Cover Page

Word Count: 2373

Contact: Eddie Harmon-Jones at School of Psychology, The University of New South Wales, Sydney, NSW, Australia 2052; email: eddiehj@gmail.com.

Does Negative Affect Always Narrow and Positive Affect Always Broaden the Mind? Considering the Influence of Motivational Intensity on Cognitive Scope

Eddie Harmon-Jones[1]

University of New South Wales

Philip A. Gable,

University of Alabama

& Tom F. Price

University of New South Wales

Abstract

Research over the last five decades has suggested that negative affective states narrow cognitive scope whereas positive affective states broaden cognitive scope. An examination of this past research, however, reveals that only negative affects of high motivational intensity (e.g., fear, stress) and positive affects of low motivational intensity (e.g., gratitude, amusement) may have been examined. Consequently, over the last five years, research has examined positive and negative affects that are low (e.g., sadness) vs. high (e.g., desire) in motivational intensity. This research has found that affects of low motivational intensity broaden cognitive scope whereas affects of high motivational intensity narrow cognitive scope, regardless of the positivity or negativity of the affective state.

Several studies have indicated that positive affective states cause a broadening of cognitive processes (e.g., Fredrickson, 2001), whereas negative affective states cause a narrowing of cognitive processes (e.g., Easterbrook, 1959; Finucane, 2011). That is, positive affect causes one's mind to be more open or more likely to see the forest, whereas negative affect causes one's mind to be more narrowly focused or more likely to see the trees. This concept of broadening/narrowing of cognitive processes, or cognitive scope, has been assessed in a variety of ways, from perception to cognitive categorization. The idea that all negative states narrow and all positive states broaden is widely accepted (Fox, 2008), as it was supported by a preponderance of results prior to 2008. Below, we review a program of research conducted since 2008 that challenges this idea.

We begin by defining constructs examined in this research. Affective states are psychophysiological constructs composed of underlying dimensions such as (1) valence, the positive to negative evaluation of the subjectively experienced state (Harmon-Jones, Harmon-Jones, Amodio, & Gable, 2011); (2) motivational intensity, the strength of urge to move toward/away from a stimulus (Harmon-Jones, Harmon-Jones, & Price, in press); (3) arousal, which can be measured subjectively and by activation of the sympathetic nervous system, and is a proxy for but not the same as motivational intensity (Gable & Harmon-Jones, in press; Peterson & Harmon-Jones, 2012). Cognitive scope is similar to the breadth of cognitive expansiveness, and it can occur at perceptual, attentional, or conceptual levels. For instance, cognitive scope has been assessed using measures of attentional and perceptual scope, categorization, unusualness of word association, social categorization, and memory details (see reviews by Fredrickson, 2001; Gable & Harmon-Jones, 2010).

POSITIVE AFFECTS DIFFER IN APPROACH MOTIVATIONAL INTENSITY

The research on the broadening effects of positive affect has used a variety of manipulations to induce positive affect such as giving participants gifts, having them watch funny films, listen to pleasant music, or recall pleasant memories (see review by Gable & Harmon-Jones, 2010). A close examination of these affect inductions, however, suggests that they may not represent all positive affective states. In fact, these past manipulations may induce a positive state that is low in approach motivation (Harmon-Jones & Gable, 2008). Most appear to induce positive states that occur after a goal has been accomplished (e.g., happiness or gratitude after receiving a gift) or they induce states that are irrelevant to goals (e.g., amusement). But there is a class of positive affective states that are higher in approach motivation (e.g., desire, enthusiasm), or the urge to go toward something (Harmon-Jones, Harmon-Jones, & Price, in press), and they often (but not necessarily) occur as individuals strive for desired goals (i.e., they occur pre-goal). High-approach states are also called "appetitive" states, because they relate to an appetite for desirable things. This distinction is supported by research suggesting that different neural structures and chemicals are involved in low- vs. high-approach positive states (Berridge, 2007; Knutson & Wimmer, 2007).

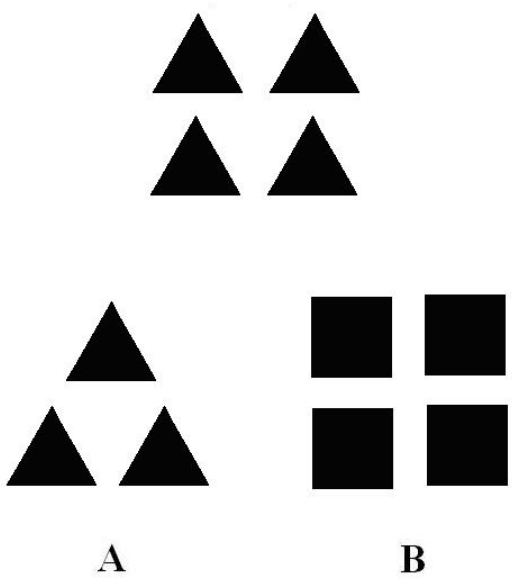
We have also suggested that positive states low vs. high in approach may have different consequences for the broadening of cognitive scope. Whereas positive affective states low in approach motivation may broaden cognitive scope, consistent with past research, positive affective states high in approach motivation may have the opposite consequence – they may narrow cognitive scope. They may do so because a narrowed focus on the desired goal may assist in ultimately obtaining the goal.

EFFECT OF LOW VS. HIGH APPROACH POSITIVE AFFECT ON COGNITIVE SCOPE

We first tested these ideas by inducing (Gable & Harmon-Jones, 2008), low approach-motivated positive affect with humorous video clips similar to manipulations in past research on positive affect and broadening. To induce high approach-motivated positive affect, we used a clip of delicious-looking desserts. Both clips caused participants to feel equal levels of general positive affect, but the desserts clip caused desire whereas the humorous cats clip caused amusement. Cognitive scope was measured with the Kimchi and Palmer (1982) task, displayed and described in Figure 1. Results revealed that the high approach clip caused less broadening than the low approach clip. That is, after the high approach clip, participants made more local than global element matches, whereas after the low approach clip, participants made more global than local element matches.

Figure 1 – Kimchi and Palmer (1982) local-global scope task

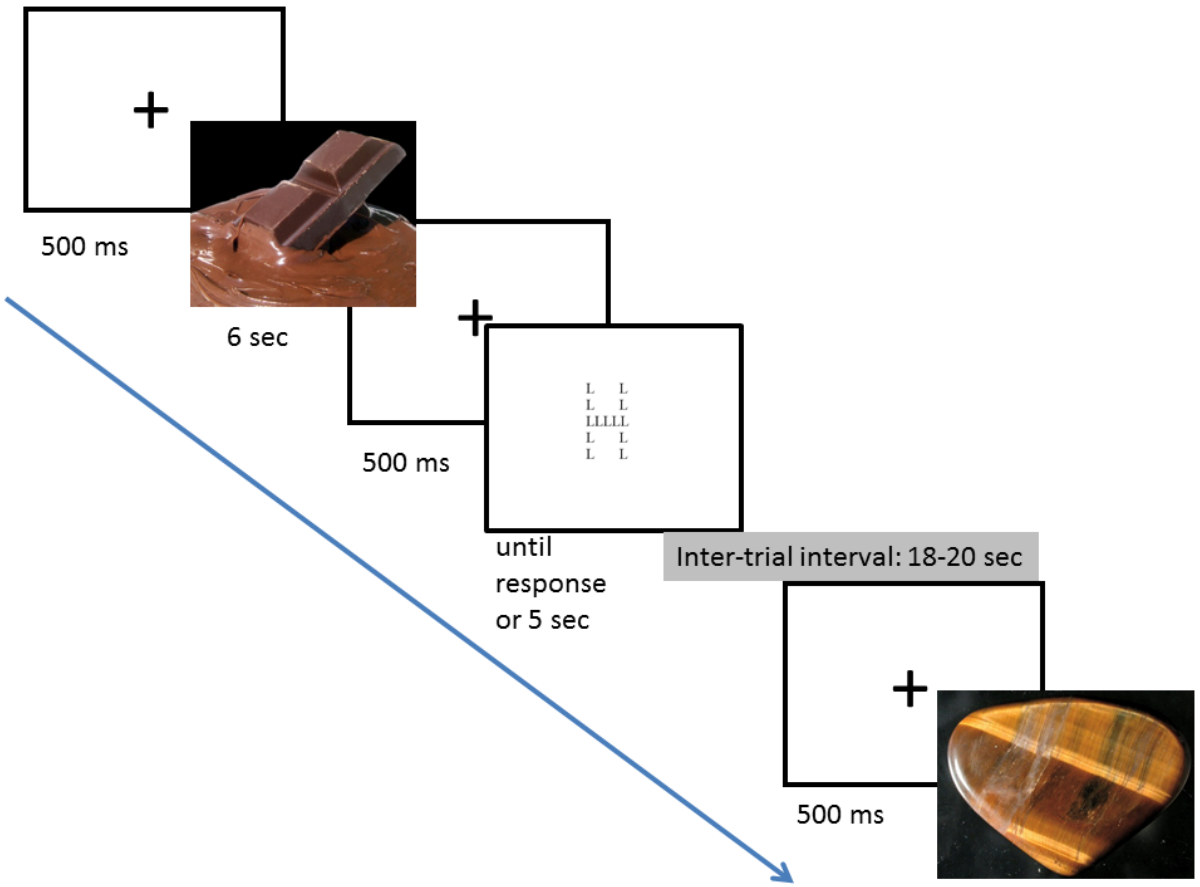
On each trial, three figures were displayed. The standard figure was positioned on top, and the two comparison figures were positioned below. One comparison figure had local elements that match the local elements of the standard; the other had a global configuration that matched the global configuration of the standard. By determining which of the comparison figures individuals selected when they give their "first and most immediate impression" concerning which of the two comparison figures best matched the standard figure, we determined whether individuals had a more local (narrow) or global (broad) attentional scope.



Subsequent experiments included a neutral affect comparison condition and also measured attentional scope using the Navon (1977) task, described and displayed in Figure 2. Whereas neutral stimuli caused broadened attention, as typically occurs during neutral states (Navon, 1977), the appetitive stimuli caused more narrowed attention. Other studies found that individuals who scored high in trait approach motivation showed even more narrowed attention following appetitive stimuli. Also, increasing the approach motivational intensity of the stimuli (by telling participants that they would get to eat desserts displayed in the pictures) further narrowed attention following appetitive stimuli (Gable & Harmon-Jones, 2008, Studies 1-4). Relatedly, Hicks, Friedman, Gable, and Davis (2012) found that alcohol-related pictures caused narrowed attention for individuals motivated to consume alcohol. In all of these studies, the positive affect stimuli reliably increased positive but not negative affective states.

Figure 2 – Appetitive Picture Priming and Navon task

Neutral (e.g., rocks) or appetitive (e.g., desserts) photographs were presented prior to the attentional scope task (Navon letters), to assess the effects of the photograph prime on the time to detect local vs. global stimuli. The stimuli to be detected were one of two letters (e.g., H or T), and each compound stimulus contained only one of the two letters, displayed at the local (small) or global (large) level. Reaction times to detect the target letters when presented at the local or global level were the dependent variables. A more broad attentional scope could cause faster detection of global letters or slower detection of local letters, whereas a more narrow attentional scope could cause faster detection of local letters or slower detection of global letters.

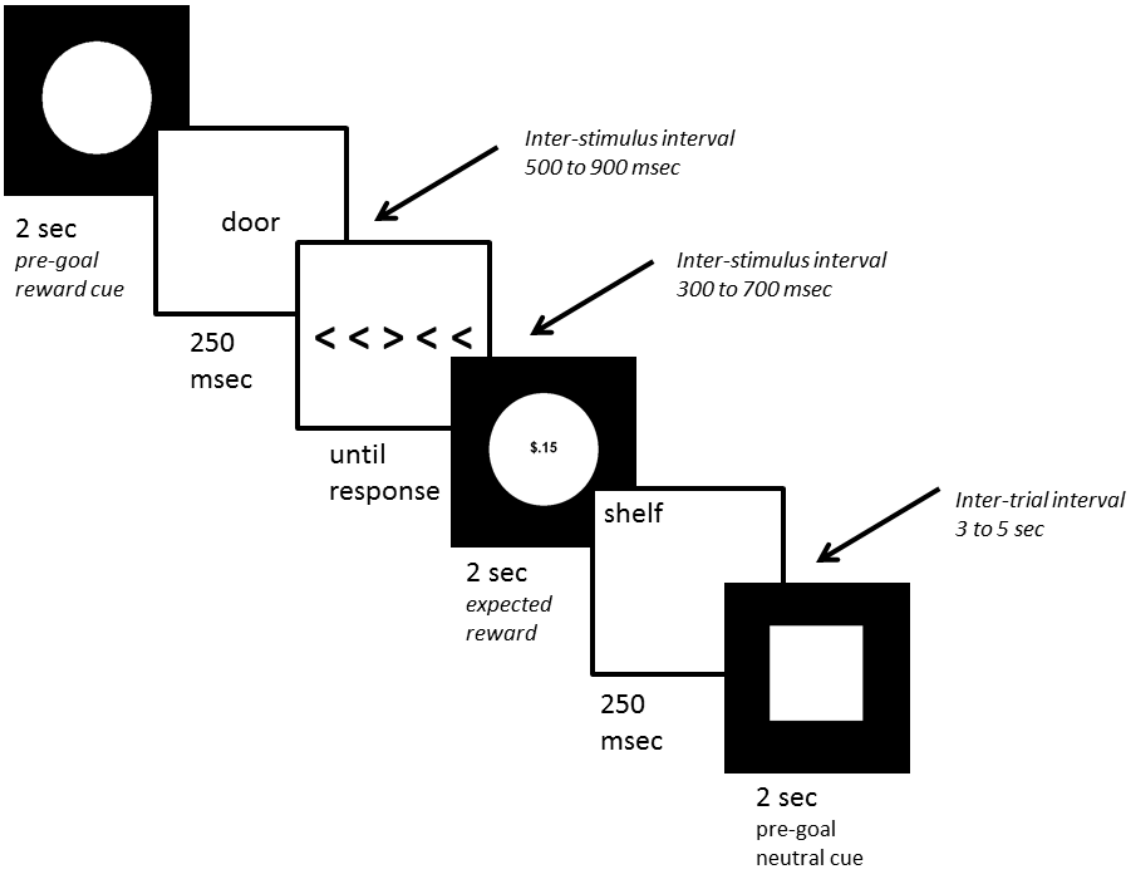


As noted earlier, past research on positive affect and broadening used a variety of assessments of cognitive scope and a variety of inductions of positive affect. Thus we tested whether low vs. high approach-motivated positive affect, induced in various ways, would influence other measures of cognitive scope. In one pair of studies (Gable & Harmon-Jones, 2010a), cognitive scope was measured using memory for neutral words presented in the center vs. periphery of viewing space, and positive affect was manipulated in a monetary incentive delay task (Knutson & Wimmer, 2007). See Figure 3. The monetary incentive delay task allows for the induction of low- (post-goal) vs. high-approach-motivated (pre-goal) positive affect within the same person within the same task. Results revealed participants accurately recognized more words presented in the center of viewing space when in a high approach-motivated positive state as compared to a neutral state. In contrast, they accurately recognized more words presented in the periphery of viewing space when in a low approach-motivated positive state as compared to a neutral state. Conceptually similar results on memory were obtained when pictures were used to evoke high approach-motivated positive affect.

Figure 3 – Monetary Incentive Delay and Visual Spatial Memory Task

Pre-goal (high approach) positive affect was induced by presenting visual cues indicating the possibility of gaining money for performance on a flankers task, and post-goal (low approach) positive affect was induced with other visual cues indicating the outcome of performance (whether a reward was obtained). The participant's task was to identify the direction of the center arrow in the string of arrows. Neutral words were presented in the center or periphery of the computer screen immediately after the pre-goal and post-goal cues.

At the end of a large number of trials, a surprise recognition memory task assessed memory for the neutral words as a function of affective states and location on the computer screen.



Based on our intuitions and other research (Harmon-Jones, Gable, & Price, 2011; Price, Dieckman, & Harmon-Jones, 2012), in another pair of studies (Price & Harmon-Jones, 2010), low vs. high approach-motivated positive affect was manipulated by having participants smile while they reclined backward (low approach positive state), sat upright (moderate approach positive state), or leaned forward (high approach positive state). See Figure 4. Participants were told we were interested in how these various body positions would influence brain activity. Cognitive scope was measured using a cognitive categorization task (Isen & Daubman, 1984). In this task, participants indicate how well example items (e.g.,

camel) fit specific categories (e.g., vehicle). Past research found that participants in a positive state induced via a gift were more inclusive in their categorization, that is, they were more likely to indicate that camel fit the category vehicle. Our results revealed that the low approach positive state replicated this effect, but the high approach positive state caused less inclusive categorization.

Figure 4 – Example Body Postures

To help establish that approach motivation is a mechanism underlying the effect of approach-motivated positive affect on narrowing, we have examined whether psychophysiological variables related to approach motivation relate to narrowing following the evocation of approach positive affect. In the first study (Harmon-Jones & Gable, 2009),

we measured regional brain activity using electroencephalographic power and replicated the methods of an experiment in which participants were primed with neutral or dessert pictures prior to responding to an attentional scope task. Based on research suggesting that greater relative left frontal cortical activity is associated with approach motivation (Harmon-Jones, Gable, & Peterson, 2010), we predicted and found that greater left frontal activity to appetitive pictures was associated with more narrowing of attention following those pictures. In a second study (Gable & Harmon-Jones, 2010b), we measured an event-related brain potential, the late positive potential, which is larger to motivationally significant stimuli and has been associated with motivated attention. In this study, we found that larger late positive potentials to appetitive pictures were associated with more narrowing of attention following those pictures.

NEGATIVE AFFECT'S INFLUENCE ON COGNITIVE SCOPE

Thus far, our analysis has focused on positive affective states differing in approach motivational intensity. Do negative affective states that differ in motivational intensity also have distinct effects on cognitive scope? Our examination of the research literature revealed that most prior research on negative affect and narrowing induced states that were high in motivational intensity (e.g., fear). Less work had examined negative states low in motivational intensity, such as sadness. However, some work suggests that depression is associated with a broadened cognitive scope (von Hecker & Meiser, 2005).

To test whether negative affects differing in motivational intensity differentially influence cognitive scope, we conducted experiments in which disgust, sadness, and neutral affect were induced with pictures (Gable & Harmon-Jones, 2010c). Attentional scope was measured with Navon's task. Results revealed that whereas disgust caused a narrowing of attention relative to neutral affect, sadness caused a broadening of attention. Other studies

have revealed that anger, which is high in approach motivation, causes a relative narrowing of attention (Gable, Poole, & Harmon-Jones, 2013).

Some past experiments, however, produced seemingly inconsistent results and did not find sadness to broaden cognitive scope. For instance, Gasper and Clore (2002) found that sadness narrowed cognitive scope. In their studies, sadness was induced by having participants write about a personal life event that made them feel 'sad and negative'. The manipulation check of self-reported affects suggested that participants experienced not only sadness, but also several other negative affects. Rowe, Hirsh, and Anderson (2007) found that sadness did not produce more attentional broadening than a neutral state. Based on this mix of results, we suspect that the effect of sadness on cognitive scope depends on whether the induced sadness is lower or higher in motivational intensity; the latter may occur when sadness is mixed with other negative affects.

AFFECTIVE STATES, AROUSAL, AND MOTIVATIONAL INTENSITY

Throughout this article, we have suggested that motivational intensity is the critical variable underlying the effect of affective states on cognitive scope. However, the manipulations of motivational intensity may have also manipulated affective arousal, and thus arousal may instead be the critical variable. Arousal is often a natural confound of motivational intensity; when we are motivated, we are often aroused as well.

However, arousal and motivational intensity can be separated. Amusement is an example: it is arousing state but low in approach motivational intensity, as it does not urge action toward something (Harmon-Jones et al., in press). Amusement causes more attentional broadening than neutral films (Fredrickson & Branigan, 2005; Gable & Harmon-Jones, 2008), suggesting that arousal is not the determining factor.

Arousal can also result from physical exercise without changing motivational intensity (Gable & Harmon-Jones, in press). In one experiment, participants either pedaled a stationary bike or not while completing the appetitive vs. neutral picture/attentional scope task (Navon, 1977). Individuals in the pedaling condition had faster heart rates than individuals who did not, which showed that they were aroused. Importantly, this manipulation of arousal had no effect on attentional scope. These results suggest that motivational intensity, rather than arousal per se, causes attentional narrowing.

THE INFLUENCE OF ATTENTIONAL SCOPE ON EMOTIVE RESPONSES

Attention and motivation are intimately related processes. Given the results suggesting that motivation influences attentional scope, we recently examined whether attentional scope would influence emotive responses. That is, does focusing narrowly on a motivationally significant object increase motivational responses toward the object? Does considering the same object from a broader perspective decrease motivation for the object?

To address these questions, we measured ERPs to emotive and neutral pictures, and focused on the N1 component, which is a component associated with selective attention that is larger to motivationally significant stimuli (Foti, Hajcak, & Dien, 2009). In the studies, immediately before each affective or neutral picture was presented, attentional scope was manipulated by having individuals indicate what letter was displayed in the Navon stimuli at the local or global level (between-subjects design). That is, they simply reported the smaller letter (local element) or they reported the larger letter (global configuration).

The manipulated local compared to global attentional scope caused larger N1 amplitudes to appetitive (Gable & Harmon-Jones, 2011) and aversive pictures (Gable & Harmon-Jones, 2012) but not to neutral pictures. These results suggest that manipulations of

attentional scope influence rapid visual processing of emotive information and that the relationship between attentional scope and motivational intensity is bi-directional.

CONCLUSION

Together, this evidence suggests a revision to the well-accepted idea that positive affect broadens and negative affect narrows the scope of cognition. The new evidence suggests this pattern only applies to low motivationally intense positive affects and high motivationally intense negative affects. When affective valence is manipulated independently of motivational intensity, it was discovered that affective states low in motivational intensity broaden and affective states high in motivational intensity narrow the scope of cognition regardless of affective valence.

Consistent with past proposals (Carver, 2003), the broadening of cognitive scope produced by positive affective states low in motivational intensity may assist the organism in considering several new goal opportunities that can be pursued. Negative affective states low in motivational intensity may likewise broaden cognitive scope, which may assist with disengaging from lost goal objects (von Hecker & Meiser, 2005). In contrast, motivationally intense affective states that narrow cognitive scope may assist in goal accomplishment, that is, the approach or avoidance of the stimulus.

However, this association of motivational intensity and narrowed cognitive scope may not inevitably result in goal accomplishment or adaptive behavior. That is, adaptive mechanisms do not always result in adaptive behavior; they occasionally get us into trouble. For instance, research has shown that narrowed cognitive scope also occurs during alcohol intoxication (Steele & Josephs, 1990) and with individuals with psychopathy (Newman & Baskin-Sommers, 2011). These programs of research have not directly considered motivational intensity as a mediating mechanism, even though alcohol and psychopathy

involve changes in affect. Thus, not only does the present review address an important question regarding the relationship between affective states and cognitive scope, it may suggest another mechanism with which to understand some cognitive consequences of addiction and psychopathology.

Endnotes

1. Address correspondence to Eddie Harmon-Jones at School of Psychology, The University of New South Wales, Sydney, NSW, Australia 2052; email: eddiehj@gmail.com.

References

Bradley, M. M., & Lang, P. J. (2007). Emotion and Motivation. In: J. T. Cacioppo, L. G., Tassinary, G. Brentson, (Eds.), *Handbook of Psychophysiology*, pp. 581-607. New York: Cambridge University.

Berridge, K. C. (2007). The debate over dopamine's role in reward: The case for incentive salience. *Psychopharmacology, 191*, 391-431. doi: 10.1007/s00213-006-0578-x

Carver, C. S. (2003). Pleasure as a sign you can attend to something else: Placing positive feelings within a general model of affect. *Cognition and Emotion, 17*, 241-261. DOI: 10.1080/02699930302294

Easterbrook, J. A. (1959). The effect of emotion on cue utilization and the organization of behavior. *Psychological Review, 66*, 183-201. doi: 10.1037/h0047707

Finucane, A. M. (2011). The effect of fear and anger on selective attention. *Emotion, 11*, 970-974. DOI: 10.1037/a0022574

Foti, D., Hajcak, D., & Dien, J. (2009). Differentiating neural responses to emotional pictures: Evidence from temporal-spatial PCA. *Psychophysiology, 46*, 521-530. doi: 10.1111/j.1469-8986.2009.00796.x

Fox, E. (2008). *Emotion science: Cognitive and neuroscientific approaches to understanding human emotions*. New York: Palgrave Macmillan.

Fredrickson, B. L. (2001). The role of positive emotions in positive psychology: The broaden and build theory of positive emotions. *American Psychologist, 56*, 218-226. doi: 10.1037/0003-066X.56.3.218

Fredrickson, B. L., & Branigan, C. (2005). Positive emotions broaden the scope of attention and thought-action repertoires *Cognition and Emotion* 19(3): 313-332. doi: 10.1080/02699930441000238

Gable, P. A. & Harmon-Jones, E. (2008). Approach-motivated positive affect reduces breadth of attention. *Psychological Science, 19,* 476-482. doi: 10.1111/j.1467-9280.2008.02112.x

Gable, P. A., & Harmon-Jones, E. (2010a). The effect of low vs. high approach-motivated positive affect on memory for peripherally vs. centrally presented information. *Emotion, 10,* 599-603. doi: 10.1037/a0018426

Gable, P. A., & Harmon-Jones, E. (2010b). Late positive potential to appetitive stimuli and local attentional bias. *Emotion, 10,* 441-446. doi: 10.1037/a0018425

Gable, P. A., & Harmon-Jones, E. (2010c). The blues broaden, but the nasty narrows: Attentional consequences of negative affects low and high in motivational intensity. *Psychological Science, 21,* 211-215. doi: 10.1177/0956797609359622

Gable, P. A., & Harmon-Jones, E. (2011a). Attentional consequences of pre-goal and post-goal positive affects. *Emotion, 11, 1358-1367*. DOI: 10.1037/a0025611

Gable, P. A., & Harmon-Jones, E. (2011b). Attentional states influence early neural responses associated with motivational processes: Local vs. global attentional scope and N1 amplitude to appetitive stimuli. *Biological Psychology, 87*, 303–305. doi: 10.1016/j.biopsycho.2011.02.007

Gable, P. A., & Harmon-Jones, E. (in press). *Does arousal per se account for the influence of appetitive stimuli on attentional scope and the late positive potential? Psychophysiology*.

Gable, P. A., Poole, B.D., & Harmon-Jones, E. (in preparation). *Anger perceptually and conceptually narrows cognitive scope.*

Gasper, K. & Clore, G. L. (2002). Attending to the big picture: Mood and global versus local processing of visual information. *Psychological Science*, *13*, 34-40. doi: 10.1111/1467-9280.00406

Harmon-Jones, E. & Gable, P. A. (2008). Incorporating motivational intensity and direction into the study of emotions: Implications for brain mechanisms of emotion and cognition-emotion interactions. *Netherlands Journal of Psychology, 64,* 132-142. doi: 10.1007/BF03076416

Harmon-Jones, E. & Gable, P. A. (2009). Neural activity underlying the effect of approach-motivated positive affect on narrowed attention. *Psychological Science, 20,* 406-409. doi: 10.1111/j.1467-9280.2009.02302.x

Harmon-Jones, E., Gable, P. A., & Peterson, C. K. (2010). The role of asymmetric frontal cortical activity in emotion-related phenomena: A review and update. *Biological Psychology, 84,* 451-462. doi: 10.1016/j.biopsycho.2009.08.010

Harmon-Jones, E., Gable, P. A., & Price, T. F. (2011). Leaning embodies desire: Evidence that leaning forward increases relative left frontal cortical activation to appetitive stimuli. *Biological Psychology, 87,* 311–313. doi: 10.1016/j.biopsycho.2011.03.009

Harmon-Jones, E., Harmon-Jones, C., Amodio, D. M., & Gable, P. A. (2011). Attitudes toward emotions. *Journal of Personality and Social Psychology, 101,* 1332-1350. doi: 10.1037/a0024951

Harmon-Jones, E., Harmon-Jones, C., & Price, T. F. (in press). What is approach motivation? *Emotion Review*.

Hicks, J. A., Friedman, R. F., Gable, P., & Davis, W. E. (2012). Interactive effects of approach motivational intensity and alcohol cues on the scope of perceptual attention. *Addiction, 107,* 1074-1080. doi:10.1111/j.1360-0443.2012.03781.x

Isen, A. M. & Daubman, K. A. (1984). The influence of affect on categorization. *Journal of Personality and Social Psychology, 47*, 1206-1217. doi: 10.1037/0022-3514.47.6.1206.

Kimchi, R., & Palmer, S. E. (1982). Form and texture in hierarchically constructed patterns. *Journal of Experimental Psychology-Human Perception and Performance, 8,* 521-535. doi: 10.1037/0096-1523.8.4.521

Knutson, B. & Wimmer, G. E. (2007). Reward: Neural circuitry for social valuation. In E. Harmon-Jones & P. Winkielman (Eds.), *Social Neuroscience: Integrating Biological and Psychological Explanations of Social Behavior, pp. 157-175.* Guilford Publications: New York.

Navon, D. (1977). Forest before trees: The precedence of global features in visual perception. *Cognitive Psychology, 9,* 353-383. doi: 10.1016/0010-0285(77)90012-3.

Newman, J.P., & Baskin-Sommers, A.R. (2011). Early selective attention abnormalities in Psychopathy: Implications for self-regulation. In M. Poser (Ed). *Cognitive Neuroscience of Attention* (pp.421 - 440). Guilford Press: New York.

Peterson, C. K., & Harmon-Jones, E. (2012). Toward an understanding of the emotion-modulated startle eyeblink reflex: The case of anger. *Psychophysiology, 49,* 1509–1522. DOI: 10.1111/j.1469-8986.2012.01469.x.

Price, T. F., & Harmon-Jones, E. (2010). The effect of embodied emotive states on cognitive categorization. *Emotion, 10,* 934-938. doi: 10.1037/a0019809

Price, T. F., Dieckman, L., & Harmon-Jones, E. (2012). Embodying approach motivation: Body posture influences startle eyeblink and event-related potential responses to appetitive stimuli. *Biological Psychology, 90,* 211-217. doi: 10.1016/j.biopsycho.2012.04.001

Rowe, G., Hirsh, J.B., Anderson, A.K. (2007). Positive affect increases the breadth of attentional selection. *Proceedings of the National Academy of Sciences of the United States of America, 104,* 383-388. doi: 10.1073/pnas.0605198104

Steele, C. M., & Josephs, R. A. (1990). Alcohol myopia: Its prized and dangerous effects. *American Psychologist, 45,* 921–33.

von Hecker, U., & Meiser, T. (2005). Defocused attention in depressed mood: Evidence from source monitoring. *Emotion, 5,* 456–463. doi: 10.1037/1528-3542.5.4.456

Recommended Readings

Fredrickson, B. L. (2001). The role of positive emotions in positive psychology: The broaden and build theory of positive emotions. *American Psychologist, 56,* 218-226. doi: 10.1037/0003-066X.56.3.218

A clearly written, user-friendly, and relatively comprehensive review for readers who wish to expand their knowledge on the past research that suggested that all positive emotions broaden cognitive scope, a view that is an alternative to the one presented in this paper.

Gable, P. A. & Harmon-Jones, E. (2008). Approach-motivated positive affect reduces breadth of attention. *Psychological Science, 19,* 476-482. doi: 10.1111/j.1467-9280.2008.02112.x

A representative study that illustrates original research about the effects of low vs. high approach motivated positive affects on attentional scope.

Gable, P. A., & Harmon-Jones, E. (2010). The motivational dimensional model of affect: Implications for breadth of attention, memory, and cognitive categorization. *Cognition and Emotion, 24,* 322-337.

A clearly written, user-friendly, and relatively comprehensive review for readers who wish to expand their knowledge on the effects of motivational intensity on cognitive scope.

Kaplan, R. L., Van Damme, I., & Levine, L. J. (2012). Motivation Matters: Differing Effects of Pre-goal and Post-goal Emotions on Attention and Memory. *Frontiers in Psychology, 3,* 00404. DOI=10.3389/fpsyg.2012.00404

This paper discusses the role of motivational intensity on cognitive scope, particularly memory, in more detail than the current paper.