.28$; dessert: $M = 3.87$, $SE = 0.29$; expectancy-to-consume/dessert: $M = 4.51$, SE = 0.28). Negative affect showed only a marginal effect of condition, $F(2, 45) = 2.88$, $p_{rep} = .86$, $\eta_p^2 = .11$ (neutral: $M = 1.75$, $SE = 0.18$; dessert: $M = 1.24$, $SE = 0.18$; expectancy-to-consume/dessert: $M = 1.23$, $SE = 0.17$). Follow-up simple-effects tests revealed that both positive and negative affect differed between the neutral condition and the expectancy-to-consume/dessert condition, $F(1, 45) = 10.55$, $p_{rep} = .98$, $\eta_p^2 = .19$, and $F(1, 45) = 4.58$, $p_{rep} = .90$, $\eta_p^2 = .09$.[5]

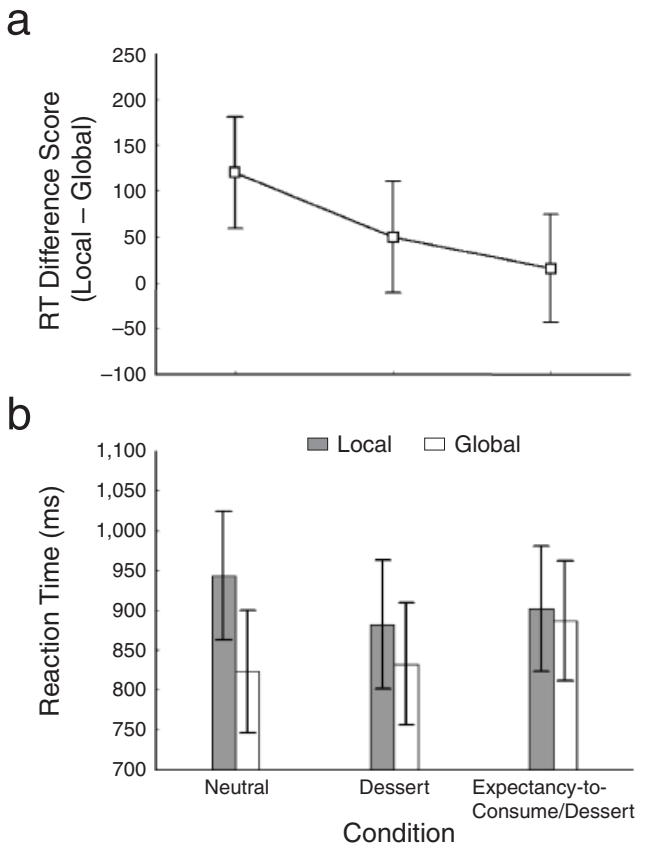

Fig. 2. Results from Study 4: (a) reaction time (RT) difference scores and (b) reaction times for local and global targets as a function of condition.

[4]The residual variance from each planned contrast was nonsignificant, $F < 1.0$.

[5]In past research that found positive affect (low approach) caused broadening, self-reported positive affect was not correlated with broadening within conditions (Fredrickson & Brannigan, 2005; Rowe et al., 2006). Our results are consistent with these past results in that positive affect did not correlate with attentional breadth in all the studies (i.e., some correlations were in the predicted direction, but some were not). It is possible that other components of positive emotions (expressive, physiological) would correlate with attentional breadth. Study 4 manipulated the mediator and found it to affect attentional breadth. This manipulation-of-mediator evidence provides more convincing evidence that approach-motivated positive affect reduces attentional breadth than would statistical mediation (Sigall & Mills, 1998; Spencer, Zanna, & Fong, 2005).

Discussion

Study 4 conceptually replicated and extended Studies 1 through 3 by demonstrating that attentional breadth was reduced when approach motivation was increased by a second manipulation. The expectancy-to-consume manipulation did not strongly influence affective ratings, a finding consistent with past work showing that emotions that vary in the intensity of approach motivation have different physiological and behavioral characteristics, but not necessarily different subjective characteristics (e.g., Berridge, 2007; Harmon-Jones et al., 2003, 2006).

GENERAL DISCUSSION

Studies 1 and 2 found that high-approach-motivated positive affect decreased global attentional focus relative to low-approach-motivated positive affect and neutral affect, respectively. Study 3 found that individuals higher in trait approach motivation showed greater reductions in the breadth of attentional focus following appetitive stimuli. Study 4 revealed similar effects in a between-subjects design using a manipulation of approach motivation in addition to picture type. This study, which experimentally manipulated the proposed mediator (approach motivation), strongly supports our hypothesis that approach-motivated positive affect reduces the breadth of attentional focus. These results are directly opposite to the broadening found with positive affects lower in approach motivation.

Positive affects, particularly those low in approach motivation, suggest a comfortable, stable environment and allow for a broadening of attention and cognition, which may serve adaptive functions (Carver, 2003; Fredrickson, 2001). However, broadening does not occur when positive affects are high in approach motivation. Such positive affects often encourage specific action tendencies, such as tenacious goal pursuit, and an associated reduction in attentional breadth. This reduced attentional breadth may prove adaptive, as it assists in obtaining goals.

Together with past research, the present research supports the idea that low- and high-approach-motivated positive affect produce opposite effects on attentional breadth. It is possible that the intensity of withdrawal motivation exerts similar attentional effects; that is, low-withdrawal-motivated negative affect may cause broadening, whereas high-withdrawal-motivated negative affect may cause reduction in breadth. Indeed, such an interpretation would fit with past research. For example, individuals with depression, a low-intensity motivation, are more creative than nondepressed individuals (Andreasen, 1987) and show broadening of attention and memory (von Hecker & Meiser, 2005). In the case of low-motivated negative affects such as sadness and depression, "a more open, unfocused, unselective, low-effort mode of attention would prove not deficient but, on the contrary, beneficial" (von Hecker & Meiser, 2005, p. 456), as one disengages from a terminally blocked goal and becomes open to new possibilities (Klinger, 1975). The past research that found negative affect caused decreased attentional breadth may have evoked negative affective states that were high in withdrawal motivation (e.g., fear; Gasper & Clore, 2002).

In conclusion, the present research provides further evidence suggesting that emotions of the same valence can have very different consequences for attention, cognition, and behavior (Bodenhausen, Sheppard, & Kramer, 1994). Moreover, it adds to a growing literature focused on motivational intensity and direction within emotions (Harmon-Jones, 2003). A more complete understanding of positive emotions and their relationships with attentional and cognitive processes not only will assist in improving understanding of positive emotions and emotion-cognition interactions, but also may have important applications in enhancing performance. As Izard (1991) noted, positive emotions high in approach motivation are extremely important in the development of skills, competencies, and intelligence.

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