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Picking up Good Vibrations:

Uncovering the Content of Distinct Positive Emotion Subjective Experience

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Abstract

Inquiry into positive emotions such as awe, compassion, gratitude, and pride has increased rapidly in recent years. Yet the distinct subjective content of each positive emotion remains unknown, leaving unclear what people feel, think, and do when they experience these states, and whether regularly studied positive emotions are experientially distinct from other positive emotions. Furthermore, there are currently no validated measurement tools with which to assess the vast majority of positive emotions. The present research aimed to address these limitations. In Study 1 (N = 150) participants generated over 1,000 subjective elements (i.e., thoughts, feelings, and action tendencies) characterizing 18 regularly studied positive emotions. In Studies 2-3 (N = 2,486) participants were induced to experience each of these emotions through the Relived Emotion Task, then reported whether the previously uncovered subjective elements characterized their feelings. Using factor analyses, we examined which elements cohered together in response to each emotion and which emotions were associated with distinctive content compared to conceptually similar emotions. Results revealed distinctive subjective content associated with 15 positive emotions, as well as 4 positive emotions often treated as distinct which were not associated with distinct subjective content. Using these results, we developed reliable self-report scales for assessing each emotion and provided initial validation for these scales. These findings lay the groundwork for future empirical efforts aimed at understanding the similarities and differences among positive emotions, and ultimately for the construction of a taxonomy of subjectively experienced positive emotions.

Keywords: *emotion; positive emotion; content; subjective experience*

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The past decade has seen a considerable increase in psychological research on the subjective experience of distinct positive emotions. Whereas the large majority of emotion research prior to the turn of the century focused on general positive affect or mood (e.g., Forgas, 1995; Fredrickson, 1998; Isen, 2000; Larsen, 2000; Russell & Barrett, 1999; Schwarz, 1990; Watson, Wiese, Vaidya, & Tellegen, 1999), in recent years affective scientists have increasingly shifted their attention to distinct emotional states. Groundbreaking studies have investigated numerous individual positive emotions, including admiration (e.g., Schindler, Peach, & Löwenbrük, 2015; Sweetman, Spears, Livingstone, & Manstead, 2013; van de Ven, Zeelenberg & Pieters, 2011), awe (e.g., Gordon, Stellar, Anderson, McNeil, Loew, & Keltner, 2017; Piff, Dietze, Feinberg, Stancato, & Keltner, 2015; Valdesolo & Graham, 2014), compassion (e.g., Lupoli, Jampol, & Oveis, 2017; Oveis, Horberg, & Keltner, 2010; Stellar, Cohen, Oveis, & Keltner, 2015), gratitude (e.g., Algoe, Fredrickson, & Gable, 2013; DeSteno, Li, Dickens, & Lerner, 2014; Williams & Bartlett, 2015), pride (e.g., Tracy & Robins, 2007; Weidman, Tracy, & Elliot, 2016; Williams & DeSteno, 2008; 2009), interest (e.g., Silvia, 2005; Sung & Yih, 2016), love (e.g., Gonzaga, Haselton, Smurda, Davies, & Poore, 2008; Gonzaga, Turner, Keltner, Campos, & Altemus, 2006), and tenderness (e.g., Buckels, Beall, Hofer, Lin, Zhou, & Schaller, 2015; Hofer, Buckles, White, Beall, & Schaller, 2018). Reflecting this trend, several years ago the *Handbook of Positive Emotions* (Tugade, Shiota, & Kirby, 2014) dedicated eight chapters to one distinct positive emotion each. Furthermore, a quantitative review of articles published in the first decade of this century in the journal *Emotion* identified studies examining more than 30 distinct positive states (Weidman, Steckler, & Tracy, 2017).

Despite the many impactful findings that have emerged from this burgeoning literature, two considerable gaps remain in the field's accumulated knowledge. First, few empirical studies have examined the unique subjective elements (i.e., thoughts, feelings, and action tendencies) that constitute lay person experiences of each positive emotion. As a result, it remains unclear exactly how people feel and think, and what they are motivated to do, when they experience each positive emotion, and the field lacks insight into how various positive emotions are similar to and distinct from one another in terms of their subjective content. Second, due in part to the lack of work examining the subjective content of positive emotions, almost no self-report scales have been constructed to assess the subjective experience of various distinct positive emotions as they are experienced by lay persons. As a result, positive emotions are currently measured in a somewhat scattered manner across empirical studies (see Weidman et al., 2017).

In the present research we aimed to redress these gaps with a primarily bottom-up empirical effort. Our first goal was to identify the subjective elements that comprise lay person experiences of each positive emotion regularly studied in the literature. We also determined which of these emotions have subjective content that is distinct from that of conceptually related emotions, as well as which emotions are entirely redundant with related emotions. Our second goal was to convert the subjective elements we identified as uniquely characterizing each positive emotion into scale items, and construct brief, reliable self-report scales to measure these states.

What is the Distinct Subjective Content of Positive Emotions?

Based on theoretical accounts of emotions, as well as surveys of affective scientists, the subjective elements comprising positive emotions largely fall into one of three broad categories: thoughts (e.g., appraisal-based cognitions; Roseman & Smith, 2001; Smith & Ellsworth, 1985),

feelings (e.g., visceral sensations such as pleasantness; Barrett & Russell, 1998; Watson & Tellegen, 1985), and action tendencies (e.g., states of motivational readiness; Fridja, 1988; see also Izard, 2010).[1] These elements stand in contrast to the many foundational and well-studied elements of emotion that are more objective, and often biological in nature, and are therefore not typically assessed with self-report surveys (e.g., non-verbal vocalizations, facial and bodily displays, touch, and autonomic profiles; Cordaro, Keltner, Tshering, Wangchuk, & Flynn, 2016; Cordaro, Sun, Keltner, Kamble, Huddar, & McNeil, 2018; Hertenstein, Holmes, McCullough, & Keltner, 2009; Sauter, Eisman, Ekman, & Scott, 2010; Shiota, Campos, Oveis, Hertenstein, Simon-Thomas, & Keltner, 2017; Tracy & Robins, 2004).

Importantly, to date almost no empirical studies have identified the specific subjective elements, including thoughts, feelings, and action tendencies, that characterize lay person experience of each positive emotion. Several experiential-based conceptualizations of individual positive emotions have been proposed, including for awe (e.g., Keltner & Haidt, 2003), compassion (e.g., Goetz, Keltner, & Simon-Thomas, 2010), contentment (e.g., Cordaro, Brackett, Glass, & Anderson, 2016), gratitude (e.g., Algoe, 2012), admiration (e.g., Onu, Kessler, & Smith, 2016), hope (e.g., Snyder, 2002), empathy (Cuff, Brown, Taylor, & Howat, 2016), and interest (e.g., Slivia, 2008). However, these conceptualizations have been formulated in a top-down manner, based on reviews of theoretical perspectives and existing empirical findings, rather than on lay-person experiences. Furthermore, these reviews are indicative of a broader trend in the field, noted by Shiota and colleagues (2017): "researchers have tended to offer theories of individual positive emotions without explicitly addressing how different

[1] Note that subjective action tendencies are distinct from objective behavioral outcomes that may follow the experience of certain positive emotions. For example, an individual feeling admiration may have a desire to emulate another person, but this is distinct from the concrete steps that individual might subsequently take toward the goal of emulating the admired person.

positive emotions might be related" (p. 625; for exceptions, see Algoe & Haidt, 2009; Campos et al., 2013; Oveis et al., 2010; Stellar, Gordon, Anderson, McNeil, & Keltner, 2018).

As a result of these trends, the field has not yet arrived at a systematic or comprehensive understanding of the subjective elements experienced by lay persons during momentary episodes of each positive emotion frequently studied in the literature. Furthermore, because positive emotions are typically studied in isolation, at present it remains unclear exactly where the boundaries exist between the subjective experiences of many conceptually similar positive emotions. In other words, when a person experiences awe, gratitude, interest, or compassion, we do not know which precise set of thoughts, feelings, and action tendencies constitute these emotional episodes, or how the subjective elements constituting one of these emotions differs from those characterizing the others.

Yet, based on previously proposed theoretical definitions of certain positive emotions, it seems unlikely that every frequently studied positive emotion is in fact associated with a distinct set of subjective elements. For example, consider the emotions of *nurturant love*, *compassion*, and *tenderness*, each of which has been conceptualized as involving feelings of care and concern for others. More specifically, *nurturant love* has been defined as a feeling "elicited by physical and behavioral 'cuteness' and promoting caregiving behavior" (Shiota, Neufeld, Danvers, Osborne, Sng, & Yee, 2014, p. 108). *Compassion* has been defined similarly, as "the feeling that arises in witnessing another's suffering and that motivates a subsequent desire to help" (Goetz et al., 2010, p. 351). Additionally, *tenderness* has been conceptualized as the "signature emotion associated with the parental care motivation system" (Buckles et al., 2015, p. 499). Although each of these three emotions may include distinctive subjective content, it is also plausible that there is only one distinct emotion that arises in response to others' suffering and motivates

helping and caretaking (see also Zickfield, Schubert, Siebt, & Fiske, 2019, for more on the interrelations among these and other conceptually similar positive emotions). If so, these different emotion terms would in fact reflect distinct labels that have been used to study essentially the same subjective emotional experience.

In light of these issues, the first goal of the present research was to uncover the set of subjective elements that characterize lay experiences of each positive emotion regularly studied in the emotion literature. We expected that pursuing this first goal would allow us to determine which positive emotions are in fact comprised of distinctive subjective content and identify any positive emotions that are typically treated as distinct but in fact are characterized by subjective content that largely or entirely overlaps with other conceptually similar emotions.

Leveraging Distinct Subjective Content to Facilitate Positive Emotion Measurement

Self-report measures are the typical method for capturing the subjective experience of positive emotions. Yet, partly due to the lack of prior work examining distinct positive emotion subjective content (i.e., thoughts, feelings, and behaviors), there exist few validated scales for assessing momentary subjective experiences of distinct positive emotions. Two notable exceptions are a set of scales that have been developed for assessing happiness, desire, and relaxation (Harmon-Jones, Bastian, & Harmon-Jones, 2016) and a set of scales for assessing two forms of pride (Tracy & Robins, 2007). Additional scale development has focused on *dispositional* positive emotions (i.e., individual differences in the propensity to experience positive emotions; Buckles et al., 2015; Lyubomirsky & Lepper, 1999; McCullough, Emmons, & Tsang, 2002; Shiota, Keltner, & John, 2006), but these do not speak to momentary experience. As a result, momentary positive emotions are often assessed in a scattered manner such that, across studies, the same positive emotion is regularly measured with different items, the same

emotion words are used to measure ostensibly distinct positive emotions, and positive emotions are regularly assessed with scales that have not been validated (see Weidman et al., 2017).

These measurement tactics may hinder the field's understanding of positive emotions because they can leave unclear exactly which positive emotion is being assessed in a given study. For example, to date, nurturant love, compassion, and tenderness have been measured with a set of partially overlapping words across studies (e.g., the word *tender* is used to measure both tenderness and nurturant love, and the word *compassion* is used to measure both compassion and nurturant love; see Weidman et al., 2017). As a result, it is difficult to separate empirically uncovered similarities and distinctions among these emotions from similarities and distinctions in how they are measured. The field would therefore benefit from self-report scales that capture any distinct subjective elements that comprise each of these emotions and are not shared by the other two (or other conceptually similar emotions).

In light of these issues, the second aim of the present research was to construct and validate brief, reliable self-report scales to measure the subjective experience of each regularly studied positive emotion in the literature.

The Present Research

Across three studies, we aimed to (a) identify the distinct subjective content associated with each positive emotion and (b) convert this subjective content into scale items, which could then be used to assess each emotion. We set out to include a large set of positive emotions that appeared regularly in the literature during the first decade of this century (see Weidman et al., 2017), adopting the consensual definition of positive emotions as those that involving pleasant feelings (cf., Solomon & Stone, 2002). We also adopted a distinct emotions approach, wherein positive emotions are viewed as functionally discrete entities (e.g., Ekman, 1992; Shiota et al.,

2017; Tracy, 2014). According to this view, it is *theoretically possible* to identify subjective elements that consistently and distinctly characterize lay person experiences of each positive emotion—apart from other, closely related positive emotions—across a wide range of participants and emotional episodes (see Barrett, 2006 and Moors, 2017, for alternative views). Critically, however, our method also allowed us to test *whether* a set of distinct subjective elements could in fact be identified for each positive emotion, rather than assuming that each positive emotion regularly examined in empirical work corresponds to a distinct experience.

Throughout this research endeavor we took a bottom-up approach, relying primarily on lay persons' reports of their experience during episodes of each positive emotion, so that the subjective elements we identified for each emotion would reflect how it is actually experienced in daily life. However, at times we also relied on our own understanding of each emotion in question (e.g., when selecting subjective elements and interpreting factor solutions), making our investigation also partly a top-down endeavor. We explicitly note these instances in the Methods and Results sections.

In Studies 1 and 2, we aimed to generate, select, and prune a broad initial list of subjective elements (i.e., thoughts, feelings, and action tendencies) that constitute lay persons' typical experiences of each positive emotion. We sought to identify distinct subjective elements for each regularly studied positive emotion in the empirical literature, but we also anticipated that this process might shed light on certain positive emotions that are typically treated as distinct but are not in fact associated with distinct subjective content separate from that shared with one or several other positive emotions.

In Study 3, we aimed to further trim this list of subjective elements into a final list of central elements for each positive emotion, which we used to construct brief, reliable self-report

scales. In light of the fact that emotion experience can differ across people from different backgrounds (e.g., Brody, Hall, & Stokes, 2018; Mesquita, De Leersnyder, & Boiger, 2018), we also tested whether the set of central subjective elements comprising each positive emotion was equivalent (or at least similar) across participant gender, ethnicity, and country of origin. Finally, Study 3 provided the opportunity to conduct initial validation of the scales we constructed by examining: (a) intercorrelations among conceptually related positive emotion scales, (b) the intensity of positive emotions following episodes of conceptually related positive emotions, (c) the links between each newly developed state positive emotion scale and related emotional dispositions (e.g., the link between our new gratitude scale and trait gratitude).

Figure 1 displays a flowchart representing the methodological approach used in Studies 1-3 to generate, select, and prune subjective elements for each positive emotion, following a consensual approach emerging from the scale development and factor analysis literature (e.g., Clark & Watson, 1995; Flake, Pek, & Hehman, 2017; Simms, 2008). All data and syntax are available on OSF (https://osf.io/fj527/).

Study 1

In Study 1, we aimed to generate a comprehensive list of subjective elements that comprise each distinct positive emotion frequently studied in the literature. To ensure wide coverage, we included all positive emotions that appeared in at least three empirical studies included in a recent review the journal *Emotion* during its first decade of publication, from 2001-2011 (see Weidman et al., 2017). This yielded the following 19 emotions: admiration, amusement, attachment love, awe, compassion, contentment, empathy, enthusiasm, gratitude, happiness, hope, interest, love, nurturant love, pride, romantic love, *schadenfreude*, sympathy, and tenderness. Although pride is included in this list, we did not identify subjective elements for

this emotion because prior work has already examined the subjective content of pride in a bottom-up fashion similar to the one employed here (Tracy & Robins, 2007).

We also excluded two additional emotions that have received considerable empirical attention but which we considered to be synonyms of happiness: joy and elation. Importantly, in Studies 2 and 3, we directly tested this assumption, and found empirical evidence that joy and elation do not constitute distinct positive emotions but are largely redundant with happiness and contentment. We also excluded calmness under the assumption that this state is best conceptualized as the low end of an affect dimension which, like pleasantness, is a continuum along which all distinct emotions vary (e.g., Barrett & Russell, 1998; Watson et al., 1999). In other words, positive emotions such as awe and pride vary in the extent to which they involve high or low activation (analogous to calmness) and positive or negative valence, but distinct emotions cannot be said to vary in the extent to which they involve high or low awe or pride.

Participants and Procedure

We first categorized each positive emotion included in our investigation into one of five groups: *other-appreciation* (i.e., admiration, awe, and gratitude), *caring* (i.e., empathy, sympathy, tenderness, and compassion),[2] *enjoyment* (i.e., happiness, contentment, amusement, and *schadenfreude*), *engagement* (i.e., hope, enthusiasm, and interest), and *loving* (i.e., love, romantic love, attachment love, and nurturant love). One-hundred fifty undergraduate participants were randomly assigned to one thematic group and asked to report up to 10 subjective elements associated with each emotion within that group (N = 30 per emotion group; M_{age} = 20.40; SD = 2.47; 85% women; 53% East Asian, 28% Caucasian, 6% Middle Eastern,

[2] We included sympathy in this thematic group, although it has not always been viewed as a positive emotion (e.g., Fredrickson, Tugade, Waugh, & Larkin, 2003), because it is often conceptualized as part a family of related emotions that include empathy, tenderness, and compassion (e.g., Batson et al., 1987; Cameron & Payne, 2011; Goetz et al., 2010).

13% Other). We grouped emotions by conceptual similarity based on our expectation that if such similar emotions had distinguishable content, participants would be more likely to generate it if they considered those emotions sequentially. From a pragmatic perspective, this approach also made the task more manageable for participants.

Across Studies 1-3, survey procedures were conducted via online tools (e.g., Qualtrics) and we used exclusion criteria provided by our online survey platforms to prevent individuals from participating in more than one of the studies reported in this manuscript.

Results and Discussion

Element generation. We sorted responses based on the number of times they were mentioned. The total number of unique elements mentioned for each emotion ranged from 124 to 167 (M = 143.72; SD = 14.65) and each was mentioned by 1 to 19 participants (M = 1.63; SD = 1.71; Median = 1). We converted all elements that were mentioned more than once into a potential scale item (n = 645 items). These items were sorted into conceptual themes *within* each emotion based on content (e.g., several *admiration* items were categorized as reflecting a theme of *wanting to emulate someone*). Next, we re-examined the subjective elements that had been mentioned by only one participant (n = 1,941) and, for those that fit into one of the previously derived conceptual themes, created additional potential scale items. Finally, for the sake of completeness, several additional subjective elements were added based on the prior literature, including theoretical reviews of distinct emotions and studies using prototype analyses (these additions amounted to less than 5% of the elements included in our initial pool).

This process allowed us to generate an extremely broad initial content pool of 1,014 frequently experienced subjective elements. The total number of conceptual themes for each emotion ranged from 4-11 (M = 8.11; SD = 2.37), and these themes each contained 1-22 items

(M = 6.95, SD = 4.14). A complete list of conceptual themes and subjective elements from Study 1 can be found on OSF (https://osf.io/fj527/).

Initial element selection. We next selected a set of most theoretically central and non-redundant elements from the initial pool. Specifically, we reviewed the elements in each conceptual theme and identified a subset that (a) appeared face valid, in that the element seemed to capture an aspect of the focal emotion that both authors considered important; (b) captured the central thrust of the given conceptual theme; (c) were written in a relatively straightforward manner; and (d) referred to a fairly general (vs. highly specific) thought, feeling, or action tendency, so that it could plausibly be endorsed across most scenarios. Finally, for each emotion, we added an item that included the label of that emotion (e.g., "I felt admiration" for *admiration*).

We also made several decisions regarding element exclusion. Given our interest in uncovering the subjective experience of emotions, we cut elements that referred to nonverbal expressions (e.g., "I smiled"). Given our goal of uncovering content that is relatively distinct to each emotion, we excluded elements that included labels of a different emotion (e.g., "I felt guilty at not being able to improve the situation" was cut as an item for the emotion *sympathy*). We also cut elements that seemed highly redundant at face value (e.g., for sympathy, we retained "I felt concern for someone" but cut "I showed consideration for someone"). This selection process left us with an initial list of 475 theoretically central subjective elements—written as scale items—across the 18 emotions, which were retained for inclusion in Study 2 (M = 26.39 items per emotion; SD = 9.57; Range: 10-44; see Tables S1-S26). Although we did not compute formal agreement indices, the two authors generally reached the same conclusions regarding item selection and disagreements were rare.

This process of element selection allowed us to retain a more manageable set of items to present to participants in Studies 2 and 3. It is worth nothing that the decisions regarding which elements to include or exclude at this early stage were made partially on the basis of our understanding of each positive emotion; however, this top-down approach served as an important complement the bottom-up content generation, given the extremely long list of subjective elements generated in Study 1. Nonetheless, we sought to minimize the number of elements excluded at this stage, in accordance with our overarching bottom-up content generation approach.

Study 2

In Study 2, we sought to prune the content pool identified in Study 1 to arrive at a smaller set of the most central and frequently experienced subjective elements which capture the experience of each positive emotion relatively distinctively. We also sought to examine the extent to which the elements captured in Study 1, on the basis of individuals' conceptual understanding of distinct positive emotions, characterize people's feelings during episodes of each emotion. We did so by asking participants to recall episodes of each emotion and rate the extent to which each item derived in Study 1 characterized their feelings. We then used factor analysis to identify subjective elements that cohered in representing distinct emotional experiences, and to identify the most central elements for each emotion. We used factor analysis rather than alternative methods, such as simply selecting synonyms of each emotion, because this approach allowed us to simultaneously assess the extent to which each positive emotion is represented by a set of elements that cohere together and identify the most representative elements that yield a distinctive set. However, we complemented these analyses with an inspection of subjective element intensity during emotional episodes, to ensure that those

elements ultimately included were experienced at a relatively high intensity during episodes of each intended emotion.

Method

Participants and procedure. Five samples of participants were assigned to complete the relived emotion task (RET; Ekman, Levenson, & Friesen, 1983) for each emotion within one of the five thematic groups created in Study 1. Sample 2a relived experiences of admiration, awe, and gratitude (*other-appreciation*), Sample 2b relived empathy, compassion, sympathy, and tenderness (*caring*), Sample 2c relived happiness, contentment, amusement, and *schadenfreude* (*enjoyment*), Sample 2d relived hope, enthusiasm, and interest (*engagement*), and Sample 2e relived love, romantic love, nurturant love, and attachment love (*loving*). Samples 2a, 2b, 2d, and 2e were comprised of undergraduate students who participated in exchange for course credit (Sample 2a: n = 267, M_{age} = 20.31, SD = 2.58, 75% women, 29% Caucasian, 55% East Asian, 16% Other; Sample 2b: n = 185, M_{age} = 20.70, SD = 3.18, 69% women, 24% Caucasian, 56% East Asian, 20% Other; Sample 2d: n = 151, M_{age} = 21.32, SD = 3.20, 79% women, 21% Caucasian, 60% East Asian, 19% Other; Sample 2e: n = 170, M_{age} = 20.39, SD = 3.09, 84% women, 22% Caucasian, 52% East Asian, 24% Other). Sample 2c was comprised of community members recruited from public locations in a major metropolitan area (n = 599, M_{age} = 28.51, SD = 10.16, Range = 18-78; 68% women, 69% Caucasian, 13% East Asian, 18% Other). Sample sizes differed due to procedural differences described below.

In the RET participants are asked to spend up to five minutes thinking back on a time when they experienced a given emotion and write in detail about that experience. After performing this task for a particular emotion, participants rated the extent to which they experienced each of the subjective items derived for that emotion in Study 1, as well as all items

derived for the other two or three emotions within the same thematic group, using a five-point scale (1 = "not at all"; 5 "very much"). For example, Sample 2a participants completing the RET for *admiration* subsequently rated their experience on all 56 items previously derived for *admiration*, *awe*, and *gratitude*. Participants then repeated this procedure for 1-2 other emotions in the respective group, depending on the design employed for that group. Specifically, in Samples 2a and 2e, participants were randomly assigned to complete the RET for 2 of 3 (Sample 2a) or 4 (Sample 2e) emotions in their assigned group. In Sample 2c, participants were randomly assigned to complete the RET for 1 of 3 emotions in their assigned group. In Samples 2b and 2d, participants completed the RET for each of the 3 emotions in their respective group, in a random order.[3] The first author read all RET narratives in Studies 2 and 3 and excluded participants who clearly did not attempt to recall and describe an experience of the target positive emotion.

In all cases except one, RET instructions included the label for each emotion (e.g., "admiration"), but no additional information about the meaning of that emotion. This decision followed from our goal of being exploratory and uncovering lay-person derived content for each positive emotion. Emotions are prototype-like experiences, meaning that the exact set of elements that correspond to experiences of each emotion is expected to differ across participants and across narratives for each participant (Russell, 1991; Shaver, Schwartz, Kirson, & O'Connor, 1987). However, by employing large samples, and aggregating across factor analytic results and mean-level endorsements of each element, we aimed to uncover the subjective elements that are most typical of each emotion. For example, participants may differ in the specific thoughts, feelings, and action tendencies they experience during individual episodes of

[3] Differences in the number of emotions assigned to participants across thematic groups resulted from differences in the time allotted for each study (e.g., we allotted a full 30-minute study session for participants in some thematic groups, whereas participants in other thematic groups also were asked to complete questionnaires for unrelated studies being conducted in our laboratory during a 30-minute study session).

awe, but on average certain elements should emerge as most prototypical of awe. However, the one emotion for which we did provide a definition in Studies 2 and 3 was *schadenfreude*, a German word that many participants may have never encountered, which we defined as "a feeling of pleasure arising from the misfortune of others" (e.g., Smith, Powell, Combs, & Schurtz, 2009).

Analyses. Within each sample, we conducted exploratory factor analyses using maximum likelihood estimation on participants' ratings of all items. We performed EFA separately for ratings in response to each emotion within a thematic group. For example, in Sample 2a we conducted three separate factor analyses of ratings made in response to *admiration*, *awe*, and *gratitude* narratives. We relied on oblimin rotation in all cases, given our expectation that positive emotions would be correlated.

For each narrative, our analyses involved two steps. First, we arrived at an appropriate number of factors by choosing the factor solution that best characterized the data, based on our expectation that items capturing each emotion would likely form a distinct factor, as well as an examination of the scree plot. This led us to expect a total of 3-4 factors from each analysis (e.g., for Sample 2a participants, we expected three factors to emerge, one each for *admiration*, *awe*, and *gratitude*). We were open to the possibility that a factor might not emerge for a given emotion, which would indicate that the emotion in question is not associated with a unique set of subjective elements, and that the elements we had included for that emotion are in fact more strongly associated with a different emotion.

Second, we selected a set of *best items* for each emotion. From our chosen factor solution for each emotion, we first identified the factor with content that best matched the emotion participants had written about, based on the results of Study 1 (henceforth referred to as the *focal*

emotion factor; e.g., a factor emerging from ratings following narratives about *admiration* that showed highest loadings for admiration-derived content items from Study 1). Any item with a primary loading greater than .40 on the focal emotion factor and a cross loading less than .30 on all other factors was included as a "best item". Although this process inevitably resulted in the inclusion of many items which appeared, at face value, to have similar conceptual content, we adopted these relatively liberal factor-loading cutoffs with the intention of retaining all items that seemed to moderately capture an emotion of interest to a greater extent than some other emotion.

If the focal emotion factor for each emotion yielded fewer than 10 items that met our loading criteria, we identified additional best items. We first turned to narratives following other emotions in the same thematic group and identified factors with content that matched the emotion of interest, again based on Study 1 (henceforth a *non-focal emotion* factor; e.g., a factor capturing admiration which emerged from ratings following narratives about awe). Any item that met our loading criteria on a non-focal emotion factor, across narratives written in response to at least two other emotions in the same thematic group, was included as a "best item" (e.g., an item that met our criteria on an admiration factor that emerged from ratings made in response to both the awe and gratitude narratives). If our list of best items still contained fewer than 10 items after searching non-focal emotion factors, we added items that met our loading criteria on non-focal emotion factors emerging in response to narratives elicited by one other emotion (e.g., an item that met our criteria on an admiration factor that emerged from ratings made in response to awe narratives, but not gratitude narratives).

To complement our selection of best items based on factor loadings, we examined the mean intensity ratings of all items in response to each individual positive emotion narrative, to ensure that we did not miss any subjective elements that strongly characterized an episode of a

given positive emotion. In many cases, the examination of item means led us to add an item to the initial set (i.e., an item that did not meet the loading criteria outlined above but had a high intensity for a target emotion). This process also occasionally led us to drop an item (i.e., an item that had loaded strongly on an emotion factor but had a relatively low intensity for the target emotion). We viewed mean intensity as an important criterion, given that subjective elements said to characterize an emotion experience should be felt intensely during that experience. However, we did not have as strict of a cutoff criterion for mean intensity as for factor loadings, because mean intensity is confounded with social desirability of item content. For example, people may report lower intensity of *schadenfreude* elements than empathy elements not because they feel *schadenfreude* less intensely than empathy, but because it is less socially desirable to admit to experiencing the thoughts, feelings, and action tendencies that go with schadenfreude.

We also excluded certain items at this stage, such as negations (e.g., "I felt stress-free"), given that reverse-worded items can introduce method factors into factor analysis (Podsakoff, MacKenzie, Lee, & Podsakoff, 2003). We also excluded semantically redundant items (e.g., for awe, we included "What I just saw was simply amazing" but excluded "I was amazed"). Finally, we again always retained the focal emotion term itself (e.g., "I felt admiration" for *admiration*).

Although our procedure for arriving at a set of best items was primarily bottom-up—in that we relied on factor loadings and mean intensities to guide item selection—this process invariably drew on our own understanding of the subjective content of each positive emotion. For example, we often had to choose whether to include an item that had strong primary loadings but weak mean intensities, or whether to include an item that had a high cross-loading but also very strong mean intensity. Similarly, we sometimes had to choose one of two items that seemed

redundant. Our hope was that, by being inclusive at this early stage of item selection, we would minimize the effects that our own top-down decisions might have on results.

Results[4]

Sample 2a: Other-appreciation emotions. In response to narratives of admiration, awe, and gratitude, we consistently observed distinct factors emerge representing awe (e.g., "What I saw was simply amazing"; "I was rendered speechless"), gratitude (e.g., "I wanted to express thanks"; "I felt appreciative toward a specific person") and feelings of unworthiness (e.g., "I felt small in comparison to a specific person"; "I realized I am inept"). In response to admiration narratives, a fourth factor emerged representing admiration (e.g., "I felt as if I could learn a lot from a specific person"; "I had a great deal of respect toward a specific person"). In response to awe and gratitude narratives, subjective elements thought to characterize admiration tended to load on one of the other factors, particularly gratitude. This suggests that admiration may constitute a distinct subjective experience during narrow episodes focused on admiration, but during episodes centering on other positive emotions admiration may blend with related experiences such as gratitude and awe.

Based on these results and the item selection criteria outlined above, we selected 7, 11, and 9 best items for admiration, awe, and gratitude, respectively, for inclusion in Study 3 (see Tables S1-S4).[5]

[4] Additional detail regarding the factor solutions and item selection process are presented in the online supplement.
[5] We did not retain any of the unworthiness items. Although these items formed a unique factor across admiration, awe, and gratitude narratives, they did not show high loadings on any of the focal emotion factors. We speculate that these items may be linked to the sense of a *small self* that has been shown to accompany awe (e.g., Bai et al., 2017; Piff et al., 2015; Stellar et al., 2018). If this is the case, however, the present factor analytic results suggest that a small self does not co-occur with the other elements of awe (i.e., the awe and unworthiness factors consistently showed weak correlations across all narratives), and therefore that awe may be characterized by a multi-factor structure (see Gordon et al., 2017, for a related finding).

Sample 2b: Caring emotions. In response to narratives of empathy, sympathy, tenderness, and compassion, we consistently observed three distinct factors emerge representing empathy (e.g., “I tried to show understanding toward someone”; “I tried to relate to another's experience), sympathy (e.g., “I felt bad for someone”; “I worried that someone would not be okay”), and tenderness (e.g., “I had a desire to be close to someone”; “I showed fondness toward someone”). In contrast, across each set of narratives, no distinct factor emerged representing compassion and the item “I felt compassion” typically showed moderate loadings on the empathy and tenderness factors. When we examined the four-factor solution in response to each set of narratives, we consistently observed a narrow fourth factor representing perspective-taking (e.g., “I compared someone's predicament to something I had gone through”; “I reflected on a time I had experienced a similar situation”), which is viewed as a key element of empathy in most major theoretical models (Batson et al., 1987; Davis, 1983; Decety & Cowell, 2014; Preston & DeWaal, 2002; Zaki, 2014; see Cuff et al., 2016, for a review). We therefore deemed these elements as part of empathy rather than as a distinct emotion experience and concluded that compassion was not distinctly represented in these factor solutions, apart from empathy, sympathy, and tenderness.

Based on these results and the item selection criteria outlined above, we arrived at a list of 18, 11, and 14 best items, for empathy, sympathy, and tenderness, respectively, for inclusion in Study 3 (see Tables S5-S10). Importantly, these lists include many of the items generated for compassion in Study 1.

Sample 2c: Enjoyment emotions. In response to narratives of happiness, contentment, amusement, and *schadenfreude*, we consistently observed one factor representing a blend of happiness and contentment (“I felt complete”; “I wished the moment would continue”, “I felt

that all was right in the world"; "I felt joy"). This finding suggests that the labels *happiness* and *contentment* in fact capture the same subjective experience, one that also encompasses feelings of joy. Across narratives we also consistently observed factors capturing *schadenfreude* (e.g., "I wanted to point out someone else's shortcomings"; "I thought that someone had it coming") and amusement (e.g., "I laughed"; "What I saw was funny"); of note, this amusement factor was most well-defined in response to amusement narratives, whereas in response to narratives of the other three emotions this factor combined amusement with subjective elements representing a general outgoing/approach orientation. We also consistently observed an additional factor capturing feelings of arousal (e.g., "My heart was racing"; "I felt an adrenaline rush") consistent with the notion that arousal is a critical dimension of emotion experience that may be closely tied to enjoyment emotions.

Based on these results and the item selection criteria outlined above, we arrived at a list of 21, 6, and 11 best items, for happiness/contentment, amusement, and *schadenfreude*, respectively, for inclusion in Study 3 (see Tables S11-S16). Of note, to be inclusive, when selecting happiness/contentment items, we selected items that met our loading or mean-intensity criteria in response at least one of the happiness or contentment narratives. For the same reason, the item "I felt *schadenfreude*" was retained, despite not meeting our loading criteria in response to *schadenfreude* narratives.

Sample 2d: Engagement emotions. In response to narratives of interest, hope, and enthusiasm, we consistently observed factors representing enthusiasm (e.g., "I felt euphoric"; "I was on top of the world") and hope (e.g., "I tried to believe in myself"; "I thought about the future"). In response to narratives of interest, we observed an additional factor representing interest (e.g., "My attention was absorbed"; "I wanted to seek out more information"). In

response to hope and enthusiasm narratives, subjective elements thought to characterize interest tended to load on one of the other factors, particularly enthusiasm. This suggests that interest may constitute a distinct subjective experience during narrow episodes focused on interest, but that during episodes centering on other positive emotions interest may blend with related experiences such as enthusiasm and hope. In response to hope and enthusiasm narratives, we also observed an additional factor which seemed to capture distraction (e.g., “I felt absentminded”; “I felt impatient”).

Based on these results and the item selection criteria outlined above, we arrived at a list of 13, 17, and 10 best items, for hope, enthusiasm, and interest, respectively, for inclusion in Study 3 (see Tables S17-S20). We did not retain any of the distraction items because they did not load highly on any of the focal emotion factors and therefore did not seem central to the experience of these emotions.

Sample 2e: Loving emotions. In response to narratives of love, nurturant love, attachment love, and romantic love, we consistently observed factors representing romantic love (e.g., “I longed for someone”; “I felt intimate toward someone”), nurturant love (e.g., “I wanted to help someone grow”; “I attended closely to someone's needs”), and attachment love (e.g., “I felt secure”; “I felt like I could rely on someone”). In contrast, across each set of narratives, we did not observe a distinct factor capturing love, apart from these other three factors capturing sub-forms of love. When we examined the four-factor solution in response to each set of narratives, we consistently observed a narrow fourth factor representing elements that described feelings of neediness for one’s partner and a sense of insecurity, which have been previously conceptualized as part of romantic love (e.g., “I felt lost without someone”; “I felt needy”; Berscheid, 2010; Diamond, 2003; Rubin, 1970). We therefore deemed these elements as part of

romantic love and concluded that love was not represented as a distinct subjective experience apart from these three sub-forms of love. Also of interest, across narratives the item "I felt love" loaded most strongly on the attachment love factor, suggesting that participants may associate the term *love* most closely with feelings of attachment. Finally, across narratives, the items "I felt attachment love", "I felt nurturant love", and "I felt romantic love" tended to show relatively weak loadings on their respective factors, along with moderate cross-loadings on other love factors, indicating that participants may not have understood these terms in the same manner as they are typically understood by affective scientists.

Based on these results and the item criteria outlined above, we arrived at a list of 21, 18, and 16 best items, for nurturant love, attachment love, and romantic love, respectively, for inclusion in Study 3 (see Tables S21-S26). To be inclusive, the items "I felt attachment love", "I felt nurturant love", and "I felt romantic love" were retained, despite not always meeting our loading criteria.

Discussion

In Study 2, we took a step toward uncovering the distinct subjective content of each regularly studied positive emotion, including admiration, awe, gratitude, empathy, sympathy, tenderness, compassion, contentment, happiness, amusement, *schadenfreude*, hope, enthusiasm, interest, love, romantic love, nurturant love, and attachment love.

This process yielded several insights regarding positive emotions which are treated as distinct in the literature, but which may not be associated with a distinct set of subjective elements compared to other conceptually similar positive emotions. First, we found that the subjective elements characterizing happiness and contentment are largely redundant. Furthermore, we found evidence that "joy" and "elation" are redundant with

happiness/contentment, even though these emotions are often treated as distinct from happiness and contentment in the literature (Weidman et al., 2017): The item "I felt joy" was the second-highest loading item on the happiness/contentment factor in response to both happiness and contentment episodes, and multiple items including synonyms of elation (i.e., "I felt glee"; "I was in a state of bliss") loaded highly on this factor. Following this result, we refer to the subjective elements constituting happiness, contentment, and related states as "contentment", to differentiate this emotion from the vast literature on "happiness" (i.e., subjective well-being; Busseri & Sadava, 2011; Diener, 1984).

Second, we did not identify a unique set of subjective elements for compassion, apart from those characterizing other caring-related emotions such as empathy, sympathy, and tenderness. Instead, when participants wrote about experiences of compassion and other caring emotions, subjective elements that were initially generated for compassion were found to split between factors representing empathy, sympathy, and tenderness, and the item "I felt compassion" tended to show moderate loadings on factors representing these three emotions.

Third, we identified multiple positive emotions which are often treated as distinct but emerged as subjectively distinct only in certain contexts. For example, a distinct set of elements emerged for admiration and interest only when participants wrote specifically about these two emotions. When participants wrote about episodes of awe and gratitude, subjective elements associated with admiration loaded on a factor reflecting gratitude. Similarly, when participants wrote about hope and enthusiasm, elements associated with interest loaded on a factor reflecting enthusiasm. These results imply that admiration and interest may themselves be rather narrow positive emotion experiences that cohere in targeted scenarios but generally share subjective elements or overlap substantially with closely related emotions in other contexts.

Study 2 also provided support for the previously proposed theoretical distinction among three flavors of love: nurturant, attachment, and romantic (e.g., Berscheid, 2010; Shiota et al., 2014). When participants wrote about each subtype of love, as well as the overarching emotion *love*, a distinct factor emerged for each subtype.

After identifying factors for each positive emotion, we trimmed the list of subjective elements loading on these factors to arrive at a set of central elements, using previously established factor-analytic practices Clark & Watson, 1995; Flake, Pek, & Hehman, 2017; Simms, 2008). These resultant subjective element lists begin to paint a picture of the specific thoughts, feelings, and action tendencies that constitute these 15 states. However, these lists are relatively long and, given our goal of being inclusive in our item retention, likely contain subjective elements that are not central to each emotion. The primary goal of Study 3 was therefore to further trim these lists to arrive at a more pragmatic set of subjective elements for each emotion, which capture the central thrust of that emotion and which, when written as self-report items, could be used as a scale for measuring each emotion.

Study 3

In Study 3, we sought to further prune the list of subjective elements characterizing each positive emotion, to arrive at a set of the most central elements that could comprise a brief, reliable self-report scale for that emotion. Separate samples of participants again wrote about emotional episodes and reported their feelings in response to each, by rating the subjective elements generated in Study 2. We then employed factor analysis to narrow these initial lists, this time prioritizing replicability by searching for elements that met our loading criteria and had relatively high mean intensities for each emotion across both Studies 2 and 3. We used this final list to create a 5-8 item self-report scale for each positive emotion. To further prioritize

reproducibility, we employed larger sample sizes in Study 3 than in Study 2, given that the sample size employed in Study 2 were on the small side for EFA (Costello & Osborne, 2005).

Given that emotion experience and understanding can vary based on characteristics such as gender and cultural background (e.g., Brody et al., 2018; Mesquita et al., 2018), we next examined whether the subjective elements we uncovered for each distinct positive emotion were equivalent (or at least similar) across several subgroups, including (a) men; (b) women; (b) participants who self-identify as Caucasian; (d) participants who self-identify as East Asian; (e) participants who were born in an English-speaking North American country (i.e., Canada or the USA); and (f) participants who were born in any country outside of those English-speaking North American nations. We compared the pattern of factor loadings between these subgroups and our entire sample, as well as among specific pairs of subgroups (e.g., men vs. women).

We next sought to uncover initial validity evidence for our newly constructed scales. We examined intercorrelations among positive emotions within each thematic group, as well as their intensity following episodes of each emotion within each group. To the extent that our newly constructed scales are valid, we expected to find that (a) conceptually similar positive emotions show moderate intercorrelations (e.g., .20-.40), reflecting some shared content but not empirical redundancy; and (b) following episodes of each positive emotion, participants report a stronger intensity of that emotion compared to other emotions within the same thematic group (e.g., awe would be reported more intensely than admiration or gratitude following episodes of awe).

We next examined whether each positive emotion correlated with dispositional variables meant to capture the propensity to feel that emotion across time and situation. Based on prior work examining the correlations between traits and corresponding states, we anticipated that

these correlations would be small to moderate in magnitude (.10-.30; e.g., Fleeson & Gallagher, 2009).

Method

Participants and procedure. In exchange for course credit, samples of undergraduate students and adults recruited via Amazon MTurk completed the RET for 1-4 emotions within each thematic emotion group: Sample 3a wrote about other-appreciation emotions (students: N = 268, M_{age} = 20.72, SD = 3.43, 77% women, 53% East Asian, 24% Caucasian, 38% North-American born, 46% non-North American born, 16% nationality not reported; adults: N = 134, M_{age} = 40.06, SD = 12.49, 97% men, 96% Caucasian); Sample 3b wrote about caring emotions (students: N = 207, M_{age} = 20.12, SD = 2.34, 77% women, 56% East Asian, 28% Caucasian, 49% North-American born, 51% non-North American born; adults: N = 175, M_{age} = 39.0, SD = 12.75, 97% men, 99% Caucasian); Sample 3c wrote about enjoyment emotions (students: N = 208, M_{age} = 20.26, SD = 3.15, 69% women, 48% East Asian, 27% Caucasian, 49% North-American born, 51% non-North American born; adults: N = 146, M_{age} = 38.77, SD = 13.80, 98% men, 97% Caucasian); Sample 3d wrote about engagement emotions (students: N = 232, M_{age} = 20.39, SD = 4.08, 78% women, 43% East Asian, 31% Caucasian, 51% North-American born, 38% non-North American born, 11% nationality not reported; adults: N = 188, M_{age} = 36.44, SD = 11.66, 96% men, 98% Caucasian); and Sample 3e wrote about loving emotions (students: N = 209, M_{age} = 20.82, SD = 3.18, 68% women, 57% East Asian, 18% Caucasian, 47% North American born, 52% non-North American born; adults: N = 195, M_{age} = 36.90, SD = 11.46, 98% men, 98% Caucasian). Percentages of North American and non-North American participants do not always sum to 100 because not all students reported their country of origin.

The uneven distribution of students and adults within each emotion group resulted from our attempt to recruit at least 100 participants for each of the six subgroups noted above. Specifically, our student sample (which we recruited first) was heavily skewed toward women and individuals who self-identified as East Asian, such that we had to recruit additional samples of adults comprised primarily of men and self-identified Caucasians, for each emotion group. Additionally, we only assessed country of origin among the student samples; adult M-Turk participants did not report their country of origin. As a result, all subgroup comparisons between individuals from North American and non-North American countries of origin were conducted on students only.

After completing each RET, participants rated the elements they felt in response to each emotion using the items retained from Study 2. Using the same procedure as in Study 2, participants rated items for all emotions within the given thematic group when responding to each emotion narrative within that group (e.g., after writing about gratitude, participants rated their feelings using the items retained for gratitude, admiration, and awe). Participants then completed a set of self-report scales measuring their dispositional tendency to feel certain emotions. MTurk adult participants relived and reported on only 1 randomly determined emotion within their assigned group, whereas students relived and reported on all 3-4 emotions within their assigned group in a randomly determined order. To additionally limit MTurk worker time, in some cases adults completed only a subset of the dispositional questionnaires (see below).

Dispositional Emotion Measures. All participants in Sample 3a completed the awe scale of the Dispositional Positive Emotions Scales (DPES; Shiota et al., 2006; $\alpha = .79$) and the Gratitude Questionnaire Six-Item Form (GQ-6; McCullough et al., 2002; $\alpha = .78$). We expected

these measures to correlate positively with momentary experiences of awe and gratitude, respectively.

All participants in Sample 3b completed the compassion scale of the DPES (Shiota et al., 2006; α = .85). Student participants completed the Parental Care and Tenderness Scale (PCAT; Buckles et al., 2015), which is comprised of five subscales—propensity toward *positive tenderness* and *negative tenderness* (assessing the tendency to feel tenderness in different scenarios), as well as the propensity toward *liking*, *protecting*, and *caring for* babies (αs = .74-.93). Adult participants completed the Parental Care and Tenderness Scale-Revised (PCAT-R; Hofer et al., 2018), which is comprised of two subscales capturing the propensity toward *protecting* and *nurturing* children (αs = .83 and 85, respectively). We administered the PCAT-R for these participants because it is conceptually superior to, and much briefer than, the full PCAT but was published after we had completed our student data collection. All participants completed the Interpersonal Reactivity Index (IRI; Davis, 1983), which is comprised of four subscales—perspective-taking, personal distress, empathic concern, and fantasy (α's = .74-.86)—although adults did not complete the fantasy subscale.

We expected positive correlations between momentary sympathy and tenderness and DPES compassion, which captures similar themes (e.g., helping the needy; caring for others). We also expected positive correlations between momentary tenderness and the PCAT scales of *positive* and *negative tenderness*, as well as both PCAT-R subscales of *protecting* and *nurturing* children. We also expected positive correlations between momentary empathy and the perspective-taking subscale of the IRI, between momentary sympathy and the personal distress subscale of the IRI, and between the empathic concern subscale and momentary empathy, sympathy, and tenderness, as this scale contains content related to all three emotions.

All participants in Sample 3c completed the contentment, joy, and amusement scales of the DPES (Shiota et al., 2006; α's = .72-.90), and the Subjective Happiness Scale (SHS; Lyubomirsky & Lepper, 1999; α = .90). We expected the DPES contentment and joy scales, as well as the SHS, to correlate positively with momentary contentment, and the DPES amusement scale to correlate positively with momentary amusement.

All participants in Sample 3d completed the Trait Curiosity Scale (Kashdan, Rose, & Fincham, 2004; α = .69) and the Life Orientation Test, a measure of optimism (LOT: Scheier, Carver, & Bridges, 1994; α = .89). We expected these measures to correlate positively with momentary experiences of interest and hope, respectively.

All participants in Sample 3e completed the love subscale of the DPES (Shiota et al., 2006; α = .82), the Romantic Love Scale (Rubin, 1970; α = .86), and the Experiences in Close Relationships-Relationships Structures questionnaire (ECR-RS; Fraley, Heffernan, Vicary, & Brumbaugh, 2011), comprised of two subscales, each of which is completed regarding one's romantic partner, best friend, mother, and father (αs = .80-.93). Adults completed only the romantic partner subscale of the ECR-RS. In light of the finding from Sample 1e that individuals associate the word *love* most strongly with attachment love, we expected the DPES love scale to correlate positively with attachment love. We also expected the Romantic Love Scale to correlate positively with momentary romantic love. Finally, we expected the anxious attachment subscale of the ECR-RS to correlate positively with romantic love, an emotion that partly captures feelings of insecurity and neediness associated with an anxious attachment style. We also expected the avoidant attachment subscale to correlate negatively with attachment love, which seems to capture intimacy and a desire for closeness.

Analyses. As in Study 2, we conducted separate exploratory factor analyses on participants' ratings of all the subjective elements for each emotion within each thematic group, in response to each emotional experience. After arriving at an appropriate number of factors, we selected a set of central subjective elements for each emotion (i.e., "best items"), by prioritizing elements that met our loading criteria on the focal emotion factor, and which had also met the loading criteria on the same focal emotion factor in Study 2. We also added items that showed high mean intensities following episodes of the emotion they were meant to capture, in an effort to ensure inclusion of subjective elements whose experience strongly characterized a given positive emotion. Finally, we always included the focal emotion term in our final lists, except where noted below.

We next trimmed these lists of best items until we arrived at 5-8 elements for each emotion. Given that we adopted relatively liberal criteria for identifying best items in Study 2 (i.e., we retained 13.53 items per emotion on average), whereas our goal in Study 3 was to arrive at a relatively short list of best items for each emotion (i.e., ideally 5-8 items), we were frequently left with an over-abundance of elements that met our best item criteria in Study 3.

This process at times forced us to make subjective decisions regarding which items to include. We aimed to avoid redundancy and maintain wide content coverage, while also ensuring that content was relatively consistent with the existing literature. Although this required some top-down decision making in an otherwise largely bottom-up process, the particular exclusion and inclusion decisions made at this stage are unlikely to have influenced the overall performance of the resultant scales because all elements that met our best item inclusion criteria would likely show similar (high) loadings on their respective focal emotion factor and similar (high) mean intensities following episodes of their respective positive emotion. In other words,

any 5-8 item combination taken from our set of best items for a given positive emotion would likely perform similarly from a psychometric standpoint.

We additionally examined whether the subjective content of each emotion group was equivalent (or very similar) across the six subgroups noted above: (a) men; (b) women; (b) participants who self-identify as Caucasian; (d) participants who self-identify as East Asian; (e) participants who were born in an English-speaking North American country (i.e., Canada or the USA); and (f) participants who were born in any country outside of those English-speaking North American nations. Specifically, for each emotion, we re-ran the exploratory factor analysis (EFA) described in Study 3 separately for each subgroup, which yielded seven EFA solutions for each positive emotion (i.e., one for the entire sample and one for each of the six subgroups). For each of these seven solutions, we examined whether the same set of factors emerged, corresponding to each emotion within a given thematic group; for example, we examined whether three factors representing admiration, awe, and gratitude emerged in each of these seven EFA solutions across episodes of each of these three emotions.

We then empirically examined the equivalence of factors across subgroups by computing Tucker's congruence coefficient between the patterns of loadings; for example, we compared the pattern of loadings for the admiration factor that emerged in the entire sample and each of the six subgroups, following admiration, awe, and gratitude episodes (see Weidman, Cheng, & Tracy, 2018, for a similar procedure). Congruence coefficients of .95 or higher would indicate nearly identical content between two factors and coefficients of .85-.95 would indicate very similar content (Lorenzo-Seva & ten Berge, 2006).

We conducted two sets of congruence analyses. First, we compared the pattern of loadings for each factor between the entire sample and each of the six subgroups. These six

comparisons can tell us whether the content identified for each emotion across our full sample would have looked nearly identical (or very similar) had we recruited a sample of participants exclusively comprised of members of any of these six subgroups (e.g., had we recruited all men, all women, all self-identified Caucasians, etc.). High congruence coefficients would therefore indicate that the primary conclusions of Study 3 regarding subjective content are relatively robust to the composition of our sample.

However, this first set of congruence analyses could yield inflated similarity indices due to the overlap in participants between the entire sample and each subgroup (e.g., male participants are included in both the entire sample and the all-men subgroup). We therefore conducted a second set of congruence analyses in which we compared the pattern of loadings for each factor across juxtaposed pairs of subgroups (i.e., men vs. women, self-identified Caucasians vs. self-identified East Asians; North-American born vs. non-North American born). These three comparisons circumvent the issue of sample overlap that arose in the first set of comparisons; comparing subgroups of men vs. women, for example, is equivalent to comparing the all-women subgroup to the entire sample with all women removed. A similar principle operates for the cross-ethnicity and country of origin subgroup analyses; comparing subgroups of self-identified Caucasians and East Asians is nearly equivalent to comparing the self-identified East Asian subgroup to the entire sample with all East Asians removed because only 21% of all participants in Study 3 self-identified as belonging to a group other than Caucasians or East Asians. High congruence coefficients in this second set of comparisons thus indicate that the central set of subjective elements for each positive emotion is nearly identical (or very similar) across participants who differ in gender, ethnicity, and country of origin.

Finally, we examined the validity of these newly constructed scales, as described above.

Results

Sample 3a: Other-appreciation emotions. Across narratives of admiration, awe, and gratitude, we consistently observed factors representing each of these emotions, and these factors had similar content as in Study 2 (see Tables S27-S30). Furthermore, the content of these factors was nearly identical regardless of gender, ethnicity, and country of origin. Congruence coefficients between factors from the entire sample and each of our six subgroups were extremely strong (e.g., the entire sample vs. women only; M = .98, SD = .02) as were congruence coefficients between juxtaposed pairs of subgroups (e.g., self-identified Caucasians vs. self-identified East Asians; M = .94, SD = .03). Only 13 (16%) congruence coefficients examined in this emotion group fell below .95—which is viewed as the cutoff for nearly identical content—and zero congruence coefficients fell below .85, which is viewed as the cutoff for very similar content (Lorenzo-Seva & ten Berge, 2006).

From these factors, we selected lists of 6, 7, and 7 items, respectively, to include in self-report scales to measure admiration, awe, and gratitude (αs = .73, .82, and .84, respectively; see Table 1). The scales tended to show moderate intercorrelations, though these were more pronounced for admiration and gratitude (rs = .52, .68, and .36 across admiration, awe, and gratitude episodes, respectively; see Table S31). After writing about each emotion (e.g., admiration) participants reported significantly more intense feelings of that emotion compared to the other two (i.e., awe and gratitude; $M_{\text{Admiration}}$ = 4.30; SD = .62; M_{Awe} = 3.26; SD = .91; $M_{\text{Gratitude}}$ = 3.72, SD = .89, all ps < .001; see Table S31). These effects remained significant and of similar magnitude when scales were computed omitting the focal emotion term (e.g., "I felt admiration" for *admiration*), which could have an elevated mean due to demand characteristics. Additionally, dispositional awe correlated positively with momentary awe following awe

narratives (r = .25, p < .001), and dispositional gratitude correlated positively with momentary gratitude following gratitude narratives (r = .28, p < .001; see Table S32).

Sample 3b: Caring emotions. Across narratives of empathy, sympathy, and tenderness, we consistently observed factors representing each of these emotions, and these factors had similar content as in Study 2 (see Tables S33-S36). A distinct factor again did not emerge for compassion across all three narrative sets. Furthermore, the content of these factors was nearly identical regardless of gender, ethnicity, and country of origin. Congruence coefficients between factors from the entire sample and each of our six subgroups were extremely strong (M = .98, SD = .02) as were congruence coefficients between juxtaposed pairs of subgroups (e.g., M = .94, SD = .03). Only 14 (17%) congruence coefficients examined in this emotion group fell below .95 and only 1 fell below .85: The tenderness factor between men and women following sympathy narratives (congruence = .84), but this factor showed high congruence between subgroups following tenderness and empathy narratives.

From these factors, we selected lists of 8, 7, and 8 items, respectively, to include in self-report scales to measure empathy, sympathy, and tenderness (αs = .82, .78, and .87, respectively; see Table 1). The scales tended to show moderate to large intercorrelations, particularly between empathy and tenderness (rs = .63, .67, and .34 across empathy, sympathy, and tenderness episodes, respectively), whereas sympathy and tenderness were actually negatively correlated during tenderness episodes (r = -.11; see Table S37). After writing about each emotion participants reported significantly more intense feelings of that emotion compared to the other two, although this difference was small between empathy and sympathy following empathy episodes (M_{Empathy} = 3.83; SD = .82; M_{Sympathy} = 3.70; SD = .86, p = .04; $M_{\text{Tenderness}}$ = 3.25, SD = .96, all other ps < .001; see Table S37). The difference between empathy and sympathy

following empathy episodes was non-significant when omitting the term "I felt empathy" from the empathy scale ($M_{Empathy}$ = 3.73, *SD* = .89, $M_{Sympathy}$ = 3.70; *SD* = .86, *p* = .55). All other differences remained significant and of similar magnitude when omitting focal emotion terms.

Additionally, dispositional compassion correlated positively with momentary sympathy and tenderness following episodes of those emotions (*r*s = .23 and .26, respectively; *p*s < .001). Dispositional tenderness, measured by the PCAT, correlated positively with momentary tenderness following tenderness episodes, though this relation was stronger for positive tenderness (*r* = .37, *p* < .001) than negative tenderness (*r* = .16, *p* = .02). Dispositional protective and nurturing tenderness, measured by the PCAT-R, also correlated positively with momentary tenderness following tenderness episodes (*r*s = .35 and .39, respectively, *p*s < .001). Dispositional perspective-taking correlated positively with momentary empathy following episodes of empathy (*r* = .24, *p* < .001) and dispositional empathic concern correlated similarly with all three momentary caring emotions (*r*s = .22-.28; *p*s < .001). However, dispositional personal distress correlated only weakly with momentary sympathy following sympathy episodes (*r* = .10, *p* = .11; see Table S38).

Sample 3c: Enjoyment emotions. Across narratives of contentment, amusement, and *schadenfreude* we consistently observed factors representing each of these emotions. Subjective elements representing happiness and contentment continued to load on one factor, which we labeled contentment. The contentment and amusement factors had similar content as in Study 2, whereas subjective elements capturing *schadenfreude* were split between a *schadenfreude* factor and the contentment factor; we did not include these primarily contentment-focused items in our final *schadenfreude* scale (see Tables S39-S42). Furthermore, the content of these factors was highly similar regardless of gender, ethnicity, and country of origin. Congruence coefficients

between factors from the entire sample and each of our six subgroups were extremely strong (*M* = .98, *SD* = .02) as were congruence coefficients between juxtaposed pairs of subgroups (e.g., *M* = .93, *SD* = .06). Only 13 (16%) congruence coefficients examined in this emotion group fell below .95 and only 3 (4%) fell below .85. Of these three, two involved *schadenfreude*, which showed some variability in content following contentment narratives between men and women (congruence = .82) as well as between self-identified Caucasians and self-identified East Asians (congruence = .80). However, the *schadenfreude* factor showed high congruence between subgroups following *schadenfreude* and amusement narratives. Following contentment narratives, the amusement factor also showed some variability between self-identified Caucasians and East Asians (congruence = .81), but this factor showed high congruence between subgroups following amusement and *schadenfreude* narratives.

From these factors, we selected lists of 5 items each to include in self-report scales to measure contentment, amusement, and *schadenfreude* (*α*s = .85, .81, and .90 for amusement and *schadenfreude*, respectively; see Table 1). Contentment and amusement correlated moderately to strongly across contentment, amusement, and *schadenfreude* narratives (*r*s = .45, .48, and .62, respectively; see Table S43). The picture was more complex for *schadenfreude*, which correlated weakly or even negatively with contentment and amusement following episodes of those two emotions (*r*s = -.18 to .15) but correlated positively with contentment and amusement during *schadenfreude* episodes (*r*s = .43 and 41; see Table S43).

When writing about contentment and amusement, participants reported significantly more intense feelings of each focal emotion than the other enjoyment emotions (e.g., after contentment episodes: $M_{\text{Contentment}}$ = 4.22, *SD* = .80, *M* = 2.91, *SD* = 1.02, $M_{\text{Schadenfreude}}$ = 1.50, *SD* = .72; *p*s < .001, see Table S43), and these effects held when omitting the focal emotion terms (e.g., “I felt

content" for *contentment*). Participants also reported significantly more intense *schadenfreude* compared to contentment and amusement after *schadenfreude* episodes, although these differences were relatively small ($M_{\text{Schadenfreude}}$ = 3.33, *SD* = 1.22, $M_{\text{Contentment}}$ = 3.00, *SD* = 1.01, $M_{\text{Amusement}}$ = 2.92, *SD* = 1.18, all *p*s < .001). The *schadenfreude* scale may have had relatively low mean intensity due to the socially undesirable nature of the scale items. The item "I felt schadenfreude" was not included in the *schadenfreude* scale given that many participants expressed confusion as to the meaning of this word.

Additionally, dispositional contentment and joy, as well as dispositional subjective happiness, positively correlated with momentary contentment following episodes of contentment, albeit these links were somewhat weaker than expected (average *r* = .09, *p*s = .04 to .18). Finally, dispositional amusement positively correlated with momentary amusement following amusement episodes (*r* = .26, *p* < .001; see Table S44).

Sample 3d: Engagement emotions. Across narratives of interest, hope, and enthusiasm, we consistently observed factors representing hope and enthusiasm, and we further observed a factor representing interest in response to interest narratives. These focal factors all had similar content as in Study 1 (see Tables S45-S48). Furthermore, the content of these factors was nearly identical regardless of gender, ethnicity, and country of origin. Congruence coefficients between factors from the entire sample and each of our six subgroups were extremely strong (*M* = .98, *SD* = .01) as were congruence coefficients between juxtaposed pairs of subgroups (*M* = .95, *SD* = .03). Only 12 (19%) congruence coefficients examined in this emotion group fell below .95 and only 1 fell below .85: The interest factor between self-identified Caucasians and self-identified East Asians following interest narratives (congruence = .84).

From these factors, we selected lists of 8, 5, and 8 items, respectively, to include in self-report scales to measure hope, enthusiasm, and interest (αs = .71, .68, and .79, respectively; see Table 1). Hope and enthusiasm showed moderate correlations across episodes of hope, enthusiasm, and interest (rs = .18, .41, and .47, respectively; see Table S49). Interest showed a moderate correlation with hope and enthusiasm during episodes of interest (rs = .29 and .42), but a much stronger correlation with these two emotions during episodes of hope and enthusiasm (rs = .49-.59; see Table S49). After writing about each emotion, participants reported significantly more intense feelings of that emotion compared to the other two (e.g., after hope episodes: M_{Hope} = 4.13, SD = .59, $M_{\text{Enthusiasm}}$ = 2.98, SD = 1.05, M_{Interest} = 3.60, SD = .85; ps < .001, see Table S49). The majority of these effects remained significant and of similar magnitude when omitting the focal emotion term from each scale (e.g., "I felt hope" for hope). However, the difference between enthusiasm and interest following enthusiasm episodes became small and non-significant ($M_{\text{Enthusiasm}}$ = 3.96, SD = .82, M_{Interest} = 3.91, SD = .69, p = .23).

Additionally, trait curiosity positively correlated with momentary interest following interest episodes (r = .28, p < .001) and trait optimism correlated with momentary hope following hope episodes, albeit weakly (r = .12, p = .05; see Table S50). This latter result may be due to the trait optimism measure emphasizing a positive outlook on life, whereas our hope scale captures a feeling of being challenged, which could engender a positive or negative outlook. The distinction between holding a positive outlook and feeling challenged has been used to differentiate optimism and hope (e.g., Cheavens & Ritschel, 2014; Lazarus, 1999; Snyder, 2002).

Sample 3e: Loving emotions. Across narratives of romantic love, nurturant love, and attachment love, we consistently observed factors representing each of these emotions, and these factors had similar content as in Study 2 (see Tables S51-S54). We again did not observe a

distinct factor representing love apart from these three sub-forms across all three narrative types. Furthermore, the content of these factors was nearly identical regardless of gender, ethnicity, and country of origin. Congruence coefficients between factors from the entire sample and each of our six subgroups were extremely strong (M = .99, SD = .01) as were congruence coefficients between juxtaposed pairs of subgroups (M = .96, SD = .02). Only 9 (11%) congruence coefficients examined in this emotion group fell below .95 and none fell below .85.

From these factors, we selected lists of 8, 7, and 7 items, respectively, to include in self-report scales to measure romantic love, nurturant love, and attachment love (αs = .83, .89, and .87, respectively; see Table 1). We did not include any of the focal emotion items in our scales, because these items never met our loading criteria on the focal emotion factor, and throughout testing we found that many participants reported not understanding the meaning of these items. All three subtypes of love showed strong correlations following romantic love episodes (rs = .42-.70), whereas these links were more moderate following nurturant and attachment love episodes (rs < .48). In fact, attachment and nurturant love were slightly negatively correlated following nurturant love episodes, perhaps reflecting that one cannot simultaneously *care for* someone and feel *cared for* by someone (r = -.08; see Table S55).

Participants reported significantly more intense attachment love than nurturant or romantic love following episodes of each form of love, suggesting that the majority of love episodes—regardless of whether they concern a romantic partner, dependent, or close companion—involve at least a modest feeling of attachment with one's love object (e.g., after nurturant love episodes: $M_{\text{Attachment}}$ = 3.85, SD = .91; $M_{\text{Nurturant}}$ = 3.66, SD = 1.01, p = .04; M_{Romantic} = 2.11, SD = .81; all other ps < .001; see Table S55). However, it is also possible that

the low intensities reported for romantic love, compared to attachment love, are partly due to the relatively low desirability of some of the items used to measure it (see Table 1).

Additionally, dispositional love positively correlated with momentary attachment love (r = .17, p = .004) and dispositional romantic love positively correlated with momentary romantic love (r = .41, p < .001), respectively, following episodes of these two emotions (see Table S56). Also, as predicted, dispositional anxious attachment style with one's romantic partner and best friend positively correlated with momentary romantic love (rs = .15 and .17, respectively, ps = .02 and .01). Dispositional avoidant attachment style with one's romantic partner and best friend negatively correlated with momentary attachment love (rs = -.19 and -.38, respectively, ps = .002 and < .001).[6]

Discussion

In Study 3, we identified a small set of central subjective elements which captured the core content of 15 positive emotions across Studies 2 and 3 and used these elements to construct brief self-report scales for each emotion. The resultant scales represent the first empirically based representation of the full range of subjective elements—thoughts, feelings, and action tendencies—that constitute the majority of frequently studied positive emotions, as these emotions are experienced by lay persons (see Table 1). These scales typically showed excellent reliability across narratives of the target emotion: Ten (67%) of the 15 positive emotion scales had reliability coefficients that exceeded .80 and only 2 had reliability coefficients slightly below .70 (i.e., .69 and .66 for hope and enthusiasm, respectively).

We further found the subjective elements that constitute each positive emotion experience were nearly identical, or at least very similar, across individuals varying in gender,

[6] In contrast, attachment style with one's mother and father correlated near-zero with all three forms of love.

ethnicity, and country of origin. When comparing subjective elements constituting each positive emotion in our entire sample with each of six distinct subgroups (i.e., men, women, participants who self-identify as Caucasian, participants who identify as East Asian, participants who were born in an English-speaking North American country, and participants who were born in any other country), we found an average between-factor congruence of .98, with only 17 (7%) falling below the .95 cutoff that indicates nearly identical factor content, with none falling below the .85 cutoff for very similar content (Lorenzo-Seva & ten Berge, 2006).

Furthermore, when comparing subjective elements constituting each positive emotion across juxtaposed subgroups (e.g., self-identified Caucasians vs. self-identified East Asians), we found an average between-factor congruence of .94, just below the cutoff for nearly identical content (although the majority, 66%, of congruence coefficients still fell at or above .95). Importantly, in this between-subgroup analysis, only 5 congruence coefficients (4%) fell below .85 (Lorenzo-Seva & ten Berge, 2006). Of these, two involved the same emotion: *schadenfreude*, the content of which differed slightly between men vs. women and self-identified Caucasians vs. East Asians, but only in response to contentment narratives (congruence coefficients = .82 and .80, respectively). Furthermore, only one involved an emotion that had been elicited by the target set of narratives: the content of interest slightly differed across self-identified Caucasians vs. East Asians following interest narratives (congruence coefficient = .84).[7] These findings tentatively point to *schadenfreude* and interest as emotions that may exhibit some content variability across gender and ethnicity. Yet it is worth noting that these lower congruence values were the exception, even for these two emotions; *schadenfreude* and interest showed high between-

[7] The other two congruence coefficients that fell slightly below .85 were as follows: (a) the amusement factor differed between self-identified Caucasians and East Asians following contentment episodes (congruence coefficient = .81); and (b) the tenderness factor differed between men and women following sympathy episodes (congruence coefficient = .84).

subgroup congruence in the majority of comparisons we examined. These results together indicate that the central set of subjective elements that we ultimately arrived at for each positive emotion—and in turn the resultant self-report scales—were largely robust to the demographic composition of our samples.

We also took initial steps toward validating our newly developed set of self-report scales. Results showed that positive emotions within each thematic group were moderately positively intercorrelated in the majority of instances and on average, suggesting an expected degree of empirical overlap given previously hypothesized similarities among these emotions. Second, in the majority of cases, participants reported more intense feelings of the positive emotion that they were assigned to recall compared to other positive emotions in the same thematic group.

Third, we found initial evidence that our scales demonstrate convergent validity, based on correlations with trait measures of dispositional emotions. These scales did not, however, show as strong discriminant validity; many of the dispositional emotional measures showed correlations of a similar magnitude with all the emotions in a given thematic group (see Tables S32, S38, S44, S50, and S56; e.g., dispositional awe correlated positively with momentary admiration and gratitude as well as awe). Although these correlations could indicate a failure of our scales to capture content distinct to each emotion, given the observed evidence for distinctiveness among these emotions at the state level, these results more likely reflect a limitation inherent to the assessment of dispositional emotions. When individuals report their general tendencies to feel dispositional positive emotions, they may have trouble differentiating their tendency to experience that particular emotion from a broader tendency toward all positive emotions. Furthermore, individuals may vary more in their dispositional tendencies to experience all positive emotions (i.e., on dispositional positive affect) than in their tendencies to feel specific

positive emotions (e.g., dispositional awe). If this is the case, individuals' chronic level of positive emotional experience may uniformly affect their experience of multiple distinct positive emotion dispositions, causing these dispositions to relate uniformly to state positive emotions. Consistent with this account, prior research suggests that scales meant to capture distinct positive emotion dispositions tend to be strongly and positively intercorrelated (Shiota et al., 2006).

General Discussion

The science of distinct positive emotions has been experiencing a surge in momentum for nearly two decades. There also have been almost no prior efforts to construct reliable self-report scales to measure the subjective experience of distinct positive emotions. The current research addresses these gaps by (a) painting a portrait of the thoughts, feelings, and action tendencies that constitute subjective experiences of each frequently studied positive emotion across individuals who differ in gender, ethnicity, and country of origin; (b) identifying a few frequently studied positive emotions which are not associated with distinct subjective content and (c) developing novel scales based on these subjective elements that can be used to reliably assess each positive emotion. These newly developed State-Trait Scales for Distinct Positive Emotions (STS-DPE) are presented in Table 1.

What is the Distinct Subjective Content of Positive Emotions?

Drawing on lay person knowledge and experience, we generated, selected, and pruned the thoughts, feelings, and action tendencies most strongly associated with each positive emotion, to arrive at a set of central subjective elements for each state. The fact that we identified a set of subjective elements that consistently characterized experiences of 15 positive emotions across a wide range of participants and scenarios lends broad support to the theoretical perspective that these positive emotions do come in separable and perhaps discrete experiential

packages (e.g., Ekman, 1992; Shiota et al., 2017; Tracy, 2014). In contrast, if there was no validity to the view that positive emotions come in discrete packages (e.g., Barrett, 2006; Moors, 2017), we would have observed subjective elements (a) loading weakly on specified positive emotion factors, (b) showing high cross-loadings on other positive emotion factors, or (c) showing tremendous variability in loading patterns across episodes of different emotions and participants from different backgrounds. Our methodological approach therefore pitted alternative theories of emotion against one another and our results broadly supported a distinct emotion perspective (see Weidman & Tracy, 2017, for further discussion).

Testifying to the validity of the subjective elements we uncovered, the lay-generated content represented in our scales were often consistent with those posited in prior theoretical treatments of these emotions. For example, researchers have argued that awe is accompanied by a sense of vastness and accommodation, or the need to adjust one's view of the world to account for newly acquired information (e.g., Keltner & Haidt, 2003; Piff et al., 2015; Stellar et al., 2018). Scale items such as "I felt I was in the presence of something quite out of the ordinary" capture vastness, and "I continued to think about what I just saw" captures accommodation (see Table 1). As another example, interest has been argued to arise when individuals encounter a novel or complex stimulus, and to stimulate motivation toward learning and exploration (Silvia, 2008). Scale items such as "I was curious about what I was seeing" reflect a novelty and "I wanted to seek out more information" reflects motivation toward learning (see Table 1).

The present findings also yielded support for several prior theoretical distinctions among positive emotions. For example, researchers have long hypothesized that love is not a unitary construct, but comes in multiple sub-forms, including romantic love, nurturant love, and attachment love (e.g., Berscheid, 2010; Shiota et al., 2014). Consistent with this view, we found

evidence for these three subtypes when participants were asked to reflect upon each, as well as when they wrote about general feelings of love. Interestingly, we did not find evidence for a general love state apart from these subtypes. Also consistent with the previously proposed typology of love, feelings of desire and neediness are captured by our newly constructed romantic love scale (e.g., "I had a craving for someone" and "The thought of someone was overwhelming"); a desire to care and protect are captured by the nurturant love scale (e.g., "I gave my full attention to someone" and "I wanted to help someone grow"); and a sense of secure connection is captured by the attachment love scale (e.g., "I felt a close bond with someone" and "I felt secure"; see Table 1).

Of course, the consistency that we observed between lay-person generated subjective elements and prior theoretical definitions of positive emotions could in part reflect our own views infiltrating the analysis. We played an active role in selecting subjective elements for inclusion in Study 2 and in interpreting factor solutions in Studies 2 and 3, and we were likely influenced by prevailing conceptualizations of positive emotions within the affective science literature. However, it is important to note that in several cases our findings directly contradicted prevailing views, suggesting that our own expectations were not determinative of the results. First, we found that compassion did not emerge as a distinct positive emotion experience. Compassion has been defined as "the feeling that arises in witnessing another's suffering and that motivates a subsequent desire to help" (Goetz et al., 2010, p. 351), and has been the subject of numerous targeted studies (e.g., Lupoli et al., 2017; Oveis et al., 2010; Stellar et al., 2015). Yet, in Studies 2 and 3, we did not uncover a unique set of subjective elements characterizing compassion experiences, apart from the elements found to characterize empathy, sympathy, and tenderness. Instead, when participants wrote about episodes of compassion, the elements that

might be expected to characterize compassion were more strongly associated with these other caring emotions. Furthermore, when we examined a four-factor solution—which could conceivably have yielded distinct factors for empathy, sympathy, tenderness, *and* compassion—we found that the fourth factor represented perspective-taking, which we considered a element of empathy, following prior work (e.g., Batson et al., 1987; Decety & Cowell, 2014; Preston & DeWaal, 2002; see Cuff et al., 2016, for a review).

There are several possible implications of these findings for how compassion might be conceptualized in relation to empathy, sympathy, and tenderness. One possibility is that *compassion* is a broad positive emotional experience that encompasses subjective elements which we included as representing empathy, sympathy, and tenderness. In this view, when people simultaneously feel empathy (i.e., a desire to listen and respond to another's predicament), sympathy (i.e., feeling bad for someone's predicament), and/or tenderness (i.e., feeling a close bond with someone), this combined emotional experience may align with what has previously been conceptualized as compassion. This is consistent with theoretical treatments of compassion as a broadly functional emotional experience that involves feeling bad for a needy individual's predicament while also wanting to help this person (Goetz et al., 2010). The potential overlap between empathy and compassion is also foreshadowed by the fact that many existing definitions of empathy explicitly reference compassionate feelings (Cuff et al., 2016). A second possibility is that *compassion* may refer to the specific prosocial behaviors that are theorized to follow from compassion episodes (Goetz et al., 2010). In this view, feelings of empathy, sympathy, and/or tenderness may lead to prosocial behaviors meant to help a needy person with an unfortunate predicament. Of course, in this view, compassion refers not to a

positive emotion per se, but to a suite of concrete behaviors that follow from related positive emotional states. Future work could shed more light on this issue.

A second example of how our findings directly contradicted prevailing views of positive emotions concerns enjoyment emotions. We found consistent evidence that happiness and contentment—which are often conceptualized as distinct emotions—involve the same subjective elements, across episodes of these two emotions as well as related emotions of amusement and *schadenfreude*. Furthermore, items reflecting joy and elation—which are regularly treated as distinct from happiness and contentment (Weidman et al., 2017)—showed strong loadings on the same experiential factor that reflected a blend of happiness and contentment. The label *contentment* therefore seems to capture a family of closely related positive emotions associated with enjoyment—including happiness, joy, and elation. From an empirical standpoint, it may be questionable to distinguish among these emotions.

Implications for Measuring Positive Emotions

The present work also reported the development and initial validation of the first set of brief, reliable self-report scales for measuring the most frequently studied positive emotions in the literature that have at least some reliably assessed distinctive content. Our empirical analyses yielded scales that, along with the previously developed authentic and hubristic pride scales (Tracy & Robins, 2007), can be used to assess each subjectively experienced positive emotion. Furthermore, by capturing subtle distinctions between highly similar emotions (e.g., gratitude and admiration) these scales allow for the targeted assessment of specific emotions, a practice that has the potential to improve emotion measurement (see Weidman et al., 2017).

We also took several initial steps toward validating these scales, finding that (a) conceptually similar positive emotion scales tended to show moderate but not too-large

correlations (M = .35, SD = .23); (b) participants typically reported more intense feelings of the positive emotion that they were assigned to recall, compared to conceptually similar positive emotions; and (c) our positive emotion scales tended to show small-to-moderate convergent correlations with measures of corresponding emotional dispositions. Implementing these newly developed scales in current and future research endeavors on positive emotions may help improve the assessment of subjectively experienced positive emotions in empirical studies, particularly in comparison to two regularly used alternative approaches: single items and scales that were previously developed using less-comprehensive methods.

Comparison with single-item assessment approaches. The current modal means of assessing distinct positive emotions is through single-item measures (Weidman et al., 2017). The scales developed in the present research offer several advantages to this approach. First, by assessing emotions with brief statements capturing subjective elements (e.g., measuring *admiration* with the item "I felt a desire to become more like a specific person") instead of often-ambiguous single-word adjectives, researchers increase the likelihood that items are consistently understood across many participants (e.g., Russell, 1991; Shaver et al., 1987). A researcher who uses these new scales can know exactly what subjective experience she is measuring, whereas a researcher who uses a single-item scale cannot be sure what definition of the emotion word participants have in mind when reporting their feelings.

Data from the present research support this contention. Table 2 displays the correlation between single-item emotion words (e.g., "I felt admiration") and the new scales for measuring that same emotion, using data from Study 3. Correlations between single items and full-length scales capturing that emotion tended to be only moderate in magnitude (M = .55, SD = .08). More importantly, when full-length scales were computed without the single-items—eliminating

empirical overlap that will necessarily inflate the correlations—they correlated even less strongly with the single-items (M = .41; SD = .12). These correlations were particularly low for certain emotions whose labels lack clear meaning, including *schadenfreude*, romantic love, and attachment love, and dipped as low as .09 for nurturant love. These findings suggest that single items are relatively poor proxies for the complex suite of thoughts, feelings, and behavioral action tendencies that constitute subjective experience of distinct positive emotions.

Comparison with previously developed positive emotion scales. The measurement approach outlined above also has several advantages over other commonly used tactics to assess distinct positive emotions, most notably the Dispositional Positive Emotion Scales (DPES; Shiota et al., 2006). The DPES were novel and groundbreaking when they were developed, because they marked the first attempt to construct a set of measures meant to capture a broad set of distinct positive emotions, whereas prior assessment tools typically captured broad emotional dimensions (e.g., Barrett & Russell, 1998; Watson et al., 1988). They therefore paved the way for considerable advancement in the science of positive emotions.

However, the scales developed in the present work possess several desirable attributes compared to the DPES. First, they were developed based on an exhaustive pool of over 1,000 frequently experienced subjective positive emotion elements generated by lay persons, compared to a pool of 38 items generated by a small team of researchers for the DPES. Second, our initial item pool was pruned through an iterative process of factor analysis and inspection of item means across two studies involving 10 samples totaling 2,486 participants. In contrast, the initial item pool for the DPES did not undergo any factor-analytic evaluation to ascertain whether the chosen items captured the subjective experience of each emotion in question, and these scales were validated in a sample of 108 participants. Third, the present set of scales (as well as the

previously developed authentic and hubristic pride scales [Tracy & Robins, 2007]) cover 17 of the most frequently studied positive emotions in the literature, whereas the DPES includes subscales for only 7 positive emotions. Fourth, our scales are amenable to measuring positive emotions at both the state and trait levels, whereas the DPES is exclusively a trait measure.

Limitations and Future Directions

The present research has several limitations that point to important future directions. First, we examined the subjective elements of each positive emotion only in relation to the other 2-3 emotions within the corresponding thematic group. We made this decision for the pragmatic reason that we wanted participants to be able to report their subjective experience on all elements for each emotion within each group, following episodes of each emotion in that group. Even using these thematic groups, participants still rated 56-91 elements per emotion episode in Study 2 and 27-55 elements per emotion episode in Study 3. Had we included all positive emotions in a single study, the demand on participants would have likely compromised data quality. Yet, this raises the question of whether each of the 15 positive emotions we found to be subjectively distinct would have emerged as distinct in comparison to all other emotions included in this investigation. Examination of our newly developed scales suggests this may not be the case; for example, the subjective elements for empathy and sympathy seem to capture similar content as those for nurturant love (i.e., caring for someone in need) and the subjective elements for tenderness seem similar to those for attachment love (i.e., bonding with someone). Future work is needed to address the question of how distinct each positive emotion is from all other frequently studied positive emotions.

Second, we relied on retrospective designs, in which participants recalled emotion experiences, rather than assessing emotion experience *in vivo*. This decision was also a

pragmatic one given the limitations associated with in vivo methods. For example, had we wished to use experience-sampling methods, we could not have expected participants to report their feelings on a long list of subjective elements as they were going about their daily lives. Alternatively, had we wished to use film clips to elicit emotions, it may have been difficult to identify and validate a set of film clips that uniquely elicited all 18 of the positive emotions with which we began this project. In contrast to these other options, the recall method we employed allowed us to target specific episodes of each distinct positive emotion using the same procedure across a wide range of positive emotions that differed in content. This type of recall methodology is widely used and has been shown to reliably elicit distinct emotion experiences (e.g., Ekman et al., 1983; Gonzaga et al., 2006; Siedlecka & Denson, 2019). Of course, because we used a recall methodology, the subjective elements we uncovered may in part reflect participants' conceptualizations of positive emotions in addition to how those emotions are actually experienced in daily life. Future work could address this question by assessing the subjective experience of positive emotions in daily life, using the short lists of subjective elements included in our newly developed scales. An additional fruitful future direction would be to develop stimuli such as film clips that reliably induce feelings of the 15 positive emotions included in our final set (see Table 1).

Third, we began this investigation with a list of 18 positive emotions (i.e., those that are consensually viewed as pleasant) that were regularly studied in the journal *Emotion* during the first decade of this century (Weidman et al., 2017). As a result, some regularly studied positive emotions were not included in our investigation. One example is *elevation*, defined as a warm, uplifting feeling experienced in response to unexpected acts of human goodness, kindness and compassion (e.g., Haidt, 2000). Although this may be seen as an omission, we predict that the

subjective elements characterizing elevation overlap substantially with admiration, which is also associated with witnessing valorous deeds of others (see Table 1; see Algoe & Haidt, 2009; Onu et al., 2016, for discussion of the similarities and differences between admiration and elevation). Furthermore, by beginning our analysis with a list of over 1,000 thoughts, feelings, and action tendencies associated with positive emotion experience, and deriving distinct subjective elements for each positive emotion from this list, we tried to minimize the chance of allowing a truly distinct subjectively experienced positive emotion to slip through the cracks. Nonetheless, future work should empirically evaluate the possibility that positive emotions other than those included in this research may in fact be characterized by a distinct set of subjective elements.

Fourth, although we were able to demonstrate convergent validity between our scales and associated emotion dispositions, the recall-based design that we used did not permit concrete tests of the extent to which our newly developed scales predicted downstream behavior. Future work should therefore examine predictive validity and, furthermore, test whether positive emotions show variability in the extent to which they predict downstream behavior. This question stems from the fact that the subjective experience of positive emotions included in our investigation appeared to differ in whether they centered primarily on thoughts, feelings, or action tendencies. For example, interest was predominantly characterized by thoughts and other cognitive processes (e.g., “I was curious about what I was seeing”), contentment was predominantly characterized by feelings (e.g., “I felt that all was right in the world”), and admiration was predominantly characterized by action tendencies (e.g., “I felt a desire to become more like a specific person”; see Table 1). We suspect that these differences in the subjective experience of each positive emotion may have implications for future tests of predictive validity. For example, emotions that primarily involve action tendencies are likely to predict immediate

behavior (e.g., admiration may motivate hard work toward attaining an outcome someone else has achieved). In contrast, emotions that primarily involve feelings may be less predictive of behavior (e.g., contentment may leave someone feeling so satisfied with their situation that they see no need to take action). These are fascinating questions for future work to tackle.

Fifth, in this work we examined the content and structure of positive emotions among samples of participants living in North America only (i.e., undergraduate students in Canada and adult MTurk workers). Although our observation, in Study 3 of relatively minimal differences in the content of positive emotions across gender, ethnicity (i.e., Caucasians vs. East Asians), and country of origin (i.e., North American and non-North American), future work is needed to examine whether the content of positive emotions differs across individuals from more ethnically, culturally, and geographically diverse samples, particularly from non-Western cultures and other ethnicities not directly targeted in the present research.

Conclusion: Toward a Taxonomy of Subjectively Distinct Positive Emotions

We hope that this work marks a first step in the development of a taxonomy of subjectively experienced positive emotions—a model of exactly how many positive emotions are experienced as subjectively distinct, as well as the distinguishing set of subjective elements, causal antecedents, and functional consequences that characterize each of these states. Future work in which the simultaneous interrelations among all 15 positive emotions included in our final set will be required to pin down exactly which of these states are distinct within the entire positive emotion landscape. We believe that the development of this type of taxonomy would provide greater organization and coherence to the positive emotion literature, primarily by shedding light on the similarities and distinctions among positive emotions, and in turn help build a better science of positive emotions.

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Table 1: State-Trait Scales for Distinct Positive Emotions (STS-DPE)

Admiration	Awe	Gratitude
I felt admiration	I felt awe	I felt gratitude
I felt a desire to become more like a specific person	I continued to think about what I just saw	I felt appreciative toward a specific person
I felt as if I could learn a lot from a specific person	I could not believe what I had just seen	I felt cared for
I felt motivated to work harder	I felt I was in the presence of something quite out of the ordinary	I felt fortunate
I had a great deal of respect toward a specific person	I felt wonder	I felt like I had benefited from a specific person's action
I strongly valued a specific person's opinion	I was rendered speechless	I felt lucky to know a specific person
	What I just saw was simply amazing	I thought that a specific person who helped me should be acknowledged
		I wanted to express thanks
Sympathy	**Tenderness**	**Empathy**
I felt sympathy	I felt tenderness	I felt empathy
I felt bad for someone	I felt a stronger connection with someone	I affirmed what someone else was feeling
I felt pity for someone	I felt great care toward someone	I allowed someone to share his or her feelings with me
I felt sorry for someone	I felt warmth for someone	I listened carefully to what someone had to say
I thought that someone else's situation seemed unfair	I had a desire to be close to someone	I reflected on a time I had experienced a similar situation
I worried that someone would not be okay	I showed affection toward someone	I tried to help find a solution to another's problem
Someone else seemed vulnerable to me	I showed fondness toward someone	I tried to relate to another's experience
	I wanted to hold someone's hand	
Interest	**Hope**	**Enthusiasm**
I felt interest	I felt hope	I felt enthusiasm
I felt engaged with what I was doing	I drew on my inner strength	I felt adventuresome
I paid close attention to what I saw and heard	I engaged in some wishful thinking	I wanted to get others excited
I wanted to seek out more information	I felt challenged	I was eager
I was curious about what I was seeing	I had a great desire for a certain outcome	I was on top of the world
I was focused	I thought about the future	
My attention was absorbed	I tried to believe in myself	
My mind was very active	I tried to stay positive	

Schadenfreude	Amusement	Contentment
I felt that justice had been served for someone else	I felt amusement	I felt happy
I thought someone deserved what had happened to them	I giggled	I felt content
I thought that someone had brought something bad upon themselves	I laughed	I enjoyed the situation
I thought that someone had it coming	I was entertained	I felt that all was right in the world
I wanted to point out someone else's shortcomings	What I saw was funny	I wanted to stay in the moment
Nurturant Love	**Romantic Love**	**Attachment Love**
I felt dedication toward someone	I could not stop thinking about someone	I felt a close bond with someone
I gave my full attention to someone	I felt butterflies in my stomach	I felt accepted by someone
I showed support for someone	I felt giddy	I felt like I could rely on someone
I tried to show patience with someone	I felt vulnerable	I felt like someone adored me
I wanted to help someone grow	I had a craving for someone	I felt secure
I wanted to sacrifice my own needs for someone	I longed for someone	I felt that someone else was there for me
I wanted what was best for someone	I was afraid of rejection	I trusted someone else
	The thought of someone was overwhelming	

Note: Items are phrased in the past tense because we asked participants to recall emotional episodes in Studies 2-3. For the purpose of assessing positive emotions *in vivo*, items can be re-written in present tense
Item stem: “To what extent does each of the following statements characterize your experience of [TARGET EMOTION]”?
Anchors: 1 = “Not at all”; 3 = “Somewhat”; 5 = “Very much”

Table 2: Correlations between single emotion terms and self-report scales for respective positive emotions (Study 3)

Scale	Correlation (including single-item in scale)	Correlation (excluding single item from scale)
Admiration	.53	.39
Awe	.60	.51
Gratitude	.57	.49
Empathy	.39	.28
Sympathy	.53	.42
Tenderness	.51	.43
Contentment	.68	.55
Amusement	.60	.45
Schadenfreude	-	.36
Hope	.46	.31
Enthusiasm	.63	.51
Interest	.58	.46
Romantic Love	-	.47
Nurturant Love	-	.07
Attachment Love	-	.41
Mean	.55	.40
Standard Deviation	.08	.13

Note: *N*s = 254-315

Correlations above |.13| are significant at $p < .05$

The single items for authentic pride, hubristic pride, *schadenfreude*, romantic love, nurturant love, and attachment love, are not included in the scales. As a result, values in these respective cells are left blank

The corresponding correlations between the authentic and hubristic pride scales and the single items "I felt proud" have previously been reported as $r = .51$ (authentic pride) and $r = .16$ (hubristic pride) in a sample of 216 undergraduate participants who were asked to recall experiences of authentic and hubristic pride and report their feelings (Tracy & Robins, 2007).

Figure 1: Process used to uncover the subjective content of, and construct scales for, each positive emotion (Studies 1-3)