Does Language Do More Than Communicate Emotion?

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Abstract

Language can certainly communicate emotions, but growing research suggests that language also helps constitute emotion by cohering sensations into specific perceptions of "anger," "disgust," "fear," and other emotion categories. The powerful role of language in emotion is predicted by a *constructionist* approach, which suggests that emotions occur when sensations are categorized using emotion category knowledge supported by language. We discuss the accumulating evidence from social-cognitive, neuropsychological, cross-cultural, and neuroimaging studies that emotion words go beyond communication to help constitute emotional perceptions, and perhaps even emotional experiences. We look ahead to current directions in research on emotional intelligence, emotion regulation, and psychotherapy.

Keywords

emotion perception, emotion experience, language, concepts, construction

"That which we call a rose, by any other name would smell as sweet"—or would it? Shakespeare's Juliet famously surmised that language is just for communication, but findings from psychology and neuroscience are beginning to suggest otherwise—that a flower might indeed be perceived as sweeter by virtue of being categorized as a "rose." For instance, growing evidence suggests that someone else's facial movements might in fact look different by virtue of being categorized as an instance of "anger." In this article, we discuss growing evidence that language helps constitute emotions. This research has important implications for the nature of emotion and paves the way for new hypotheses about the role of language in emotional intelligence, emotion regulation, and psychotherapy.

A Role for Language in Emotion: Predictions From a Constructionist Theory

The role of language in emotion is uniquely predicted by a *constructionist* theory of emotion. As a family, individual constructionist models are united in the assumption that the mental events called "anger," "sadness," "fear," "pride," "joy," and so on are not basic building blocks of the mind but are instead mental "compounds" that result from the interplay of more basic psychological "elements." These elements are not themselves specific to emotion and play a domain-general role across myriad mental states (including emotion perceptions and experiences but also memories, visual perceptions, thoughts, etc.; Barrett & Satpute, 2013; Lindquist & Barrett, 2012). Most (but not all) constructionist models include at least (a) representations of sensory information, such as visual sensations of someone else's body movements or interoceptions of one's own body sensations, and (b) concept knowledge that is used to make meaning of sensory information in the present context (Gendron & Barrett, 2009; Lindquist, 2013). Constructionist models predict that just as visual sensations are made meaningful as percepts (e.g., of a gun vs. a hairdryer) through concept knowledge about objects (Bar, 2004), visual sensations of another person's facial muscle movements (Barrett, Lindquist, & Gendron, 2007; Lindquist & Gendron, 2013) or one's own internal body sensations (Barrett, 2006; Lindquist, 2013; Russell, 2003) are made meaningful as instances of anger, disgust, fear, and so on

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through concept knowledge about emotions. Concept knowledge in the mind of the perceiver is thus as essential to emotional perceptions and experiences as sensory information gleaned from the world or one's own internal body changes.

Constructionist models were nascent in early writing on emotion and can be observed in the work of James (1890), Wundt (1897/1998), Duffy (1941), Schachter and Singer (1962), and Mandler (1990), to name a few (for other early constructionist theories, see Gendron & Barrett, 2009). Despite their early start, constructionist theories have only recently been formalized as a viable framework for studying emotion (Barrett, 2006; Clore & Ortony, 2013; Cunningham, Dunfield, & Stillman, 2013; Lindquist, 2013; Russell, 2003) and mind-brain correspondence more broadly (Barrett & Satpute, 2013; Lindquist & Barrett, 2012).

According to our particular constructionist model, language plays a role in emotion because it allows people to acquire, organize, and use the concept knowledge that is an essential element in emotion perceptions (Barrett et al., 2007; Lindquist & Gendron, 2013) and perhaps even experiences (Barrett, 2006; Lindquist, 2013). We draw our predictions from cognitive science, in which research has demonstrated an important link between the linguistic and conceptual systems. Language helps individuals acquire new concepts, both early in life (Xu, 2002) and into adulthood (Lupyan, Rakison, & McClelland, 2007). Once acquired, linguistic concepts interact with and augment other cognitive and perceptual processes, warping memories of perceptual objects into more categorical representations and even shaping on-line visual perception (Lupyan, 2012). For instance, merely hearing a verbal label during a visual perception task helps individuals accurately detect the presence of stimuli that would otherwise be invisible (Lupyan & Spivey, 2010; Lupyan & Ward, 2013). Neuroscience research has shown that language may shape perception by virtue of rapid and reciprocal connections between early sensory brain regions and the orbitofrontal cortex—a region associated with semantic knowledge (Lamme & Roelfsema, 2000; Pessoa & Adolphs, 2010). In this way, conceptual information alters and constrains the ongoing processing of sensory information.

Although evidence from cognitive science suggests that language shapes visual perception, less research has focused on emotion perception. Herein, we focus on the growing evidence that language helps observers categorize visual sensations of another person's facial movements into perceptions that the person is feeling emotions such as anger, disgust, joy, pride, and so on. Building on these emotion-perception findings, we then extrapolate to new hypotheses about how language might shape individuals' own experiences of emotion.

Language Helps Constitute Perceptions of Emotion

Impairing language accessibility impairs emotion perception

The best evidence that language helps constitute emotion perception has come from studies that have experimentally disrupted participants' access to linguistic emotion concepts and shown a corresponding disruption in emotion perception. In several such studies, we manipulated participants' access to words for linguistic emotion concepts using a method called *semantic satiation* and demonstrated impairments in emotion perception using two different perceptual measures. Semantic satiation involves repeating a word out loud 30 times until the word temporarily loses its meaning (vs. 3 times, on control trials, in which the word does not lose its meaning; Black, 2004). In the critical conditions of our first set of studies, participants repeated a word (e.g., "anger") that was relevant to upcoming pictures of facial emotion expressions (e.g., two scowling faces) either 30 or 3 times. Participants' task was to judge whether the two pictured facial expressions represented instances of the same emotion category or not. As predicted, when participants' access to the relevant emotion word meaning (e.g., "anger") was reduced following semantic satiation (vs. when access to the relevant emotion word meaning was intact on control trials), participants were slower and less accurate to perceptually match the two emotional facial expressions (Lindquist, Barrett, Bliss-Moreau, & Russell, 2006).

Although the results from this first study are suggestive, it could be argued that semantic satiation merely interfered with ancillary processes required by the matching task rather than processes related to perception of emotion per se. We thus accounted for this possibility in another study (Gendron, Lindquist, Barsalou, & Barrett, 2012). As before, access to an emotion concept (e.g., "anger") was disrupted using semantic satiation prior to presenting a related facial expression (a scowling face; Fig. 1). Yet this time, we measured the effects of semantic satiation implicitly. Specifically, we examined whether, following semantic satiation of a relevant emotion word, a facial expression retained the ability to "prime" a subsequent perception of the identical facial expression (see Fig. 1). Such perceptual priming is evidenced when seeing any stimulus once causes a person to render faster judgments about the identical stimulus on later presentations (Grill-Spector, 2008). In our study, perceptual priming was measured as participants' speed at rendering an arbitrary perceptual judgment about the second face presented (i.e., how close or far apart the eyes were). We hypothesized that if emotion concepts are routinely involved in emotion perception, then disrupting access to
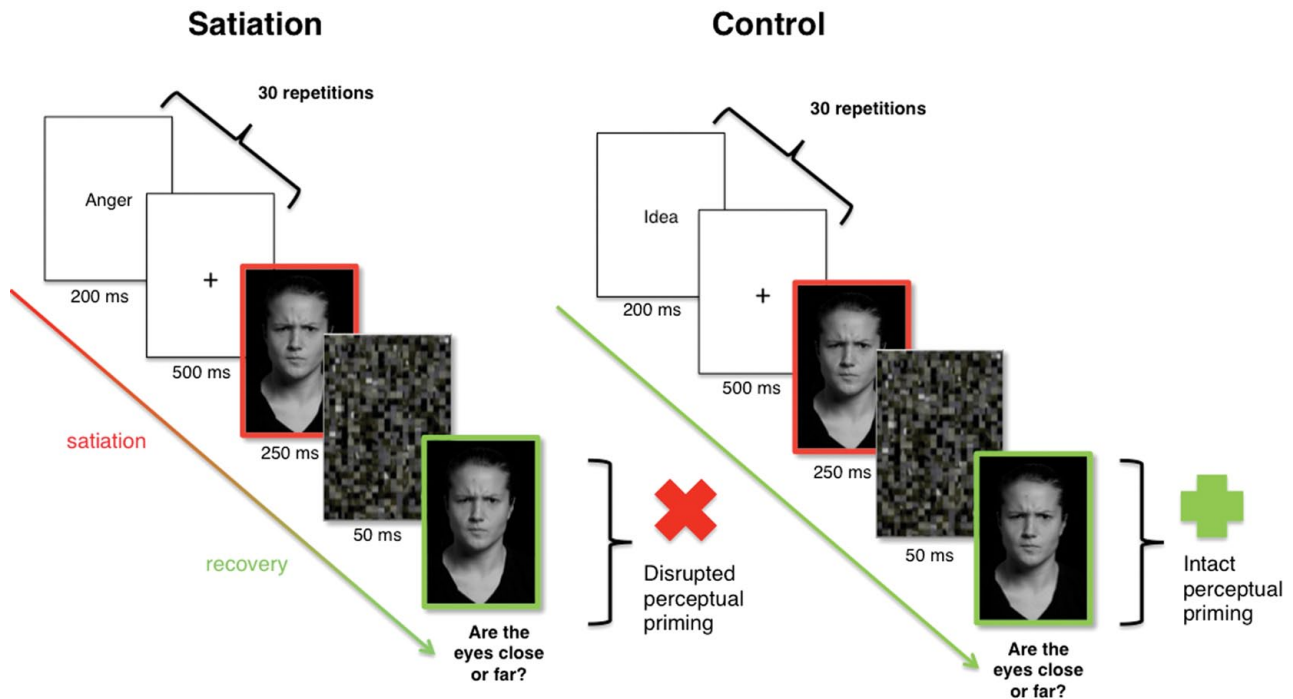
Fig. 1. Timeline for critical trials from the perceptual priming paradigm. On satiation trials in Gendron, Lindquist, Barsalou, and Barrett (2012; left), participants repeated a relevant emotion word (in this example, "anger") out loud 30 times—until the word temporarily lost its meaning—prior to seeing the first face in a perceptual priming paradigm. We predicted that without access to the meaning of a relevant emotion word, perception of this first face would be impaired. Upon perception of the second face, participants' access to the word would have recovered and they would be able to perceive the face normally. The result would be that Face 1 (highlighted in red) and Face 2 (highlighted in green) would appear different from one another and perceptual priming would not occur. By contrast, on control trials (right), participants would have access to the meaning of a relevant emotion word during the perception of both faces, which would result in perceptual priming (Face 1 would facilitate responses to Face 2). Adapted from "Emotion Words Shape Emotion Percepts," by M. Gendron, K. A. Lindquist, L. Barsalou, and L. F. Barrett, 2012, *Emotion, 12*, p. 319. Copyright 2012 by the American Psychological Association. Adapted with permission.

emotion concepts ought to interfere with how an emotional face is perceived, which should in turn impair its ability to perceptually prime itself later in the trial (see Fig. 1). Consistent with this hypothesis, semantic satiation interfered with the ability of the first face to facilitate judgments made about the subsequently presented face, even though the task involved making an arbitrary perceptual judgment that did not itself require access to emotion concepts. Importantly, our findings were not due to fatigue, because satiating an irrelevant word (e.g., "idea") did not similarly impair a face's ability to perceptually prime itself later in the trial.

We further tested whether language helps constitute emotion perception by examining emotion perception in patients with semantic dementia. Semantic dementia is a neurodegenerative disorder that permanently damages patients' ability to access the meaning of words (Gorno-Tempini et al., 2011). In a task that did not explicitly require labels, patients freely sorted 36 images of 6 individuals who were each photographed making six facial expressions (anger, disgust, fear, happiness, sadness, and neutral) into piles. If patients with semantic dementia were able to perceive emotion on faces, then, like our

age-matched healthy control participants, they should have created roughly six piles for the six emotion categories portrayed (e.g., a pile of scowling faces for anger, frowning faces for sadness, wide-eyed faces for fear, etc.). Yet patients with semantic dementia did not make piles like control participants did. Instead, patients with semantic dementia each created three or four piles that represented the broader categories of unpleasantness (angry, fearful, disgusted, and sad faces), pleasantness (happy faces), and neutral expressions (Lindquist, Gendron, Barrett, & Dickerson, 2014). Without available linguistic emotion concept knowledge, patients with semantic dementia could not make meaning of facial expressions beyond the broad dimension of valence (unpleasantness vs. pleasantness).

Increasing language accessibility enhances emotion perception

If impairing access to linguistic emotion concepts impairs emotion perception, then it stands to reason that increasing the accessibility of linguistic emotion concepts might enhance perceptual categorization, causing individuals to

see facial expressions in terms of specific emotion categories when they did not previously. Indeed, prior to the development of language, infants can reliably differentiate only pleasant, unpleasant, and neutral expressions (e.g., 5-month-olds look longer at any unpleasant face, whether fearful, angry, or sad, after habituating to happy faces; Bornstein & Arterberry, 2003; for a review, see Widen, 2013).

As toddlers acquire and use words for "sadness," "anger," and "fear" in discourse, they simultaneously become able to perceptually categorize different unpleasant expressions (Widen, 2013). For instance, 2-year-olds use the very simple emotion labels "angry" and "happy" in daily discourse and, like infants and semantic dementia patients, can only reliably differentiate faces in terms of valence (Widen, 2013). For instance, when 2-year-olds are given a set of pictures depicting five emotional facial expressions and are asked to perceptually match only those faces that match an additional picture (e.g., of an angry face) by placing them in a box, they place all unpleasant faces (angry, sad, disgusted, and fearful) in the box but leave out happy faces. Yet as 3- and 4-year-olds begin to acquire the concepts "sad" and "fearful," they leave those faces out of the "angry" box, demonstrating an ability to perceptually categorize unpleasant faces into more specific emotions (Russell & Widen, 2002; Widen, 2013). By the age of 7, children show adult-like perceptual categorization of most faces save for those expressing disgust (which they still tend to confuse with anger and sadness; Widen, 2013; Widen & Russell, 2013). These findings suggest that as children acquire emotion words, they become able to perceive facial behaviors in terms of specific emotion categories.

Although the findings with children are correlational, experimental data from adults have demonstrated that pairing faces with words helps adults perceptually categorize otherwise unfamiliar facial expressions. In the first phase of an experiment, adults unfamiliar with chimpanzee facial expressions were assigned to one of two conditions. In both conditions, participants were given the goal of learning different types of chimpanzee facial expressions. However, in the first condition, participants did so by merely viewing the novel chimpanzee facial expressions (i.e., bared-teeth, screaming, hooting, or play faces). In the second condition, participants viewed the same pictures but also learned to associate each type of facial expression with a single nonsense word. Participants were later shown images taken from a continuous morphed array of two chimpanzee facial expressions (e.g., ranging from bared teeth to a scream) and were asked to indicate when two faces from the array were similar to one another and when they were different. Participants who had learned to associate faces with a label displayed "categorical perception"—they were able to perceive a categorical boundary at the midpoint in the morphed array of bared-teeth and screaming faces—but participants who did not learn to associate faces with a label did not perceive such a categorical distinction (Fugate, Gouzoules, & Barrett, 2010).

Cultural relativity in emotion perception

Finally, there is evidence from cross-cultural research that people who speak different languages perceive emotion differently from one another. We recently assessed emotion perception in speakers of Herero, a dialect spoken by the remote African Himba tribe, and American English speakers. Participants were asked to complete the emotional face-sorting task that the semantic dementia patients discussed previously completed. Whereas English speakers created relatively distinct piles for angry, disgusted, fearful, sad, happy, and neutral faces, Herero speakers did not sort in this so-called "universal" pattern. Even labeling the piles in advance with translations of English emotion words did not help the Herero speakers' performance. Importantly, the Herero speakers sorted similarly to one another, suggesting that they understood the instructions but were using different perceptual cues than the English speakers to guide their sorting (Gendron, Roberson, van der Vyver, & Barrett, 2014).

Herero speakers might have performed differently than English speakers because the perceptual representations anchored by emotion words vary across languages. Although this hypothesis has yet to be addressed with Herero speakers, data from Chinese versus English speakers are suggestive. Chinese and English speakers were presented with videos of computerized facial muscle movements that changed over time and in random patterns. For instance, videos sometimes depicted furrowed brows, a relaxed nose, and a scowl (consistent with the Western English representation of "anger") and at other times depicted furrowed brows, a scrunched nose, and a smile (not consistent with any Western English emotion category). Participants were asked to indicate when the facial configuration was consistent with their representation of the categories "happy," "surprised," "fearful," "disgusted," "angry," or "sad."

During analysis, the authors used reverse correlation based on participants' self-reported indications (e.g., that a certain set of facial muscle movements belonged to the category "anger") to reconstruct models (visualized as a video) of facial muscle movements for each emotion category, for each individual subject, and across subjects within each culture. These models displayed the visual features that, on average, participants from each culture thought were indicative of a certain emotion category (e.g., anger). Whereas English speakers represented each

of the six so-called universal categories with a distinct set of facial movements, Chinese speakers did not, showing considerable overlap in the facial muscle movements they considered to be indicative of surprise, fear, disgust, and anger (Jack, Garrod, Yu, Caldara, & Schyns, 2012). There was less agreement among Chinese participants about which facial muscle movements corresponded to each category, perhaps because the response options included in the task were translations of English emotion terms rather than the terms used most frequently by Chinese speakers. It is thus possible that Chinese-speaking individuals would show greater reliability for a different set of emotion categories that are more representative of their language—a point that underscores the linguistic relativity of emotion concepts and the cultural relativity of emotion perception.

A Role for Language in Emotion Experience

Thus far, we have focused on the role of language in emotion perception because most research to date has done so for practical reasons—it is easier to experimentally manipulate and control visual images than sensations in someone's body. Nonetheless, our constructionist model unifies *emotion perceptions*, in which people categorize visual sensations of someone else's actions (e.g., facial muscle movements) as instances of emotion, and *emotion experiences*, in which people categorize interoceptions of their own body sensations as instances of emotion, under one framework with a common set of mechanisms to explain both (Barrett, 2013, 2014; Lindquist, 2013). Our constructionist approach thus makes the novel prediction that concept knowledge represented by language also influences how individuals experience sensations interocepted from their own bodies (e.g., a quickened heartbeat or accelerated breathing) as instances of specific emotions (e.g., anger vs. fear; Lindquist & Barrett, 2008). This novel hypothesis has important implications for how psychologists think of the nature of emotional experiences, as well as emotional intelligence, emotion regulation, and even psychotherapy, and current directions in research are suggestive of its promise.

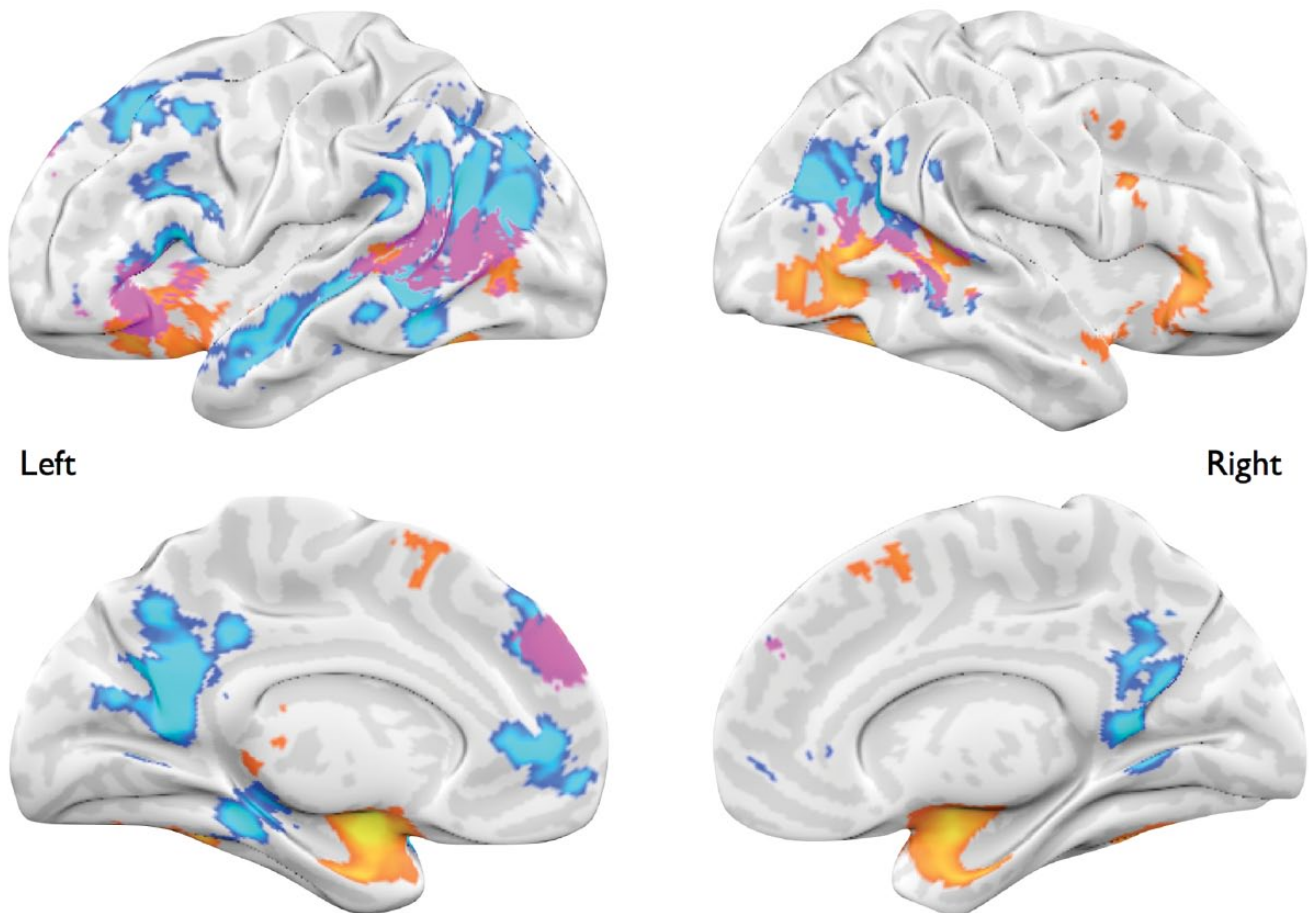## *Brain regions involved in semantics are active during emotion*

Evidence from neuroimaging is suggestive that language helps constitute emotional experiences. For instance, when individuals experience emotions in the fMRI scanner, they not only have increased activity in limbic/paralimbic brain regions that are associated with bodily arousal but also have increased activity in lateral prefrontal brain regions that are associated with semantic retrieval

and in medial prefrontal regions that are associated with categorization of body states (Satpute, Shu, Weber, Roy, & Ochsner, 2013). Meta-analyses of hundreds of neuroimaging studies have confirmed these findings: Brain regions that are consistently involved in language and semantics (Binder, Desai, Graves, & Conant, 2009) have also shown reliable increases in activity across studies of emotional experiences and perceptions (Kober et al., 2008; Lindquist, Wager, Kober, Bliss-Moreau, & Barrett, 2012; see Fig. 2). Although these findings are ultimately correlational, they are consistent with several behavioral studies that have experimentally manipulated language accessibility and shaped emotional experience.

Increasing language accessibility enhances emotion experience

In ongoing research, we are testing the constructionist prediction that accessible linguistic concepts shape how a person experiences his or her body state. For instance, in one study (Lindquist & Barrett, 2008), we increased participants' access to emotion concept knowledge, manipulated their body state, and measured whether they experienced the specific discrete emotion of fear. To increase participants' access to emotion words, we had them write a story about a character who felt "fear," "anger," or neutral. We next manipulated participants' body state by having them listen to unpleasant and highly arousing or neutral music. Consistent with the idea that accessible emotion words shape how body states are experienced, we found that participants who felt unpleasant while knowledge about "fear" was accessible were more likely to behave in a fearful manner (i.e., to be risk averse) than participants who felt unpleasant while knowledge about "anger" was accessible, participants who felt unpleasant while emotion knowledge was not particularly accessible, or participants who felt neutral while knowledge about "fear" was accessible.

Another recent study demonstrated that the accessibility of emotion words during a stressful task actually shaped participants' resulting cardiovascular profile. Participants who labeled their emotions while completing a stressful mental arithmetic task showed physiological responses consistent with an experience of threat (i.e., increased total peripheral resistance and relatively reduced cardiac output), whereas participants who did not label their emotions experienced a physiological profile more consistent with active coping (i.e., decreased total peripheral resistance and increased cardiac output; Kassam & Mendes, 2013). Together, these findings are consistent with the constructionist hypothesis that the presence of emotion words during the experience of affective states shapes participants' behavior, their physiology, and perhaps even their experiences.

Fig. 2. Overlap between brain regions involved in emotion and semantics. Meta-analytic summaries of functional neuroimaging studies on emotion (orange; evoking discrete emotions relative to neutral conditions; from Kober et al., 2008; Lindquist, Wager, Kober, Bliss-Moreau, & Barrett, 2012) and semantic processing (blue; e.g., word-processing or object-naming conditions) show overlaps in several cortical regions (purple; from Binder, Desai, Graves, & Conant, 2009).

Manipulating language results in emotion regulation

If language helps constitute emotional experiences as a constructionist view predicts, then this has far-reaching consequences for clinical psychology. Although psychologists have long known that putting feelings into words after the fact helps diminish them (Pennebaker & Beall, 1986), recent research on affect labeling (Kircanski, Lieberman, & Craske, 2012), conceptual reappraisal (Jamieson, Nock, & Mendes, 2012), and mindfulness-based therapies (Goldin & Gross, 2010) hints that training individuals to categorize their feelings as instances of emotions in the moment can reduce phobias and stress. For instance, explicitly labeling facial expressions with emotion words produces decreased activity in the amygdala (Lieberman et al., 2007), a brain region that responds to the presence of uncertain stimuli and promotes autonomic responding (Cunningham & Brosch, 2012; Whalen, 2007). Language might therefore help regulate emotion by reducing the uncertainty of sensations in the world or body—once a person knows what sensations mean, he or she can do something about them.

Techniques using emotion words might therefore be fruitful avenues for training emotion knowledge and emotion regulation, in both clinical and nonclinical settings. For instance, the emotion-perception deficits observed in autism are mediated by impairments in using words to label emotional states (i.e., alexithymia; Cook, Brewer, Shah, & Bird, 2013). Training children to label their own and others' emotions leads to a host of positive social and academic outcomes (Hagelskamp, Brackett, Rivers, & Salovey, 2013). In fact, psychotherapy might operate by helping individuals to increase the complexity of their emotion category knowledge and more specifically label their emotional experiences and perceptions.

Conclusion

Linguistic concepts clearly do more than just communicate emotion. Evidence that linguistic concepts interact
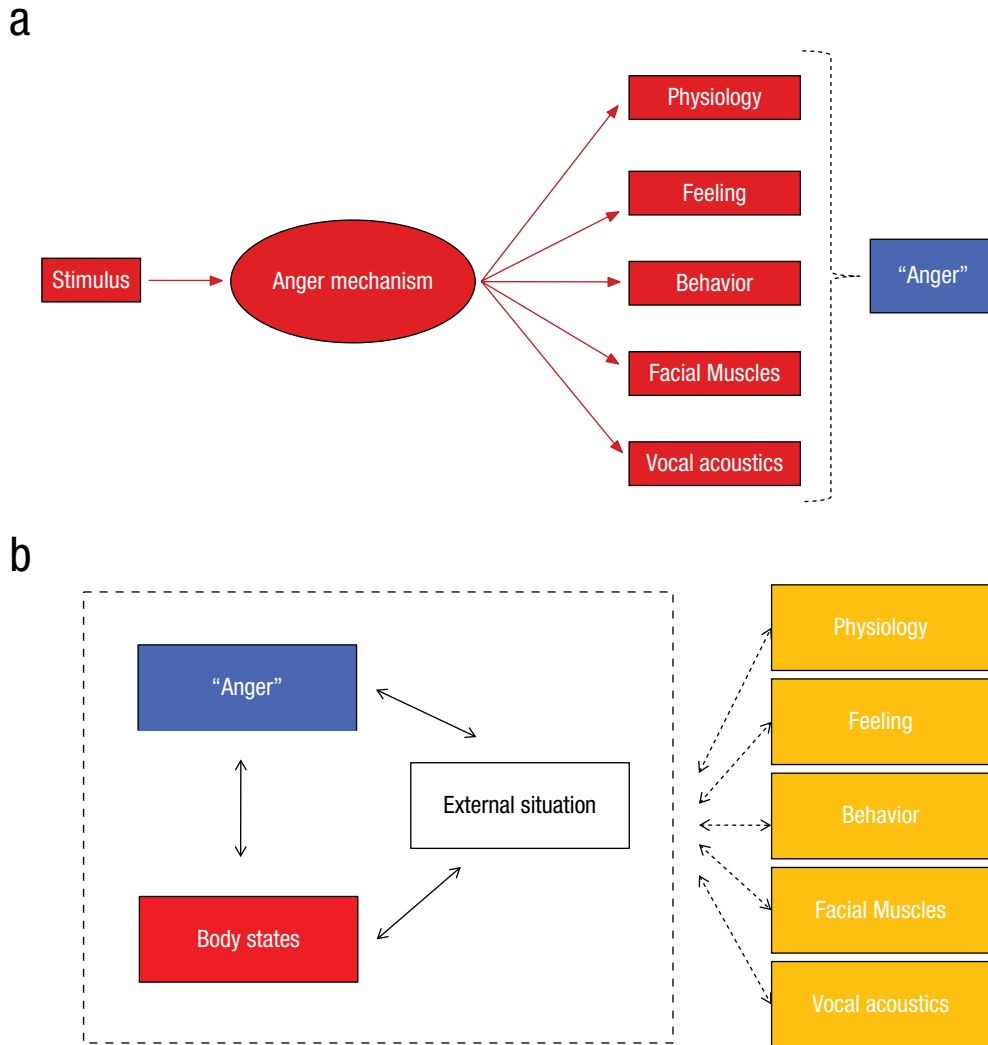
Fig. 3. Basic versus constructionist approaches to emotion. In a basic emotion view (a), linguistic concepts are at most invoked after an emotion has formed and are purely used for communicating emotions to others. In contrast to basic emotion views, causal appraisal models hypothesize that a cognitive appraisal intervenes between the stimulus and emotion, but this is not typically thought to be a linguistic process per se. By contrast, in a constructionist view (b), linguistic concepts help make meaning of ambiguous body states in light of the present context. Linguistic concepts are thus constitutive of the emotion, helping to create the experience in the first place.

with visual sensations to influence the emotion seen on another person's face pave the way for new hypotheses about the role of language in emotion experience. Early findings are suggestive that language helps shape how people make meaning of their body states and, perhaps, how they regulate their emotions.

The idea that language shapes experience is not new. Questions about the role of language in experience are often aligned with the linguistic relativity hypothesis (LRH; Whorf, 1956), the oft-debated idea that language can shape thought and experience (Boroditsky, 2003). Our argument is consistent with, yet distinct from, the LRH. The extreme interpretation of the LRH—that language determines all

experiences—is untenable. Yet the idea that both sensory information and conceptual information contribute to conscious experience has long been accepted (Bruner & Postman, 1948). What remains a question for contemporary scientists is the relative extent to which sensory information and conceptual information contribute to emotion.

On one end of the spectrum, "basic emotion" approaches argue that language plays a minor role in emotion. If emotions are triggered by innate, dedicated mechanisms that produce specific "expressions" of five to seven universal emotion categories (e.g., facial muscle movements, behaviors, bodily changes, and feelings; Ekman & Cordaro, 2011; Izard, 2011; Panksepp & Watt,

2011), then language might help identify or express pre-existing perceptions and experiences of those emotions (Ekman & Cordaro, 2011; Ogarkova, Borgeaud, & Scherer, 2009; see Fig. 3a). By contrast, constructionist views predict that language plays a constitutive role in emotion by interacting with sensory information from the body and world during the actual formation of discrete emotions (see Fig. 3b).

Of course, further research is required to develop a more mechanistic understanding of constructionist accounts. Findings from cognitive science suggest that language dynamically constitutes emotion because it activates representations of categories and then increases processing of sensory information that is consistent with conceptual representations (Lupyan & Ward, 2013). In the case of emotion, language might not only increase attention to sensory information (e.g., a furrowed brow on someone's face; a beating heart in one's own body) but also produce feedback to infuse those perceptions with additional information (e.g., a perception or experience of anger), causing a discrete experience of emotion to "pop out" in consciousness (cf. Barrett et al., 2007). That language has the power to shape emotion in some manner is thus increasingly clear—the question that remains for future research is just how far language goes in shaping our emotional perceptions and experiences.

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