Emotion Concepts and Self-Focused Attention: Exploring Parallel Effects of Emotional States and Emotional Knowledge

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Abstract:
Many experiments have found that emotional experience affects self-focused attention. Several approaches to cognition and emotion predict that conscious emotional experience may be unnecessary for this effect. To test this hypothesis, two experiments primed emotion concepts without affecting emotional experience. In Experiment 1, subliminal exposure to sad faces (relative to happy faces and neutral faces) increased self-focused attention but not subjectively experienced affect. In Experiment 2, a scrambled-sentences task that primed happy and sad emotion concepts increased self-focused attention relative to a neutral task. Thus, simply activating knowledge about emotions was sufficient to increase self-focused attention. The discussion considers implications for research on how emotional states affect self-awareness.
Keywords Emotion - Self-awareness - Emotion concepts - Self-focused attention - Cognition and emotion

Article:
Many studies find that manipulating emotional states causes changes in self-focus (Abele, Silvia, & Zöller-Utz, *2005*; Salovey, *1992*; Sedikides, *1992*; Silvia & Abele, *2002*; Wood, Saltzberg, & Goldsamt, *1990*). Emotions are typically manipulated with music (Wood et al., *1990*) or with guided imagery tasks (Salovey, *1992*), and self-focused attention is then measured with pronoun-selection tasks (Silvia & Abele, *2002*), thought listings (Abele et al., *2005*), or Likert scales that assess feelings of self-consciousness (Sedikides, *1992*). Both positive and negative emotions significantly increase the intensity of self-focused attention relative to neutral affect, although the effects are most reliable for negative emotions.[1]

There is no leading theory of why emotions affect self-awareness, although several theories have been proposed. Salovey (*1992*) suggested that emotions, as distinctive internal states, draw attention by virtue of their salience in experience. Sedikides (*1992*) proposed that emotions have built-in effects on self-focus as a result of the emotion's tendency to promote action or inaction (see Green & Sedikides, *1999*). Duval and Silvia (*2001*) suggested that emotions will affect self-focus only when the emotion is unexpected or places the self in a salient figure–ground position (Snow, Duval, & Silvia, *2004*). A recent model proposed that emotions have flexible effects on affect according to contextual factors (Abele et al., *2005*). Consistent with mood-as-input approaches (Martin & Stoner, *1996*), this view suggests that the effects of mood on self-focus depend on contextual factors that influence the meaning and function of the mood.

Are emotions necessary for emotional effects on self-focused attention?
All of the models of emotions and self-focus assume that the subjective experience of emotion affects self-focused attention. Recent research in cognition and emotion, however, suggests that these effects could appear without conscious affective experience. Models of affect-as-information (Clore, Gasper, & Garvin, *2001*) contend that emotional states and primed emotional knowledge carry the same information about value (Clore & Colcombe, *2003*). Conscious moods and subliminal affective primes can thus have the same effects on cognition. Consistent with affect-as-information models, Soldat and Sinclair (2001; Soldat, Sinclair, & Mark,

1997) found that affective cues influenced judgments but not subjective experience. In one study, people read persuasive arguments on a computer monitor. A happy or a serious face appeared briefly (13 ms) before each argument. The emotional faces didn't affect conscious moods, but they did affect message processing. In another study, reading arguments on blue paper (a sad cue) caused deeper processing relative to reading arguments on red paper (a happy cue).

Models of unconscious affect also predict emotional effects on cognition in the absence of consciously experienced emotion. Berridge and Winkielman (*2003*) proposed that affect can be activated outside of awareness, such as by subliminal priming of emotional faces, and that the resulting affective states can remain outside of awareness. Like conscious affect, unconscious affective states can influence judgments, modify the incentive value of possible actions, and guide behavior. Experiments on drinking found that subliminal exposures to happy faces increased how much thirsty people poured and drank, how much they enjoyed the beverage, and how much they were willing to pay for the beverage (Winkielman, Berridge, & Wilbarger, *2005*).

Finally, research on *emotion concepts* suggests that semantic priming processes could cause emotion-like effects on self-focused attention. People's knowledge about emotions—their semantic concepts of emotions—contain information about what emotions are like, the kinds of circumstances associated with certain emotions, and similarities between emotions (Innes-Ker & Niedenthal, *2002*; Shaver, Schwartz, Kirson, & O'Connor, *1987*; Silvia, *2006*, chap. 6; Wisniewski, *2002*). Because emotions are subjectively experienced from a first-person point-of-view—emotions happen to oneself—it seems likely that people's emotion concepts contain extensive self-relevant information. For example, a person's concept of happiness likely contains information about what makes him or her happy, the kinds of self-relevant goals implicated in happy events, what he or she typically thinks and feels when happy, and memories about past instances of happiness. Activating knowledge about happiness should thus entail activating self-relevant information, which would appear as heightened scores on measures of self-focused attention (Eichstaedt & Silvia, *2003*). Like other conceptual knowledge, knowledge about emotions can be primed and activated. To the extent that emotional knowledge contains self-relevant knowledge, then activating emotional knowledge should activate self-relevant information as well.

The present experiments

Three related areas of research—affect as information, unconscious affect, and emotion concepts—suggest that subjective emotional experience isn't necessary for emotional effects on cognition and action. The present experiments tested whether emotional knowledge can affect self-awareness in the absence of emotional experience. In each study, participants completed a task that primed happiness or sadness, or they completed or a neutral task that did not prime emotions. Emotion concepts were primed with subliminal facial expressions of emotion (Experiment 1) or with a scrambled sentence task (Experiment 2). The priming tasks should not affect subjective emotional experience, but they should activate emotion-specific knowledge. Self-awareness and emotional experience were measured after the priming tasks. We expect (1) that priming happy and sad emotion concepts, relative to neutral priming, will increase self-focused attention, and (2) that this effect will appear despite no changes in subjective emotional experience.

Experiment 1
Method
Participants and design

Seventy people enrolled in general psychology at the University of North Carolina at Greensboro (UNCG) participated and received credit toward a research option. Five participants were excluded—one person had heard about the subliminal manipulation from a prior participant, another person saw the subliminal faces, and three people failed to understand or follow the instructions. This left a final sample of 65 participants (52 females and 13 males). Each participant was randomly assigned to one of three between-person conditions: *happy priming*, *neutral priming*, or *sad priming*.

Procedure

Each person participated individually. The experimenter explained that the experiment was about personality and cognition. People expected to complete cognitive tasks followed by some measures of personality. A pre-task baseline measure of mood was obtained with the Brief Mood Introspection Survey (BMIS; Mayer & Gaschke, *1988*). This 16-item scale can form several subscales; the positive affect and negative affect subscales were used in this research.

People worked on a computer-based perceptual matching task, in which they indicated whether two letters were the same or different (e.g., Proctor & Rao, *1983*). This filler task provided a context for repeatedly presenting facial expressions of emotion. The experimenter explained that the study was interested in how mild distractions affected cognitive performance. Thus, each trial would begin with a fixation cross, a brief random pattern as an ostensible distraction, and then the letter-matching trial. In fact, following the fixation cross, a face was presented for 13 ms and then followed by a random pattern mask for 200 ms. Four happy, neutral, and sad facial expressions (half male, half female) were taken from the Ekman and Friesen (*1978*) set. Participants completed 54 trials, and a face was presented before each trial. The presentation and timing were controlled with SuperLab Pro (Version 2.0.4; Cedrus, *2003*).

Dependent measures
Self-focused attention. Following the priming manipulation, people completed a "second cognitive task," actually a measure of self-focus. The "Linguistic Implications Form" has 20 incomplete sentences that must be completed by choosing one of three pronouns (Wegner & Giuliano, *1980*). The choices consist of one self-relevant pronoun (*I*, *me*, or *my*) and two filler pronouns (e.g., *she*, *their*, *our*). One item, for example, reads "Someone stopped (*them, me, us*) to get directions to the stadium." The measure is scored by assigning a 1 to first-person singular pronouns and a 0 to all other pronouns; the dependent measure is the percentage of self-relevant pronouns. This sentence completion task is one of the most widely-used measures of state self-awareness (e.g., Silvia, Eichstaedt, & Phillips, *2005*; Stephenson & Wicklund, *1984*). Many manipulations of self-awareness increase the selection of self-relevant pronouns (see Davis & Brock, *1975*; Silvia & Eichstaedt, *2004*; Snow et al., *2004*), and it is a common measure in research on emotions and self-awareness (Abele et al., *2005*; Salovey, *1992*; Silvia & Abele, *2002*).

Subjective emotional experience. To assess possible changes in mood as a function of the priming manipulation, we administered the BMIS after the measure of self-focused attention. This enabled an analysis of change in PA and NA as a function of the priming manipulation.

Results
Priming effects on self-focused attention
If priming emotion concepts influences self-awareness, then people in the happy priming and sad priming conditions should be more self-focused than people in the neutral priming condition. To test this hypothesis, we conducted a planned contrast that compared the happy priming and sad priming conditions against the neutral priming condition (weights: 1, 1, −2). This contrast was not significant, $t(62)=1.43$, $p < .16$. Because the planned pattern did not appear, we conducted a one-way ANOVA, which found significant variability between the groups, $F(2, 62)=2.96$, $p < .059$. Table 1 shows the descriptive statistics and confidence intervals. As expected, people in the sad priming condition were more self-focused relative to people in the neutral condition, $t(41)=2.18$, $p < .035$, and in the happy condition, $t(43)=1.93$, $p < .061$. The happy priming and neutral priming conditions, however, did not differ, $t < 1$, *ns*. Thus, the sad priming condition had higher scores than the neutral and happy priming conditions.

Table 1 Effects of emotional priming on self-focused attention: Experiment 1

Condition	*Mdn*	*M*	*SD*	95% CI	*n*
Happy	.40	.434	.121	.381–.488	22
Neutral	.40	.423	.121	.366–.479	20

Condition	*Mdn*	*M*	*SD*	95% CI	*n*
Sad	.55	.507	.131	.449–.563	23

Note. Scores range from 0 to 1, with higher scores indicating higher self-focus.

Priming effects on subjective experience

Did the priming manipulation affect subjectively experienced affect? A 3 (priming manipulation: happy, neutral, sad) by 2 (time: pre, post) by 2 (affect: PA, NA) ANOVA assessed whether PA and NA changed over the experiment due to the priming manipulation. This analysis found only a main effect for affect ($F(1, 62)=111$, $p < .001$) and a main effect for time ($F(1, 62)=8.41$, $p < .005$). All other effects were not significant, Fs < 1. The time main effect reflected an overall decline in both PA and NA over the course of the experiment, probably because of boredom; the affect main effect reflected higher PA than NA at both time periods. Table 2 shows the descriptive statistics. Thus, as expected, priming emotion concepts affected self-focused attention without affecting subjective emotional experience.

Table 2 Effects of emotional priming on emotional experience: Experiment 1

Condition	PA-start	PA-end	NA-start	NA-end
Happy	3.46 (.69)	3.39 (.73)	1.89 (.62)	1.88 (.67)
Neutral	3.41 (.63)	3.18 (.71)	1.96 (.48)	1.93 (.63)
Sad	3.34 (.66)	3.32 (.79)	1.79 (.70)	1.71 (.75)

Note. PA and NA scores range from 1 to 5, with higher scores indicating more intense emotions. Standard deviations are in parentheses.

Discussion

Experiment 1 offered qualified support for our predictions. First, congruent with our predictions, activating emotion concepts with subliminal exposure to emotional expressions did not affect subjective emotional experience. Second, priming sad concepts significantly increased self-focus relative to neutral concepts. No effect was found for the happy priming condition, however, and we had expected that both the happy and sad conditions would show higher self-focus than the neutral condition. The asymmetry between happy and sad concepts might stem from the use of faces to prime emotional information. Recent research shows that happy faces are easier to process than other expressions (Leppänen & Hietanen, *2003*; Silvia, Allan, Beauchamp, Maschauer, & Workman, in press). In contrast, negative facial expressions draw additional processing relative to neutral and positive faces (Eastwood, Smilek, & Merikle, *2001*, 2003; Fenske & Eastwood, *2003*), even when the faces are presented outside of awareness (Mogg & Bradley, *1999*). Thus, it is possible that positive facial expressions are less powerful primes relative to negative facial expressions. We thus conducted a second experiment to extend these findings and to seek additional support for our predictions.

Experiment 2

Experiment 2 conceptually replicated Experiment 1 by using a different priming manipulation. Happy, sad, and neutral emotion concepts were primed with a semantic priming task that did not involve facial expressions. Participants completed a scrambled-sentences task that was developed to prime happy and sad emotion concepts (Innes-Ker & Niedenthal, *2002*) and then completed the pronoun-selection measure of self-focused attention. As before, we predicted that priming happy and sad emotion concepts would increase self-focused attention.

Method

Participants and design

Sixty undergraduate women enrolled in general psychology at UNCG participated as part of a research option. Two people were excluded for not speaking English natively or for not adhering to the instructions, leaving a final sample of 58. Each person was randomly assigned to one of three between-subject conditions: *happy priming*, *neutral priming*, or *sad priming*.

People participated in groups of six to eight. A female experimenter explained that the study was about "how people process complex and ambiguous language." The participants expected to complete two "linguistic tasks" along with other questions. People first completed a single-item bipolar mood scale. This item asked "How would you describe your current mood?" People responded using an 11-point scale ranging from −5 to +5 (endpoints: *very negative*, *very positive*). A brief measure was used to avert suspicion about the study's true purposes.

The first "linguistic task" was the manipulation of emotion priming. Participants completed a scrambled-sentences task developed by Innes-Ker and Niedenthal (*2002*) for their research on judgment and categorization. Scrambled sentences are a widely-used method of priming concepts unobtrusively (see Bargh & Chartrand, *2000*; Srull & Wyer, *1979*). The task had 45 sentences. For each sentence, people had to form a correct sentence or expression using 4 of 5 provided words. In the happy priming and sad priming conditions, two-thirds of the sentences referred to happy (e.g., "the winners were ecstatic") or to sad (e.g., "she wept with grief") events. In the neutral condition, no sentences referred to emotional content (e.g. "the harbor was busy"). Innes-Ker and Niedenthal (*2002*) demonstrated that the scrambled sentences task successfully primed emotional knowledge. For example, participants who completed the happy or sad sentences showed facilitated lexical decisions for happy or sad words. The task did not affect subjective emotional experience in their experiments. Thus, the scrambled sentences manipulate the accessibility of emotional knowledge without manipulating subjective experience.

Dependent measures
All participants completed the 20-item pronoun-selection measure of self-focused attention upon finishing the scrambled sentences task (Wegner & Giuliano, *1980*). It is important to note that none of the scrambled sentences contained first-person singular pronouns, so an increase in the selection of such pronouns could not be due to the priming task. In fact, any effects of pronoun exposure during the priming task would work against the predicted effects: many scrambled sentences contained third-person pronouns, and all selections of third-person pronouns are scored as "not self-focused."

Two measures of emotional experience followed the measure of self-focus. First, people completed the 16-item BMIS. To enhance the scale's possible sensitivity, we expanded the scale from 5 points (as in Experiment 1) to 7 points (endpoints: *definitely do not feel*, *definitely feel*). Second, people completed the same 11-point bipolar mood scale that they had completed before the priming task. Following the dependent measures, participants completed a funneled debriefing that assessed awareness of the priming manipulation (see Bargh & Chartrand, *2000*).[2] Afterward, participants were debriefed and thanked for their participation.

Results
Data reduction
Self-focus scores were computed as the percentage of sentences completed with the self-focused option. The distribution of scores deviated from normality, and the variances differed significantly between some conditions (see Table 3). Violations of these assumptions reduce the power of conventional parametric analyses and result in distorted estimates of significance (Gibbons, *1993*). We thus analyzed the self-awareness data with nonparametric analyses, which avoid the reduction in power and provide more accurate significance estimates (Zimmerman & Zumbo, *1993*). Positive affect (PA; α=.83) and negative affect (NA; α=.73) subscales of the BMIS were calculated. Distributions of PA and NA scores did not deviate significantly from normality. The distributions of self-awareness, PA, and NA were examined for outliers, defined as 3 standard deviations from the overall mean. Two cases were excluded for extreme self-awareness scores; no outliers were found for PA and NA scores.

Priming effects on self-focused attention
If priming emotion concepts influences self-awareness, then people in the happy priming and sad priming conditions should be more self-focused than people in the neutral priming condition. To test this hypothesis, we

conducted a planned contrast that compared the happy priming and sad priming conditions against the neutral priming condition (weights: 1, 1, −2), using the rank-transformed self-awareness scores. This contrast was significant, $t(53)=2.64$, $p < .011$. Table 3 shows the descriptive statistics and confidence intervals.

Mann-Whitney nonparametric tests examined the pattern of effects. People in the happy priming condition were more self-focused relative to people in the neutral condition, M-W $Z=2.11$, $p < .035$. Furthermore, people in the sad priming condition were more self-focused relative to people in the neutral condition, M-W $Z=2.26$, $p < .024$. The happy priming and sad priming conditions did not differ, M-W $Z < 1$, ns. Priming happy and sad emotion concepts thus increased self-awareness relative to priming neutral concepts.

Priming effects on emotional experience

Did priming emotional concepts affect emotional experience? We first analyzed the bipolar measure of affect (see Table 4). A 3 (priming manipulation: happy, neutral, sad) by 2 (time: pre, post) repeated-measures ANOVA found no significant main effects or interactions, all Fs < 1. Analyses of the BMIS PA and NA scales showed a similar lack of differences. Neither PA nor NA differed between the three priming conditions, all Fs < 1.8, ns. In summary, no evidence was found for different levels of emotional experience in the three priming conditions.

Table 3 Effects of emotional priming on self-focused attention: Experiment 2

	Mdn	*M*	*SD*	95% CI	*n*
Happy	.550	.513	.169	.432–.595	19
Neutral	.421	.435	.076	.399–.472	19
Sad	.500	.516	.138	.451–.524	18

Note. Scores range from 0 to 1, with higher scores indicating higher self-focus.

Table 4 Effects of emotional priming on emotional experience: Experiment 2

			Bipolar	Bipolar
Condition	PA	NA	scale-start	scale-end
Happy	4.29 (1.23)	2.66 (1.07)	2.26 (2.30)	2.11 (2.18)
Neutral	4.81 (1.04)	2.65 (0.78)	2.53 (1.68)	2.21 (2.04)
Sad	4.95 (1.07)	2.65 (1.18)	2.17 (2.33)	2.39 (2.40)

Note. PA and NA scores range from 1 to 7, with higher scores indicating more intense emotions; scores from the bipolar scale range from −5 to +5. Standard deviations are in parentheses. $n=19$ in the happy priming and neutral priming conditions; $n=18$ in the sad priming condition.

Discussion

Experiment 2 fully supported our predictions. As expected, priming happy and sad emotion concepts increased self-focused attention relative to priming neutral concepts. Moreover, the priming manipulation did not affect subjective emotional experience. Thus, evidence was found for a conceptual effect of emotional knowledge on self-focused attention.

General discussion

Positive and negative emotions reliably increase self-awareness (Salovey, *1992*; Sedikides, *1992*; Silvia & Abele, *2002*; Wood et al., *1990*), but precisely why is controversial (for reviews see Duval & Silvia, *2001*, chap. 10; Sedikides & Green, *2000*). Some models assume that emotions are distinctive and thus direct attention internally (Salovey, *1992*). Other models assume that emotions have innate links to attention (Green & Sedikides, *1999*; Sedikides, *1992*). Despite their differences, all of these models assume that emotional experience affects self-awareness. The present research offered a twist on this literature by proposing that merely thinking about emotions was sufficient for increased self-focus. Two experiments supported these predictions. Experiment 1 found that priming sad faces increased self-focus relative to priming happy faces and

neutral faces. Experiment 2 found that priming both sad and happy concepts increased self-focus. The effect of priming was not due to changes in emotions. People's emotional states did not change from before to after the priming manipulation, and measures of PA and NA following the manipulation found no differences between the priming conditions.

The present experiments were designed to examine the possibility of conceptual effects on self-focus, not to decisively distinguish between the three possible explanations for why emotion priming could affect self-focused attention. The experiments and their findings, however, suggest that some of the explanations are more plausible than others. The affect-as-information model (Clore et al., *2001*) is consistent with the findings we observed, although it isn't obvious how information about value is influencing self-focused attention. Research has shown that primed emotion concepts affect value-related outcomes, such as impressions of other people, the desirability of behaviors, and the expected value of behavioral outcomes (Clore & Colcombe, *2003*). It may be possible to connect perceived value to self-focused attention, but at this point the relationship appears obscure. The unconscious affect model (Berridge & Winkielman, *2003*) is more consistent with Experiment 1 than with Experiment 2. A reasonable case can be made that subliminal emotional expressions can induce unconscious affect (Winkielman et al., *2005*), given the specialization of both face processing and emotion recognition. It seems unlikely, though, that a scrambled-sentence task would create unconscious emotions. Although implicit, this task involves conscious reasoning about the words in each sentence, and scrambled sentences fail to harness the atavistic emotion processes involved in the perception of facial emotion. This issue could be settled by examining if conscious-yet-implicit tasks and subliminal-affect tasks have similar effects on incentives and motivated action (Winkielman et al., *2005*).

Models of emotion concepts seem to be the most promising of the three explanations. If people's concepts of emotions contain information about the self, then activating the emotion concepts should increase the activation of self-relevant information. As a result, activating emotional knowledge should incidentally activate self-knowledge, which would appear as higher scores on measures of self-focused attention. This approach fits both experiments, and it offers the most straightforward explanation for why emotion priming should affect self-focused attention. Nevertheless, the present experiments did not directly contrast the three possible explanations, so it remains for future research to examine how conceptual and experiential aspects of emotion influence self-focused attention.

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Footnotes

[1] We do not review every experiment on mood and self-focus here. Some experiments lacked neutral-mood control conditions (e.g., Carr, Teasdale, & Broadbent, *1991*; Green & Sedikides, *1999*; Krohne, Pieper, Knoll, & Breimer, *2002*), which are important comparisons. A significant difference between positive and negative mood conditions could mean that (1) both moods increased self-focus, but one increased it more; (2) both moods decreased self-focus, but one decreased it more; (3) one mood increased and the other mood decreased self-focus; or (4) only one mood affected self-focus. Another experiment (Green, Sedikides, Saltzberg, Wood, & Forzano, *2003*) included happy, neutral, and sad conditions, but segments of the design had non-random assignment to condition. Most of these studies, along with additional unpublished studies, are reviewed in detail elsewhere (Duval & Silvia, *2001*, chap. 10).

[2] Responses to the funneled debriefing were coded conservatively. Four participants (3 in the sad priming group, and 1 in the happy priming group) mentioned the emotional quality of the scrambled sentences. Excluding these participants did not change the pattern of results.