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### What is shared, what is different? Core relational themes and expressive displays of eight positive emotions

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# What is shared, what is different? Core relational themes and expressive displays of eight positive emotions

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Understanding positive emotions' shared and differentiating features can yield valuable insight into the structure of positive emotion space and identify emotion states, or aspects of emotion states, that are most relevant for particular psychological processes and outcomes. We report two studies that examined core relational themes (Study 1) and expressive displays (Study 2) for eight positive emotion constructs—amusement, awe, contentment, gratitude, interest, joy, love, and pride. Across studies, all eight emotions shared one quality: high positive valence. Distinctive core relational theme and expressive display patterns were found for four emotions—amusement, awe, interest, and pride. Gratitude was associated with a distinct core relational theme but not an expressive display. Joy and love were each associated with a distinct expressive display but their core relational themes also characterised pride and gratitude, respectively. Contentment was associated with a distinct expressive display but not a core relational theme. The implications of this work for the study of positive emotion are discussed.

*Keywords:* Positive emotion; Appraisal; Core relational theme; Expressive display; Differentiation.

Positive emotions influence a wide array of psychological phenomena spanning cognitive tendencies, relationship processes, and health and well-being outcomes (e.g., Folkman & Moskowitz, 2000; Gable, Reis, Impett, & Asher, 2004; Pressman & Cohen, 2005; Tugade, Fredrickson, & Barrett, 2004). As a class of emotion, positive emotions centre around pursuit of opportunities

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and rewards (e.g., Fredrickson, 1998; Lazarus, 1991; Morgan & Heise, 1988; Shiota, Campos, Keltner, & Hertenstein, 2004), building resources by modulating cognitive processes, increasing approach motivation, and enhancing relational bonds (e.g., Fiedler, 2001; Forgas, 2008; Fredrickson & Branigan, 2005; Gonzaga, Keltner, Londahl, & Smith, 2001; Harmon-Jones, 2003; McCullough, Kilpatrick, Emmons, & Larson, 2001). The common features among positive emotions have led to a suggestion that they are less categorically differentiated than negative emotions (e.g., de Rivera, Possel, Verette, & Weiner, 1989; Ekman, 1992; Ellsworth & Smith, 1988). However, emotions such as awe, contentment, interest, love, and pride also have been shown to have distinctive phenomenological, cognitive, physiological, and behavioural features that may reflect particular functions (e.g., Fehr & Russell, 1991; Gonzaga, Turner, Keltner, Campos, & Altemus, 2006; Griskevicius, Shiota, & Nowlis, 2010; Sauter, 2010; Shiota, Neufeld, Yeung, Moser, & Perea, 2011; Silvia, 2005; Tracy & Robins, 2007).

Despite great advances in research on individual positive emotion states, few studies have explicitly compared positive emotions on any aspect of emotional responding. Ellsworth and Smith (1988) found that interest, hope, challenge, tranquillity, playfulness and love were characterised by distinct appraisal patterns. Shiota and colleagues (2011) documented qualitatively different profiles of autonomic nervous system reactivity to stimuli eliciting five positive emotions. Mortillaro, Mehu, and Scherer (2011) reported differences in actors' dynamic poses for facial expressions of interest, joy, pride and pleasure. Their work suggests important differentiation among positive emotions. In our view, systematic comparisons of overlap and difference among multiple positive emotions on key aspects of responding can generate a better understanding of the structure of emotion and identify specific emotion states, or aspects of emotion states, that are most relevant for particular psychosocial processes and outcomes.

We report two studies that examined eight positive emotions on two core features of emo-

tional responding with the goal of providing a rich description of the similarities and differences in subjective experience and behaviour displays associated with these emotions. Study 1 used a narrative method to examine core relational themes, a highly subjective aspect of emotion. Study 2 used a posed display task to examine expressive display patterns, one of the most objective aspects of emotional responding (i.e., observable muscle movements). These aspects of emotion have been studied extensively in research on negative emotions, generating evidence of differentiation among several distinct constructs (e.g., Ekman et al., 1987; Lazarus, 1991). In the present research, however, we expanded traditional definitions of core relational themes and expressive displays to better capture the likely features of positive emotions. Core relational themes of negative emotions typically emphasise intrapersonal functions (Levenson, 1999), especially threats to individual well-being (Lazarus, 1991). However, functional analyses of positive emotions often emphasise *social* functions, or ways in which emotions support the interdependent relationships on which humans depend for survival and reproductive success (e.g., Keltner, Haidt, & Shiota, 2006; Shiota et al., 2004). Similarly, research on expressive displays of negative emotions has focused on the face (e.g., Ekman et al., 1987; Izard, 1977) but positive emotion displays have been found to extend to posture and touch (e.g., Gonzaga et al., 2001; Hertenstein, Keltner, App, Bulleit, & Jaskolka, 2006; Tracy & Robins, 2007).

We selected the eight emotions for our two studies based upon the middle-level categories that emerged from a pilot lexical analysis of positive emotion word free-sorts (Campos, Gonzaga, Shin, & Keltner, 2002) and published theoretical analyses and empirical data on positive emotion constructs, preferably from multiple labs (e.g., Algoe, Haidt, & Gable, 2008; Berenbaum, 2002; de Rivera et al., 1989; Fredrickson, 1998; Gonzaga et al., 2001; Lazarus, 1991; McCullough et al., 2001; Morgan & Heise, 1988; Shaver, Schwartz, Kirson, & O'Connor, 1987; Silvia, 2005; Tracy & Robins, 2007): amusement, awe,

contentment, gratitude, interest, joy, love, and pride.<sup>1,2</sup> Importantly, this list included closely related constructs (e.g., gratitude and love, awe and interest) as well as more clearly distinct ones (e.g., love and pride), which allowed us to examine both broad categories of positive emotion and more subtle distinctions.

## STUDY 1: CORE RELATIONAL THEMES OF EIGHT POSITIVE EMOTIONS

Core relational themes (CRTs) capture the prototypical “script” associated with an emotion experience (Lazarus, 1991). The distinct elements of CRTs—elicitors, appraisals, and tendencies to act—reflect an organised response to the potential harm or benefit associated with an emotion-evoking event. Unification of these elements into a coherent script theoretically links objective features of the environment to more subjective perceptions of relevance to the self and functional behaviours. For the purposes of Study 1, we asked whether the specific CRTs suggested by recent theoretical analyses of our eight positive emotions (see Table 1 for CRT item description) captured meaningful similarities and differences in open-ended narratives of emotional experience. Although subject to memory biases, open-ended narratives are effective for capturing themes embedded in naturalistic descriptions of experience (Baumeister, Stillwell, & Heatherton, 1995; Shaver et al., 1987). A between-subjects design was used to reduce the likelihood that comparisons among positive emotions would exaggerate their similarities or differences. Analyses assessed whether the theorised CRT differentiated each target emotion from each of the seven comparison emotions.

## Method

### *Participants*

Two hundred and forty-two participants took part in a study of positive emotion at UC Berkeley in exchange for course credit. Participant mean age was 20.24 years ( $SD = 5.43$ ). Due to a logistical error, demographic information was only collected from 19% of participants. This 19% included 37 women and nine men who self-identified as European American (20%), Asian American (66%), Latino (12%), and African American (2%).

### *Procedure*

Participants arrived in groups of 10–15. One of three experimenters seated each participant and distributed a study packet containing the open-ended narrative task. Participants were asked to write about a recent personal experience with one of the following positive emotion words: amusement ( $n = 30$ ), awe ( $n = 30$ ), contentment ( $n = 31$ ), gratitude ( $n = 31$ ), interest ( $n = 30$ ), joy ( $n = 30$ ), love ( $n = 30$ ), and pride ( $n = 30$ ).

*Narrative reports of emotion experience.* Participants answered four open-ended questions derived from previous research (e.g., Roseman, Spindel, & Jose, 1990; Shaver et al., 1987). Participants were given one page to answer each of the first two questions, and a half page to answer each of the last two questions:

- Describe in as much detail as possible what happened to cause you to feel [emotion].
- Describe in as much detail as possible what it was like while you were actually experiencing [emotion], not what it was like either before or after the emotional experience. This should include: What were you were feeling or what was going through your

<sup>1</sup>We considered including happiness because it is the only positive emotion on many basic emotion lists (Ekman & Davidson, 1994). However, the term “happiness” is also used to refer to a general sense of well-being and life satisfaction (e.g., Diener & Diener, 1996), or to a cognitive tendency to engage in downward social comparison (Lyubomirsky, 2001). Instead, joy was chosen to represent the emotion component of the broader term happiness.

<sup>2</sup>The emotions studied originally also included sympathy and desire. Both had a significantly less positive valence than the other emotions in Study 1 (sympathy:  $M = -1.00$ ,  $SD = 2.70$ ; desire:  $M = 1.45$ ,  $SD = 3.24$ ). Further, in Study 2, the sympathy display was similar to the established display for sadness (Ekman, 1972). Thus, both were dropped from this final report.

mind? What physical signs of [emotion] you showed (i.e., what happened to your body)? What you said, how you said it, and to whom you said it? What you did/how you acted? How you expressed your feelings of [emotion]? Describe everything about the experience that you can remember.

- Did your experience of [emotion] change you in any way (e.g., did it lead to any long-lasting changes in your relationship with people or in how you view the world)?
- Can you add anything that would help describe your experience more fully?

*Emotion experience check.* Following the narrative prompts, participants used Likert scales to self-report on the following characteristics of their emotion experience: valence, salience, recency, duration, and intensity. For valence, participants reported on the pleasantness of their emotion experience ( $-5 = \text{Unpleasant}$ ;  $5 = \text{Pleasant}$ ). For salience, participants reported how much of the emotion they felt while writing about the experience ( $0 = \text{None}$ ;  $8 = \text{A great deal}$ ). For recency, participants reported on how long ago the eliciting situation had occurred ( $1 = \text{Days ago}$ ;  $4 = \text{Years}$ ). For duration and intensity, participants rated the duration ( $1 = \text{A few seconds}$ ;  $5 = \text{A day or more}$ ) and intensity ( $1 = \text{Not very intense}$ ;  $4 = \text{Very intense}$ ) of their emotion experience.

*Core relational themes.* The coding of CRTs occurred in two phases. In the first phase, a team of trained research assistants read the narratives and retained those about a specific emotional experience rather than a diffuse one (e.g., philosophising on the nature of emotion). All narratives met this criterion and were retained for analyses. All narratives were then edited to remove any emotion-identifying references (e.g., “love”, “pride”). In the second phase, a separate team of five coders used 5-point Likert scales ( $1 = \text{Not at all}$ ;  $5 = \text{Very much}$ ) to rate the extent to which each emotion narrative referenced 16 items that tapped the possible CRTs. Each emotion narrative was coded by all five coders for all 16

items. This minimised the likelihood that coders would be influenced by a narrative subset to see more or less differentiation across emotions. To assess inter-rater reliability, we used the intraclass correlation (ICC) for multiple coders whose ratings are averaged together ( $ICC_{\text{average}}$ ). The 16 items and their ICCs are described below.

- *Amusement.* Amusement has been conceptualised as a response associated with play that facilitates cognitive and behavioural skills (Griskevicius, Shiota, & Neufeld, 2010; Pellegrini & Smith, 2005; Wyer & Collins, 1992). A similar construct has been studied under the labels “exhilaration” and “joy” (Panksepp, 1998; Ruch, 1993). Given our young adult sample, the items tapping amusement emphasised cognitive rather than physical play. Judges rated the extent to which a participant (a) was aware of incongruity in a situation (e.g., realising one meaning was really another;  $ICC = .70$ ), and (b) playful with others in the environment ( $ICC = .88$ ).
- *Awe.* Awe has been conceptualised as a response elicited by novel, complex stimuli that require cognitive accommodation (Keltner & Haidt, 2003; Shiota, Keltner, & Mossman, 2007). Judges rated the extent to which a participant (a) felt the situation challenged their worldview (e.g., seeing something not thought possible;  $ICC = .69$ ),  $.69$ ), and (b) felt small relative to the environment or others (e.g., overwhelmed by beauty or achievement;  $ICC = .80$ ).
- *Contentment.* Contentment has been conceptualised as a response derived from the satiety of basic physical needs such as food, warmth, or companionship (e.g., Ellsworth & Smith, 1988; Fredrickson, 1998). Judges rated the extent to which a participant (a) appreciated present circumstances ( $ICC = .88$ ), and (b) felt satisfied and secure (e.g., all needs met;  $ICC = .79$ ).
- *Gratitude.* Gratitude has been conceptualised as a response to being benefited by another’s intentional action (e.g., Algoe

et al., 2008; McCullough et al., 2001). Judges rated the extent to which a participant (a) was benefited by another's action (e.g., receiving an unsolicited gift or favour; ICC = .90), and (b) wanted to give back (e.g., reciprocate or benefit another; ICC = .80).

- *Interest*. Interest has been conceptualised as a response to novel information that fits existing schema, motivating learning and exploration (Silvia, 2005). Judges rated the extent to which a participant (a) was absorbed by novelty (e.g., engrossed in something new; ICC = .76), and (b) felt they could explore (e.g., focused on taking in something new; ICC = .82).
- *Joy*. Joy has been conceptualised as a high-arousal response to obtaining a reward (e.g., Lazarus, 1991; Shaver et al., 1987). Our use of "joy" includes the meaning of "happiness" as an emotion state, and the associated empirical research, but does not extend to general feelings of well-being (Lyubomirsky, 2001). Judges rated the extent to which a participant (a) experienced an improvement in resources (e.g., receiving a reward or something of value; ICC = .81), and (b) felt an increase in positive energy (e.g., wanting to jump up and down; ICC = .80).
- *Love*. Love has been conceptualised as a response that promotes commitment to relationships essential to survival and reproduction (e.g., Fehr & Russell, 1991; Gonzaga et al., 2001; Sternberg & Grajek, 1984). Judges rated the extent to which a participant (a) made him/herself vulnerable to another (e.g., sharing intimate information; ICC = .67), and (b) felt increased commitment (e.g., more certain that another can be counted on; ICC = .74).
- *Pride*. Pride has been conceptualised as a response to personal or collective accomplishment and is linked to increases in social status (e.g., Tracy & Robins, 2007; Williams & DeSteno, 2009). Judges rated the extent to which a participant felt (a) they had accomplished something (e.g., obtained re-

ward through effort; overcome obstacles; ICC = .95), and (b) able to take on new challenges (e.g., more confident; able to rely on self or other; ICC = .81).

## Results and discussion

### *Data analysis approach*

Analyses occurred in two steps. First, we checked ratings to assess whether the narrative task tapped salient, positive valence emotion experience. Second, coder ratings per item were averaged and a series of one-way analyses of variance (ANOVAs) were conducted on the averaged item ratings. Significant omnibus effects were followed with Dunnett pairwise tests comparing the target emotion for each CRT item with each of the other seven positive emotions. This allowed us to assess the extent to which a core relational theme item was specific to the target emotion or shared more broadly among other positive emotions.

### *Emotion experience check*

Ratings of the eight positive emotions did not differ significantly with respect to valence, salience, recency, or intensity (all omnibus *F*-test *ps* > .05). All positive emotions were characterised by highly positive valence ( $M = 4.13$ ,  $SD = 1.44$ , where the highest possible rating was five). Mean ratings for salience (the amount of emotion felt while writing) were above the midpoint of the 9-point scale across all eight emotions ( $M = 5.25$ ,  $SD = 1.88$ ), and also for each individual emotion. Emotion experiences had occurred within the previous few months ( $M = 2.86$ ,  $SD = 1.13$ ) and were felt quite intensely ( $M = 3.07$ ,  $SD = 0.78$ ). The eight emotions did differ significantly with respect to duration,  $F(7, 228) = 5.15$ ,  $p < .001$ . The overall mean indicated a duration of several hours ( $M = 4.15$ ,  $SD = 1.10$ ), but amusement was of shorter duration than gratitude, joy, love, and pride (*Scheffé* ranges of  $-1.23$  to  $-1.03$ ,  $p < .05$ ).

### *Core relational themes*

Table 1 presents the means and standard deviations for core relational theme items for each of

the eight positive emotion narratives. Subscript notations indicate that a core relational theme item significantly differentiated the target emotion from a comparison emotion. For ease of presentation, results of the Dunnett tests are reported in ranges in the text below.

- *Amusement*. Mean ratings for references to “awareness of incongruity in a situation”,  $F(7, 234) = 3.69, p < .001$  (Dunnett *t*-range of  $-0.39$  to  $-0.27, p < .02$ ) and feeling “playful with others in the environment”,  $F(7, 234) = 12.44, p < .001$  (Dunnett *t*-range of  $-1.33$  to  $-0.72, p < .001$ ) differed across emotion conditions. Both were significantly higher in amusement narratives than in all other positive emotion narratives.
- *Awe*. Mean ratings for references to “feeling small relative to environment/others” differed significantly across emotion conditions,  $F(7, 234) = 21.55, p < .001$ , and awe narratives had significantly higher ratings on this item than all other positive emotions (Dunnett *t*-range of  $-1.46$  to  $-1.19, p < .001$ ). The omnibus effect of emotion for “situation challenged worldview” was also significant,  $F(7, 234) = 4.50, p < .001$ , with awe narratives receiving the highest mean ratings, but awe differed significantly only from amusement, contentment, and pride in Dunnett tests (Dunnett *t*-range of  $-0.67$  to  $-0.46, p < .05$ ). This may have been due to a floor effect; explicit reference to this item was infrequent.
- *Contentment*. The omnibus effect of emotion on “appreciation of present circumstances” was significant,  $F(7, 234) = 4.59, p < .001$ , and contentment narratives had higher mean ratings for this item than all other emotions except pride and joy, but Dunnett tests found that contentment only differed significantly from interest on this item (Dunnett *t* =  $-0.74, p < .002$ ). Our analysis of feeling “satisfied and secure” was also significant,  $F(7, 234) = 11.36, p < .001$ , and contentment had higher mean ratings on this item than all other positive emotions, but contentment only differed significantly from amusement, awe, interest, and gratitude (Dunnett *t*-range of  $-1.15$  to  $-0.67, p < .05$ ). In sum, there was little evidence that these core relational theme items were specific to contentment; they were more broadly characteristic of the eight positive emotions.
- *Gratitude*. The eight emotion conditions differed significantly overall, with gratitude receiving significantly higher ratings than all other positive emotions, on the items “benefited by another’s action”,  $F(7, 234) = 41.13, p < .001$  (Dunnett *t*-range of  $-3.17$  to  $-1.58, p < .001$ ), and “wanting to give back”,  $F(7, 234) = 37.49, p < .001$  (Dunnett *t*-range of  $-1.59$  to  $-1.23, p < .001$ ).
- *Interest*. Ratings of “absorbed by novelty” differed significantly across emotion conditions,  $F(7, 234) = 25.76, p < .001$ , and interest received significantly higher ratings on this item than all comparison emotions except awe in Dunnett tests (Dunnett *t*-range of  $-1.80$  to  $-0.99, p < .001$ ). Ratings of “could explore” also differed significantly across emotions,  $F(7, 234) = 27.25, p < .001$ , and interest narratives had higher mean ratings on this item than all other positive emotions (Dunnett *t*-range of  $-1.86$  to  $-0.99, p < .001$ ).
- *Joy*. Ratings of “improvement in resources” differed significantly across the eight emotions,  $F(7, 234) = 13.49, p < .001$ , and joy narratives received higher ratings on this item than all comparison emotions except gratitude and pride, which received directionally higher ratings than joy (Dunnett *t*-range of  $-1.15$  to  $-0.62, p < .03$ ). Ratings of “increase in positive energy” also differed across emotions,  $F(7, 234) = 10.87, p < .001$ , and joy received significantly higher ratings than all comparison emotions except pride (Dunnett *t*-range of  $-1.57$  to  $-0.78, p < .01$ ). Thus, the core relational themes for joy also strongly characterised pride.
- *Love*. Love narratives had higher mean ratings for references to vulnerability and commitment than all other emotion narratives



**Table 1.** Study 1: Means and standard deviations for references to core relational theme items in positive emotion narratives

<i>Core relational theme items</i>	<i>Amusement</i> ( <i>n</i> = 30) <i>M (SD)</i>	<i>Awe</i> ( <i>n</i> = 30) <i>M (SD)</i>	<i>Contentment</i> ( <i>n</i> = 31) <i>M (SD)</i>	<i>Gratitude</i> ( <i>n</i> = 31) <i>M (SD)</i>	<i>Interest</i> ( <i>n</i> = 30) <i>M (SD)</i>	<i>Joy</i> ( <i>n</i> = 30) <i>M (SD)</i>	<i>Love</i> ( <i>n</i> = 30) <i>M (SD)</i>	<i>Pride</i> ( <i>n</i> = 30) <i>M (SD)</i>
<i>Amusement</i>								
Aware of incongruity	1.41 <sub>a</sub> (0.52)	1.14 <sub>b</sub> (0.47)	1.10 <sub>b</sub> (0.44)	1.07 <sub>b</sub> (0.18)	1.08 <sub>b</sub> (0.24)	1.05 <sub>b</sub> (0.26)	1.12 <sub>b</sub> (0.37)	1.02 <sub>b</sub> (0.01)
Playful with others	2.42 <sub>a</sub> (1.28)	1.20 <sub>b</sub> (0.31)	1.37 <sub>b</sub> (0.83)	1.09 <sub>b</sub> (0.21)	1.24 <sub>b</sub> (0.39)	1.70 <sub>b</sub> (0.87)	1.33 <sub>b</sub> (0.50)	1.17 <sub>b</sub> (0.29)
<i>Awe</i>								
Situation challenged worldview	1.29 <sub>b</sub> (0.49)	1.97 <sub>a</sub> (0.86)	1.51 <sub>b</sub> (0.65)	1.80 <sub>a</sub> (0.61)	1.61 <sub>a</sub> (0.66)	1.63 <sub>a</sub> (0.64)	1.93 <sub>a</sub> (0.67)	1.37 <sub>b</sub> (0.44)
Felt small relative to other	1.24 <sub>b</sub> (0.51)	2.60 <sub>a</sub> (1.18)	1.26 <sub>b</sub> (0.39)	1.14 <sub>b</sub> (0.25)	1.41 <sub>b</sub> (0.57)	1.19 <sub>b</sub> (0.41)	1.20 <sub>b</sub> (0.28)	1.39 <sub>b</sub> (0.41)
<i>Contentment</i>								
Appreciate present circumstances	3.75 <sub>a</sub> (0.90)	3.91 <sub>a</sub> (1.02)	4.23 <sub>a</sub> (0.84)	3.97 <sub>a</sub> (0.61)	3.49 <sub>b</sub> (0.97)	4.40 <sub>a</sub> (0.50)	3.89 <sub>a</sub> (0.87)	4.35 <sub>a</sub> (0.46)
Feeling satisfied and secure	2.77 <sub>b</sub> (0.67)	2.84 <sub>b</sub> (0.71)	3.81 <sub>a</sub> (0.80)	3.14 <sub>b</sub> (0.54)	2.65 <sub>b</sub> (0.65)	3.51 <sub>a</sub> (0.65)	3.57 <sub>a</sub> (0.88)	3.37 <sub>a</sub> (0.53)
<i>Gratitude</i>								
Felt benefited by another's action	1.77 <sub>b</sub> (0.75)	2.04 <sub>b</sub> (1.05)	1.53 <sub>b</sub> (0.79)	4.70 <sub>a</sub> (0.55)	2.05 <sub>b</sub> (0.94)	1.41 <sub>b</sub> (0.76)	3.12 <sub>b</sub> (1.19)	1.71 <sub>b</sub> (0.74)
Wanting to give back	1.00 <sub>b</sub> (0.00)	1.01 <sub>b</sub> (0.04)	1.10 <sub>b</sub> (0.30)	2.59 <sub>a</sub> (1.13)	1.08 <sub>b</sub> (0.26)	1.24 <sub>b</sub> (0.36)	1.37 <sub>b</sub> (0.31)	1.15 <sub>b</sub> (0.39)
<i>Interest</i>								
Attention absorbed by novelty	2.73 <sub>b</sub> (0.81)	3.67 <sub>a</sub> (0.86)	1.95 <sub>b</sub> (0.98)	1.92 <sub>b</sub> (0.73)	3.72 <sub>a</sub> (0.78)	2.26 <sub>b</sub> (0.71)	2.12 <sub>b</sub> (0.74)	2.41 <sub>b</sub> (0.61)
Felt they could explore	1.43 <sub>b</sub> (0.75)	1.96 <sub>b</sub> (0.76)	1.25 <sub>b</sub> (0.35)	1.09 <sub>b</sub> (0.18)	2.95 <sub>a</sub> (1.24)	1.46 <sub>b</sub> (0.55)	1.20 <sub>b</sub> (0.25)	1.28 <sub>b</sub> (0.41)
<i>Joy</i>								
Improvement in resources	1.25 <sub>b</sub> (0.54)	1.41 <sub>b</sub> (0.83)	1.79 <sub>b</sub> (0.89)	2.63 <sub>a</sub> (1.12)	1.29 <sub>b</sub> (0.50)	2.41 <sub>a</sub> (1.12)	1.59 <sub>b</sub> (0.53)	2.55 <sub>a</sub> (1.07)
Increase in positive energy	2.99 <sub>b</sub> (0.98)	2.62 <sub>b</sub> (0.93)	2.99 <sub>b</sub> (0.78)	2.42 <sub>b</sub> (0.83)	2.20 <sub>b</sub> (0.81)	3.77 <sub>a</sub> (0.68)	2.68 <sub>b</sub> (0.90)	3.27 <sub>a</sub> (0.72)
<i>Love</i>								
Made self vulnerable to another	1.12 <sub>b</sub> (0.29)	1.11 <sub>b</sub> (0.28)	1.06 <sub>b</sub> (0.19)	2.02 <sub>a</sub> (0.69)	1.22 <sub>b</sub> (0.35)	1.44 <sub>b</sub> (0.62)	1.86 <sub>a</sub> (0.73)	1.15 <sub>b</sub> (0.26)
Increased level of commitment	1.41 <sub>b</sub> (0.54)	1.25 <sub>b</sub> (0.43)	1.46 <sub>b</sub> (0.61)	2.35 <sub>a</sub> (0.84)	1.24 <sub>b</sub> (0.50)	1.96 <sub>b</sub> (0.85)	2.56 <sub>a</sub> (0.61)	1.25 <sub>b</sub> (0.35)
<i>Pride</i>								
Accomplished something	1.40 <sub>b</sub> (0.94)	1.57 <sub>b</sub> (1.26)	2.88 <sub>b</sub> (1.56)	1.33 <sub>b</sub> (0.86)	1.41 <sub>b</sub> (0.76)	2.55 <sub>b</sub> (1.71)	1.15 <sub>b</sub> (0.29)	4.27 <sub>a</sub> (1.17)
Able to take on new challenges	1.26 <sub>b</sub> (0.74)	1.48 <sub>b</sub> (0.82)	1.63 <sub>b</sub> (0.83)	1.19 <sub>b</sub> (0.36)	1.70 <sub>b</sub> (0.90)	1.80 <sub>a</sub> (0.92)	1.08 <sub>b</sub> (0.19)	2.29 <sub>a</sub> (0.81)

Notes: *N* = 242; Ratings on 1 (*Not at all*) to 5 (*Very much*) scale. Means and standard deviations for core relational theme items are **bolded** in the target emotion column. Means in the same row that do not share subscripts differed at the *p* < .05 level in Dunnett tests.

except gratitude. Omnibus effects of emotion were significant for “vulnerable to another”,  $F(7, 234) = 18.98, p < .001$ , and feeling “increased commitment”,  $F(7, 234) = 22.55, p < .001$ . Moreover, love narratives received significantly higher ratings for “vulnerable” (*Dunnett t*-range was  $-0.81$  to  $-0.43, p < .001$ ) and “commitment” (*Dunnett t*-range was  $-1.32$  to  $-0.60, p < .05$ ) than all other positive emotions except gratitude. Thus, the core relational themes for love also strongly characterised gratitude.

- *Pride*. Pride narratives had higher mean ratings for references to accomplishment and feeling able to take on new challenges than all other emotion narratives. Our analysis of “accomplishment”,  $F(7, 234) = 26.75, p < .001$  (*Dunnett t*-range of  $-3.11$  to  $-1.39, p < .001$ ) showed that pride differed significantly from all comparison emotions. Our analysis of “able to take on new challenges”,  $F(7, 234) = 8.51, p < .001$  (*Dunnett t*-range of  $-1.21$  to  $-0.59, p < .01$ ) showed that pride differed significantly from all comparison emotions except joy ( $t = -0.49, p = .06$ ).

#### *What is shared, what is different?*

Our examination of core relational themes for eight positive emotions revealed both shared and differentiating elements. All eight shared strong positive valence. All but interest also shared an appreciation for present circumstances, a finding consistent with previous work suggesting that positive emotions tend to occur in contexts of safety and reward (e.g., Fredrickson, 1998). Contentment was least differentiated, with its theorised core relational theme—appreciation for circumstances and satisfaction and security—widely characteristic of the other positive emotions as well. In line with previous research, joy’s hypothesised core relational theme was shared with pride (Ellsworth & Smith, 1988). Newly documented, but consistent with the strong ties of love and gratitude to relationship building (Algoe et al., 2008), love’s hypothesised core relational

theme was shared with gratitude. Awe and interest, two emotions that might have been expected to overlap, showed quite distinct core relational themes. Only interest appears to promote exploration of novel stimuli and only awe was associated with feelings of smallness. In sum, the eight emotions shared positive valence but also showed substantial, theory-consistent, differentiation in core relational themes.

## STUDY 2: EXPRESSIVE DISPLAYS OF EIGHT POSITIVE EMOTIONS

Expressive displays serve to coordinate social interaction by signalling social intentions and likely actions. Distinct and reliable signals of emotion have long been of interest to researchers (e.g., Darwin, 1872/1998; Ekman, 1972). The Duchenne smile, which involves the simultaneous lifting of the lip corners and contraction of the *orbicularis oculi* muscles around the eyes, is regarded as the key behavioural marker of “happiness”, the global term for displayed positive emotion (e.g., Ekman & Friesen, 1978; Ekman et al., 1987). Displays that may be distinct to more specific positive emotion experiences such as love (Gonzaga et al., 2001), pride (Tracy & Robins, 2007), interest (Izard, 1977), and amusement (Dickson, Walker, & Fogel, 1997) have also been documented. To date, however, no study has systematically compared display behaviour across these eight positive emotions.

For Study 2, we used a within subjects design and a videotaped emotion pose task that asked participants to recall and describe an experience corresponding to each of the eight positive emotions, and then to pose the display. Drawing from the existing literature on positive emotion displays we expected that the Duchenne smile would be widely shared among many, if not all, of the eight positive emotions (e.g., Mortillaro et al., 2011). Beyond this, however, we refrained from making more specific predictions. Whereas analyses of negative emotion displays have emphasised the face, movements such as head nods and postural changes have been found to distinguish a number

of positive emotion signals (e.g., Gonzaga et al., 2001; Keltner, 1995; Tracy & Robins, 2007). Thus, to tailor our observational analysis to positive emotion displays, we developed a coding system that combined the Facial Action Coding System (FACS; Ekman & Friesen, 1978), a recognised system for quantifying facial muscle movements that may be associated with felt emotion experience, with a rich set of upper body movements.

## Method

### Participants

Ninety-four participants (47 females, 47 males) attending UC Berkeley participated in a study of emotion expression in exchange for partial course credit. Participants' mean age was 19.84 years ( $SD = 1.68$ ) and the sample included participants who self-identified as European American (42%), Asian (42%), Latino (11%), and African American (5%).

### Procedure

Study procedures consisted of two phases. First, in one room, participants completed a set of questionnaires that included demographic measures. Participants were then taken to a private room and seated in a comfortable chair behind a large table, facing a video camera mounted on a nearby bookshelf behind a plexiglass barrier. The experimenter explained that the emotion display task would involve recalling and briefly talking about times when "you felt a specific emotion, and trying to show how you would express that emotion to

another non-verbally". Participants were cautioned that some emotions might be more difficult to express than others, but they should just do their best and "be as natural as possible".

The participant was then given a set of  $3 \times 5$  cards, each printed with an emotion word. The cards contained each of the eight positive emotion words—amusement, awe, contentment, interest, gratitude, joy, love, and pride. One negative emotion word—anger—was also included because the elements of the prototypical anger expression are well established (e.g., Ekman et al., 1987). Thus, anger poses were useful for assessing the validity of our task. The cards were randomly ordered with one exception; anger always went first to ease the participant into the task. The experimenter used a sample card (enthusiasm) to demonstrate and ensure that the task was understood. The experimenter then left the room and instructed the participant to complete the task at his/her own pace via intercom. Due to equipment error, data from five participants could not be used. Two were not recorded and three were recorded without sound.

### Expressive display coding

The coding system consisted of all FACS action units (Ekman & Friesen, 1978) and a set of codes for upper body movements that was developed for the present research.<sup>3</sup> Two FACS-certified coders—the second (MNS) and fifth (JLG) authors—coded the posed displays. The first coder (MNS) coded all displays as primary coder, with the second coder (JLG) serving as the reliability coder.

<sup>3</sup> FACS includes all possible facial muscle movements, eye movements, and head movements intense enough to be captured by the video recording. The upper body movement codes documented the following 24 possible arm, torso, and complex head movements observed in the full data set of poses: (a) *Nod*—head nodding sharply, once or repeatedly; (b) *Laughter*—visible staccato exhalation; (c) *Sigh*—visible long, unpunctuated exhalation; (d) *Shrug* of the shoulders; (e) *Shoulders Back*, to expose the chest; (f) *Slump* forward, with upper back curved; (g) *Sitting Up* straight from a previously relaxed posture; (h) *Arch* of the back; (i) *Forward Lean* in the torso; (j) *Side Lean* in the torso; (k) *Twist* of the torso; (l) *Slide*, with rear end moving forward in the chair and body moving down; (m) *Bounce*, with head and body bouncing fluidly and repeatedly up and down; (n) *Sway*, with head and body swaying fluidly back and forth; (o) *Arms Forward*, reaching toward camera; (p) *Arms Up*, reaching toward ceiling; (q) *Arms Wide*, reaching out at 90 degree angles to torso; (r) *Arms Crossed* over chest; (s) *Self Hug*, wrapping arms around own chest without crossing; (t) *Linking Hands* behind head, with elbows out; (u) *Face Touch*, with fingers touching but not covering face; (v) *Face Conceal*, with the hands used to cover the mouth, eyes, or nose; and (w) *Chin Rest*, with one or both elbows on the table, and the chin resting in the cup of the hand. Of the 24, only Nod, Shrug, Shoulders Back, Forward Lean, Bounce, Arms Forward, Self Hug, and Chin Rest movements appeared in at least 10% of the poses of any positive emotion and were retained for analyses.

To select the exact epoch for coding, research assistants supervised by the first author (BC) listened to the verbal description of each emotional experience and then noted the time in milliseconds when the participant said “and it looked like . . . ” or a similar phrase, stopped talking, or physically began a distinct pose.<sup>4</sup> Research assistants created soundless edited tapes showing all participants during these moments of posed display in response to a particular word prompt. Sound was removed to avoid the possibility that participants’ talk would influence coding. A set of soundless, edited, and unmarked videotapes were used for coding so the coders would be blind to emotion label. The two FACS coders each used their judgement to identify the exact onset of the intended pose and recorded any action units (AUs) displayed during the pose.

For each pose, a “1” was entered if an AU was present and a “0” if it was absent. If an AU was not reliably scorable in a given pose (e.g., mouth open codes during speech, head turn or face touch concealing facial movements), data for that AU were treated as missing. If coders could not identify a clear pose, the epoch was considered unscorable and data for all codes were treated as missing. This occurred in 15–20 cases per emotion for all emotion labels except gratitude. For gratitude, unscorable poses occurred at considerably higher rates. Thus, gratitude poses were not coded and are not included in these analyses. Eighty-two poses were coded by both coders. Percent agreement—a highly conservative measure of intercoder reliability that gives “credit” for agreement on the presence but not the absence of a code—was 71%.

## Results and discussion

Drawing from previous emotion display research criteria (Ekman, 1994; Haidt & Keltner, 1999), actions appearing in at least 25% of scorable poses were regarded as weakly associated with that emotion label, actions appearing in at least 50%








of scorable poses were regarded as moderately associated, and actions appearing in at least 75% of scorable poses were regarded as strongly associated. Table 2 presents photos and descriptions of the FACS action units and upper body movements that met our association criteria for each emotion except gratitude. A complete table of frequencies and percentages of scorable poses is available from the authors upon request.

We first assessed the validity of our task and coding system by examining anger displays. As expected, the results for anger validated our task, coding system, and association criteria. The three FACS action units most distinctively associated with anger displays in previous research—AU4, AU7, and AU23—appeared most frequently in participants’ anger poses. Frequencies appeared to reflect the prototypicality of the action as well as the difficulty of voluntarily enacting a movement. AU4 (brow contraction), an easy voluntary movement, appeared in 68% of scorable anger poses. AU7 (lower lid tighten) and AU23 (lip tighten), which are difficult to enact voluntarily, appeared in 33.3% and 28.3% of anger poses, respectively. Importantly, our criteria would have identified all three elements as at least weakly distinctive of anger.

As Table 2 shows, distinctive positive emotion displays were observed with at least the same frequency, and often higher frequencies, as anger displays. As expected, many positive emotion poses were associated with Duchenne smiles. At least 75% of the scorable poses for amusement, contentment, joy, love, and pride contained raised lip corners (AU12), and 56–85% of the poses of these emotions also included contraction of the *orbicularis oculi* (AU6). In contrast, smiling rarely appeared in the posed displays of awe (23%) and interest (21%). Amusement displays typically included a strong Duchenne smile, but also the head bounce and dropped jaw reported in prior studies of infant and primate “play” expressions (e.g., Dickson et al., 1997; Sarra & Otta, 2001), as well as lower-frequency inner eyebrow raises and head tilts. Awe displays typically included parted

<sup>4</sup>Notably, participants commonly flashed a mild version of the expression they ultimately posed during the recalling and talking portion of the task.

**Table 2.** Expressive displays of amusement, awe, contentment, interest, joy, love, and pride. (Photographic credit: David Lundberg-Kenrick)

<i>Amusement</i>	<i>Awe</i>	<i>Contentment</i>	<i>Interest</i>	<i>Joy</i>	<i>Love</i>	<i>Pride</i>
						
<i>Moderate to strong association (&gt; 50%)</i>						
AU6—85%	AU25—86%	AU6—56%	AU1—58%	AU6—79%	AU6—69%	AU6—70%
Cheek raiser	Lips apart	Cheek raiser	Inner brow raise	Cheek raiser	Cheek raiser	Cheek raiser
AU12—95%	AU26/27—80%	AU12—85%	AU4—56%	AU12—97%	AU12—84%	AU12—80%
Lip corner puller	Jaw drop/mouth stretch	Lip corner puller	Brow lowerer	Lip corner puller	Lip corner puller	Lip corner puller
AU25—81%	AU1—78%	AU24—60%		AU25—50%	AU25—54%	55%
Lips apart	Inner brow raise	Lip pressor		Lips apart	Lips apart	Sit up
AU 26/27—68%	AU5—61%					AU24—60%
Jaw drop/mouth stretch	Upper lid raiser					Lip pressor
<i>Weak association (25–49%)</i>						
49%	AU57—27%	38%	AU24—38%	34%	AU55/56—49%	45%
Head bounce	Head forward	Head nod	Lip pressor	Bounce	Head tilt	Shoulders back
AU55/56—34%		AU25—26%	AU2—37%	AU26/27—31%	AU43—26%	AU53—38%
Head tilt		Lips apart	Outer brow raise	Jaw drop/mouth stretch	Eyes closed	Head up
AU1—25%			AU55/56—37%			
Inner brow raise			Head tilt			
			37%			
			Forward lean			
			AU57—33%			
			Head forward			

*Note:* AU = FACS action unit.

lips, dropped jaw, raised inner eyebrows, raised eyelids, and head movement forward. Contentment displays were associated with a low-intensity Duchenne smile as well as compressed lips, a small nod, and (at lower frequency) parted lips. Interest displays were associated with raised and contracted brows, lip presses, head tilts, head movement forward, and forward leans that resembled expressions of sympathy or concerned attention in prior research (e.g., Eisenberg et al., 1989). Joy displays commonly included an open-mouthed Duchenne smile; head bounces and dropped jaws were observed at lower frequencies. Love displays also commonly included an open-mouthed Duchenne smile, but with head tilts, and closed eyes as other associated elements. Pride displays commonly included a slight Duchenne smile along with lip presses and postural expansion (sitting up straight, pulling the shoulders back, and raising the head) that have been previously documented (Tracy & Robbins, 2007).

#### *What is shared, what is different?*

Study 2 found that seven of the eight positive emotions were associated with a distinct expressive display. Consistent with previous research on “happiness”, joy displays were strong, prototypical Duchenne smiles with parted lips. Amusement, contentment, love, and pride typically included some version of the Duchenne smile, but the smiles varied in intensity across emotions, and each was accompanied by more distinctive elements. Awe and interest expressions did not include smiles (either Duchenne or non-Duchenne), and were also quite distinct from each other. Although gratitude has been found to be reliably communicated with touch (Hertenstein et al., 2006), we did not find that this emotion showed a consistently scorable expressive display. Overall, these findings indicate considerable differentiation in the expressive displays of positive emotions. An important next step in establishing the validity of these displays will be to examine if they are accurately decoded by others within US society and by members of other cultures.

We are mindful that people vary in their ability to accurately pose emotion displays. However, our

analysis of anger poses suggests that participants’ poses reasonably approximated actual displays. We are also mindful that the observed displays may reflect either holistically meaningful *sets* of actions or co-occurring combinations of psychologically meaningful *elements* (e.g., Scherer, 1994). For example, relaxed signals such as head tilts and head bounces may communicate vulnerability and submissiveness whereas expanded posture may reflect power and status. Similarly, the particular pattern observed here suggests that Duchenne smiles do not uniformly reflect positive valence emotion but may reflect the type of reward associated with particular positive emotions. While Study 2 cannot tease these possibilities apart, these findings provide direction for future research. For example, pride displays can be experimentally manipulated to include open mouth Duchenne smiles or love displays to include expanded posture to tease apart the contribution of these particular elements to emotion communication.

## GENERAL DISCUSSION

Our examination of core relational themes and expressive displays across eight positive emotions add substantially to the field’s understanding of similarity and differentiation within the positive emotion domain. Positive emotions are generally thought to be less differentiated than negative emotions, but the only similarity shared across all eight of our emotions was strong positive valence. Distinctive core relational themes and expressive displays were found for four emotions—amusement, awe, interest, and pride. Key differences and similarities were found for joy and love, such that each was associated with subtly distinct expressive displays but their core relational themes also characterised pride and gratitude, respectively. Finally, contentment was associated with a distinct expressive display but not a core relational theme whereas gratitude was associated with a distinct core relational theme but not an expressive display.

The present studies examined a particular set of points in positive emotion space that were chosen based on a convergence of prior theory and research. While the structure of positive emotion space remains controversial and unclear, our data suggest areas of overlap, important distinctions, and gaps that should be accounted for by emotion scholars in future theories and research. Far more research is clearly needed. One interpretation of these findings is that they suggest a hierarchical structure that may correspond to discrete states or meaningful components of states. For example, the features of contentment, and to a lesser extent, joy, were widely shared among the eight positive emotions. These emotions—or aspects of their core relational themes and expressive displays—may comprise the highest-order of positive emotion space that captures the most shared features of the domain. Alternatively, one could interpret these findings in terms of motivational systems of positive emotion space, such as affiliation systems and consummated reward systems, or appraisal-driven systems with certainty and power/control as possible continuums. Either way, the present studies offer valuable data for emotion scholars to work with as they test possibilities that account for shared positive valence as well as systematic differentiation within positive emotion space.

The present work had a number of strengths. First, we compared eight widely studied constructs that capture broad positive emotion space but have not been systematically studied together. Second, we used multiple methods that focused on two important, but very different, aspects of emotion. Third, the findings of this work—generated via labour-intensive coding of narratives and expressive displays—yielded new data that capture important variation among the eight positive emotions studied.

We are also mindful of the limitations of the present research. We could not study all points in positive emotion space and do not suggest that the eight constructs in these studies capture all possible (or even all important) variants of positive emotion. Another set of emotions, another set of indicators (different core relational themes, differ-

ent aspects of expression), or another aspect of emotion responding may have yielded different patterns of findings. Our studies relied on English-language words as stimuli. These same studies, if conducted in other languages or cultures, may have also yielded different patterns of findings.

Overall, however, these findings provide a trove of information for better understanding the defining features, possible structure, key signals, physiological signals, and intrapersonal and interpersonal consequences of positive emotion experience that can be studied from a variety of theoretical perspectives. Researchers from a dimensional perspective can examine whether variation among multiple positive emotions is most parsimoniously described by a particular dimensional continuum. For example, awe and interest may be best explained as gradations in intensity of feeling evoked by cognitive stimuli whose novelty is increasingly difficult to incorporate into existing knowledge structures. Researchers from a discrete emotion perspective can develop functional analyses for positive emotions and focus on spontaneous display, recognition, physiology, and cross-cultural validation. For example, an analysis of gratitude that focuses on relationship building may account for why some signals (e.g., touch), but not others (e.g., Duchenne smiles), communicate gratitude. From all perspectives, however, research on positive emotion should continue to expand traditional paradigms of emotion research. In our work, extending the definition of core relational themes to include interpersonal concerns, and our analysis of display to the upper body, allowed us to detect differentiating features that would have been concealed by traditional approaches. Most important, these findings highlight the utility of comparing several positive emotion states, and including closely related as well as more obviously distinct constructs, in any single study of emotional responding. We look forward to seeing future research that benefits from these findings and yields a better understanding of positive emotion than can be currently envisioned.

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