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Publication Date

2024

Peer reviewed|Thesis/dissertation

A High-Dimensional Measure of Specific Emotion Experiences (the SEEQ): Capturing the Richness of Human Emotional Experiences and Their Relationships with Well-Being

By

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A dissertation submitted in partial satisfaction of the

requirements for the degree of

Doctor of Philosophy

in

Psychology

in the

Graduate Division

of the

University of California, Berkeley

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Spring 2024

Abstract

A High-Dimensional Measure of Specific Emotion Experiences (the SEEQ): Capturing the Richness of Human Emotional Experiences and Their Relationships with Well-Being

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In the present work I validate the Specific Emotion Experience Questionnaire (SEEQ) and use it to test the explanatory power of specific emotions on well-being. In three studies using both cross-sectional and longitudinal data, I support my claim that the specific emotions measured in the SEEQ more powerfully relate to critical outcomes—including life satisfaction, social connection, and daily experiences of stress —than positive and negative affect. First, I tested the psychometric reliability of the full SEEQ and the SEEQ-20, a shorter 20-item measure. Then, in study 1, the SEEQ-20 explained up to 10 percentage points more variance in critical outcomes (e.g., loneliness and life satisfaction) than the predominant measure of positive and negative affect, the PANAS. Furthermore, using a statistical test of non-nested models, the SEEQ-20 was significantly better at explaining many of these outcomes. In study 2, a longitudinal sample comprised of 4,008 daily reports from 296 individuals, SEEQ-20 elation (high-arousal positive emotion), contentment (low-arousal positive emotion), gratitude (prosocial positive emotion), and sexual desire (an oft-neglected emotion) all uniquely corresponded to important, real-world experiences of daily life satisfaction, social connection, and stress. Study 3 replicated the SEEQ-20's explanatory power over the PANAS on three (life satisfaction, loneliness, and positive relationships) of four (depression) pre-registered hypotheses. Furthermore, I replicated the psychometric reliability of the SEEQ and explored how other emotion constructs (e.g., contempt and elevation) fit with the SEEQ's items. In summary, the SEEQ's specific emotional experiences provide a foundation for a more comprehensive study of emotion in well-being, daily life, and potentially other domains such as culture.

A High-Dimensional Measure of Specific Emotion Experiences (the SEEQ): Capturing the Richness of Human Emotional Experiences and Their Relationships with Well-Being

Emotion is a visceral and core component of subjective experience. Decades of research have been dedicated to uncovering the role of emotional experience in multiple domains: psychopathology (Kring & Bachorowski, 1999), positive psychological functioning (Fredrickson, 2001; Lyubomirsky et al., 2005), social behavior (Keltner, Sauter, et al., 2019), decision-making (Lerner & Keltner, 2001), and culture (D. Cordaro et al., 2020; Matsumoto, 2001; Mesquita et al., 2016; Tamir et al., 2016; Tsai, 2007). The culmination of this research has moved some within the field to deem this the "age of affectivism" (Dukes et al., 2021).

Given the richness of emotional life and the blooming of academic research on specific emotion constructs, one might expect emotion science to have correspondingly rich self-report measures of emotional experience. The reality is mixed. The predominant measure of emotion, which I consider in depth below, is a scale of affect, the Positive and Negative Affect Schedule (PANAS; Watson et al., 1988) cited over 51,000 times on Google scholar at this moment. This measure reduces emotional experience to two core affective dimensions of positive affect (PA) and negative affect (NA). This fails to capture the high dimensional nature of emotional experience I consider below.

Just as Watson et al. (1988) rightly critiqued the "purely ad-hoc" nature of many affect scales at the time, research in emotion 30 years later has similar issues: emotion is measured using ad hoc or impromptu scales (Weidman et al., 2017). Lack of standardization contributes to variability in which specific emotions are measured and how individual emotions are treated in analysis (e.g., aggregated into PA and NA or treated individually), which threatens the generalizability and comparability of different studies of the same constructs.

This state of affairs animates the present investigation. To arrive at a measure of specific emotions that can faithfully represent people's experiences, this paper begins by discussing the defining characteristics of emotion and two contrasting theoretical perspectives: constructivist and basic emotion accounts. I then discuss how these two accounts have resulted in different approaches to measuring subjective emotion experience. First, I argue the predominant measure in affective science, the PANAS, is primarily situated in the constructivist account. I briefly review some of the empirical evidence relevant to this measure, but also note its limitations and the limitations of factor analytic approaches, generally. This discussion segues into more recent empirical work on a data-driven, high-dimensional perspective of emotion. Based on a novel theoretical perspective, this high-dimensional approach includes data-driven tests of which representation (dimensions like valence and arousal or discrete categories) better explains what people see, think, and do in response to thousands of naturalistic stimuli. I end my discussion of the research by examining two notable discrete measures of emotion consistent with a high-dimensional view of emotion, the development of the SEEQ, and the rationale for the present research.

Emotion: Definitions and Relevant Theory

Philosophers, scientists, and psychologists have debated the definition of emotion over the centuries, and these differing conceptualizations necessarily impact any putative measure of emotion. Dixon (2012) traces the historical origin of the word "emotion" from the William James in the 1800s to modern debates in emotion research. In his survey of relevant theorists, Izard (2010) also finds no consensus definition. Emotion scientists have grappled with the boundaries

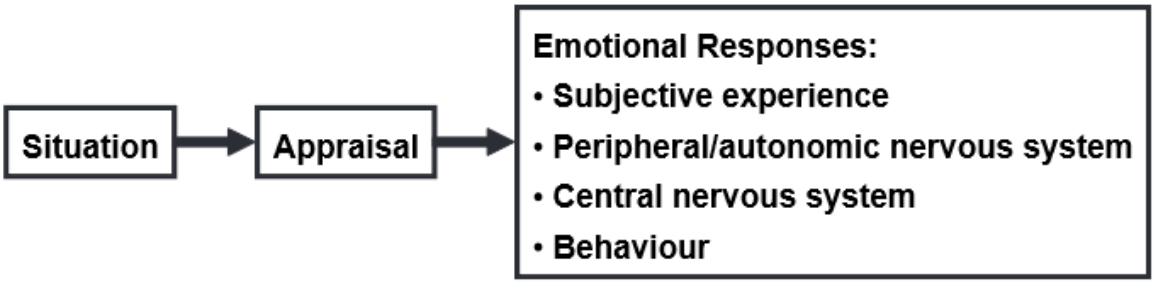
of many ambiguous subjective phenomena that are related to this discussion, including emotion, affect, and mood (for discussion, see Scherer, 2005).

Despite the lack of a consensus definition, conceptual approaches to emotion share commonalities. Most notably, it is widely assumed that emotions involve a relatively brief multicomponent process involving: 1) appraisal, 2) bodily or peripheral physiology, 3) subjective experience, 4) action tendencies, and 5) behavior (for a review of many distinct definitions, see Kleinginna & Kleinginna, 1981; Levenson, 1999; Mulligan & Scherer, 2012; Scherer, 2005). In this paper, when I refer to emotion, I mean consciously experienced, specific feeling states that are about something (i.e., intentional) and that involve most aspects of the multicomponent process. I also accept the measure of emotion dispositions or tendencies (Mulligan & Scherer, 2012; Shiota et al., 2006) because they are useful[1]. Finally, alongside emotion is the more general concept of affect. Researchers have used the term affect in different ways. For example, *current affect* (Watson & Tellegen, 1985) refers to specific emotions or feeling states in-the-moment, *core affect* (Russell, 2003) to the diffuse, objectless experiences of valence (pleasant/unpleasant) and arousal (activated/deactivated), or as an umbrella term referring to both conscious and non-conscious emotional experience, mood, or motivational states (Dukes et al., 2021; Mulligan & Scherer, 2012). I use the word affect primarily in the way Russel (2003) does, referring to general experiences of pleasantness and physical intensity.

The complexity of emotional experience is that it unfolds in real time through the multicomponent process. Nevertheless, as the field of emotion science has matured, self-reports remain the gold-standard for measurement. Emotional experience occurs during an *emotional episode*, proceeding from situations to appraisals to *emotional responses* across systems of the mind and body and expressed in behavior (Mauss & Robinson, 2009; Mulligan & Scherer, 2012). For an example of this process model, see Figure 1 reproduced from Mauss & Robinson (2009). Notably for measurement, *subjective experience* is only one component of emotion, which implies emotion could be assessed with external (i.e., outside the experiencer's mind) measures. Indeed, there is a rich line of research assessing emotion from bodily expression, voice, behavior, peripheral physiology, and the brain (D. Cordaro et al., 2016, 2020; Cowen, Laukka, et al., 2019; Cowen et al., 2020), but past work also demonstrates the difficulty in identifying reliable correspondence between specific emotional experiences and physiology (Barrett & Westlin, 2021; Lindquist et al., 2016; Mauss & Robinson, 2009; Siegel et al., 2018).

[1] A detailed discussion of my thinking about the nature of dispositional emotion would be a separate paper, but a short summary is that dispositional emotion is not "emotion," but rather reflects a mixture of more basic individual differences (e.g., a person is prone to feel anxiety across situations) and contextual factors (e.g., the situation causes anxiety across most people).

Figure 1
Emotion Process Model Reproduced from Mauss & Robinson (2009)



Note. In this model, emotion involves multiple response systems that are activated by appraisals of a situation. Not shown, but this process feeds-back and continues in real time: emotional responses can change situations, leading to new appraisals and new emotional responses.

The attention to self-report measures of emotion stems from the necessity of accounting for subjective *emotional experience* in any complete theory of emotion. Subjective experience is core to what both lay people and researchers mean when they talk about emotion (LeDoux et al., 2016; LeDoux & Hofmann, 2018). These experiences are thought to be anchored in language (Barrett et al., 2007; Cowen & Keltner, 2017; LeDoux & Hofmann, 2018; Robinson & Clore, 2002). This is one of the reasons LeDoux & Hofmann (2018) conclude "unobservable private events" like emotion experience require self-report, the gold standard for measuring conscious experience (p. 67).

Capturing the phenomenology of subjective emotional experience is inherently complex and has been approached in a variety of ways. Modern theories of emotion acknowledge the immense variability in situations and emotional expressions, including variability from culture, social norms, and self-regulatory processes (Barrett, 2017; Keltner, Tracy, et al., 2019). To know what someone experiences, the most direct approach is simply to ask. This is one of the reasons why the reliance upon self-reports in language with emotion-related word lists remains the most common and accessible approach.

Scherer (2005) provides an excellent review forming the basis of the following discussion of self-report. Free-response is a widely-used, intuitively appealing measure of emotion experience because it allows people to be precise and accurately represent their experience. However, this is limited by the difficulty of spontaneously generating precise labels and individual variability in the ability to do so (Smidt & Suvak, 2015). Free-response has historically been difficult to analyze quantitatively, resulting in researchers applying theoretical or impromptu (Weidman et al., 2017) categorization systems to free-response answers that do not generalize across studies. Instead, emotion research has often turned to measures of emotion experience using emotion words (e.g., *sad, angry, proud*) or affective words (e.g., positive, negative) in categorical (i.e., yes or no) or ordinal/continuous response scales.

Approaches to experience: basic and core affect constructivist perspectives

Within the field of emotion, two theoretical approaches to emotional experience have emerged over time. A first account can be understood as a basic emotions approach and is identified through conceptualizing emotions as categorically distinct psychophysiological states. This perspective has a long tradition. For example, Carroll Izard (1977) recognizes "a rich

intellectual heritage" including Charles Darwin, William James, and Wilhelm Wundt when discussing Differential Emotions Theory. Ekman's (1969) cross-cultural work in emotion recognition also laid the foundation for his formalization of Basic Emotion Theory (1992).

The science of emotion was shaped profoundly by the Ekman and Friesen research in facial expression in New Guinea and discoveries of what were claimed to be 6 universal facial expressions. That work and books that would follow would orient an emergent science of emotion to an examination of the face as the central medium of expression, and would identify six emotions—anger, disgust, fear, sadness, surprise, and happiness—as a first taxonomy of "basic emotions" presumed to have been shaped by evolution (Ekman, 1992; Lench et al., 2011). Moreover, for critics of evolutionary approaches to emotion, the Ekman and Friesen paradigm would become a central focus for critical tests of Darwin's evolutionary account (Barrett, 2022; Gendron et al., 2014). Since the basic six, many other emotions have been conceptualized as distinct states (e.g., Tracy & Robins, 2004b). In developing the taxonomy of emotions, researchers have drawn on criteria first outlined by Ekman (1992) and also Social Functionalist Theories (SFTs) that outline how emotions solve evolutionary challenges of our highly social species (Keltner et al., 2022; Sauter, 2017).

In recent data driven work, Cowen and Keltner (2021) highlight several predictions regarding basic emotion approaches to emotional experience, as noted in Figure 2. First, emotion is "biologically prepared," and this causes (and explains) substantial cross-cultural interpretability of many emotion expressions and personal accounts of emotion experience (e.g., Keltner, Sauter, et al., 2019). Second, emotional behaviors should be conceptualized in discrete categories of emotional experience. Third, these emotional experiences are organized into specific emotion states with clear boundaries (Ekman, 1992), though more recent work includes emotional blends.

Figure 2

Table 1 Reproduced from Cowen & Keltner (2021)

	Basic emotion theory	Appraisal theories	Constructivism
Claims regarding biological preparedness	Emotional feelings associated with specific cognitive appraisals and behaviors are biologically prepared and modified by experience. Emotional states intervene between appraisal and response.	Certain appraisals (e.g., certainty, pleasantness, or goal conduciveness) are biologically prepared and modified by experience. Patterns in emotion-related response can be explained by mappings from appraisal to behavior.	Certain valence/arousal responses are biologically prepared. Specific emotions involve valence and arousal but are artifacts of language (i.e., infants and non-human animals do not have emotions).
Claims regarding how emotions should be conceptualized	Patterns in emotion-related behavior are best conceptualized in terms of specific emotions such as awe and fear.	Emotion-related behaviors are best explained in terms of particular cognitive processes (e.g., certainty), not specific emotions.	Emotions are best conceptualized in terms of valence, arousal, and language-based conceptual knowledge.
Claims regarding the structure of emotion-related behaviors	Traditional BET reduces emotions to six or seven discrete clusters of states. Revised BET admits of complex (>25 kinds), blended emotions.	Emotions reduce to a specific set of appraisal dimensions, usually <10 (in a few cases, many more) and may or may not fall into discrete clusters.	Emotion-related behaviors are fundamentally low-dimensional and lack any inherent categorical structure.

Note. Summarizes the core biological, conceptual, and behavioral concepts in three perspectives in emotion theory.

In contrast, constructivist accounts often suggest that core affect (valence and arousal) and other non-emotional processes (e.g., attribution or conceptual categorization), forms the universal basis of emotional (and all affective) experience, not biologically prepared specific emotions (Barrett, 2022; Cunningham et al., 2013; Russell, 2003). While emotional experience is about something (i.e., intentional), core affect is a basic, "objectless" (i.e., not intentional), and conscious process that is combined with cognitive processes to construct emotional experience (Russell, 2003). In this way, emotion should be conceptualized as a cognitive-affective labeling process, where the "hot" emotional aspect is explained by changes in core affect that are then attributed to external causes. The implication is that emotion itself is not the coordination of specific systems, but rather how individuals label patterns across those systems. In Russell's 2003 formulation, he postulated that core affect, affective quality, and explicitly non-emotional processes explain all there is to say about emotional experience. Critically, tests of these competing perspectives require the right measures. This measurement issue is central to the present investigation.

Positive and Negative Affect Schedule and the Valence-Arousal Perspective

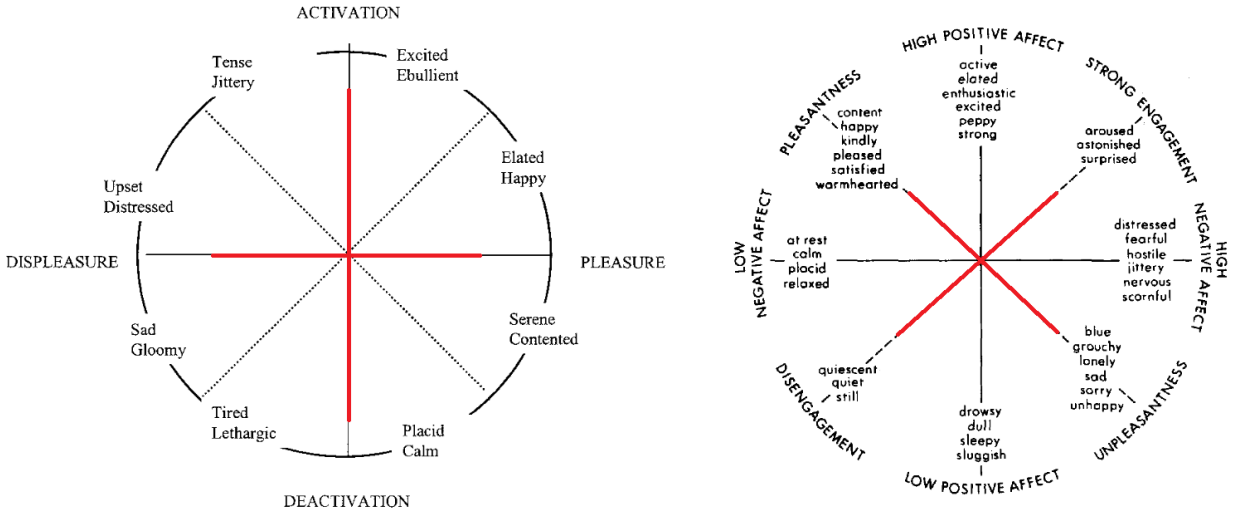
Critical to the study of emotional experience are measures that are differentiated and capture the richness of experience. The dominant measure in the field is the PANAS. The PANAS grew out of a historical need for a validated measure of *affect*. In affective science, *affect* has been used in at least two ways: 1) an umbrella term that encompasses both subjectively experienced, object-focused, short-lived emotional states and diffuse, longer-lived conditions like mood, such as in *affective phenomena* (e.g., Scherer, 2005); and 2) basic dimensions of emotional experience yielded by factor analysis, notably valence and arousal, or what Russell (1980, 2003) referred to as core affect.

Accounts like Russell's (1980, 2003) circumplex model and later core affect are examples of the second meaning of affect and constitute a "dimensionalist" perspective of emotion (Barrett et al., 2007). Here, "dimensionalist" refers to basic (not emotion-specific) processes, and particularly valence and arousal. Critical to this discussion, the PANAS was designed from this dimensionalist perspective rooted in valence and arousal. In devising the PANAS, Watson et al. (1988) sought to fill "a need for reliable and valid PA and NA scales" (p. 1063) using items that "were relatively pure markers of either PA or NA" (p. 1064). The authors' note that this perspective is a varimax rotation of the valence (i.e., pleasure & displeasure) and arousal dimensions. As shown in Figure 3, Russell's (2003) arousal dimension (activation-deactivation) corresponds to Watson & Tellegen's (1985) (dis)-engagement dimension, and Russel's valence dimension (pleasure-displeasure) corresponds to Watson & Tellegen's (un)-pleasantness dimension rotated 45° clockwise (and reflected along that 45° axis).

In one strand of affective science, this factor analytic solution produced these two dimensions that mathematically constituted the study of self-report emotion, mood, and affective states. The PANAS (and PA and NA more broadly) has been used extensively to test relationships between affect and physical health outcomes like inflammation (Brouwers et al., 2013), is critically important in positive psychology as directly incorporated factors of subjective well-being (Diener, 2009), is highly related to big five personality domains (Burger & Caldwell, 2000), shows both trait and state variability (Merz & Roesch, 2011), and has demonstrable lifespan trajectories (Joiner et al., 2018).

Figure 3

Schematic Representation of the Positive and Negative Affect Dimensions as a Rotation of the Valence-Arousal Dimensions



Note: Left—Reproduction of Figure 1 from Russell (2003), "Core Affect." Right—Reproduction of Figure 1 from Watson & Tellegen (1985) "The two-factor structure of affect figure." Red lines added to both images to clarify location of the valence and arousal dimensions.

As a standard measure of PA and NA given by factor analysis of subjective affective experiences, the PANAS works quite well. In addition to decades of prior research on the factor structure of mood discussed in the original manuscript by Watson et al. (1988), robust tests have followed since. The alpha reliability of PA and NA are rarely in question. The two-factor solution of the PANAS has additionally been tested for factor invariance across White and Black Americans (Merz et al., 2013), men and women (Seib-Pfeifer et al., 2017), and validated in multiple countries (e.g., Deniz & Işik, 2010). While some researchers have tested more complex factor structures for the PANAS items, the two factor model is presently the most replicable and robust (Heubeck & Wilkinson, 2019).

The success of the PANAS notwithstanding, the PANAS still made sacrifices to achieve its original aims. In particular, those sacrifices stand out when adopting a basic emotions perspective. Consider compassion. This state is elicited by the suffering of others (Goetz et al., 2010), and it is doubtful such a feeling could ever be a "relatively pure marker" of either PA or NA: it feels aversive to see others suffer at the same time compassion has prosocial, approach-related functions like many positive emotions. There are numerous complex positive and negative emotions not considered by the PANAS, states like compassion, embarrassment, and awe, with robust research traditions. As an aggregate measure, PA and NA likely treat emotion-specific links to well-being (e.g., gratitude to social connection) as error.

Critics of the PANAS have offered other critiques. First, it emphasizes primarily high-arousal states, despite the likely importance of low-arousal states like contentment (D. T. Cordaro et al., 2024; Fredrickson & Cohn, 2008; McManus et al., 2019). Second, PA and NA both have especially large correlations with Extraversion and Negative Emotionality,

respectively (Burger & Caldwell, 2000).[2] Third, the PANAS includes words most do not consider emotion (Jovanović, 2015). Non-emotional words like active and high correlations between PA-NA with other affect theories explicitly about high-arousal states are some reasons PA and NA from the PANAS were later renamed Positive and Negative *Activation* (Watson et al., 1999). Finally, the PANAS excludes important social emotions like gratitude (Stellar et al., 2017) and basic emotions like sadness (Ekman, 1992). For the items of the PANAS, see Table 1.

Table 1
Items of the PANAS

Positive Affect	Negative Affect
Active	Afraid
Alert	Ashamed
Attentive	Distressed
Determined	Guilty
Enthusiastic	Hostile
Excited	Irritable
Inspired	Jittery
Interested	Nervous
Proud	Scared
Strong	Upset

Note. The 20 items of the PANAS have been the same since 1988. Watson and Clark (1994) did propose expanding the set of "specific affects" in the PANAS-X, but it is a 60-item scale.

Critically, factor analysis has real limitations that are consequential for the items selected and the meaning of the factor solution. Factor analysis is one form of latent variable analysis. In general, latent variables refer to two things: 1) unobservable, theoretically causal constructs that explain observable phenomena (e.g., a student turns their work in on time ***because*** they are conscientious) and 2) mathematical abstractions formalized in a specific statistical model (Bollen, 2002). As such, factor analysis generates "*mathematical representations of some portion of the variance of one or more indicator variables*…" and is "inherently agnostic" about causality (DeYoung & Krueger, 2020). To analogize the idea of "mathematical representations," the average of 10 ft., 20 fl. oz., and 30 seconds is 20, but it is not clear what 20 means or that we can attribute causality to it. Making the leap to interpretation requires philosophical assumptions, particularly entity and theory realism (e.g., that the average of 10 ft, 20 fl oz, and 30 seconds is a real thing that exists independently outside measurement), that are subject to continuous debate (Borsboom et al., 2003).

To do the previous discussion justice would require a more extensive review of philosophy of science, but there are practical implications for PA and NA. One issue is that the nature of PA and NA are debatable and, empirically, depends upon the choice of items and rotation. This directly relates to critiques of how the PANAS includes items some consider

[2] This research was undertaken by Watson and Clark in various forms (e.g., Clark et al., 1994; Watson & Clark, 1984, 1992), and they sometimes refer to the big five factors and PA and NA interchangeably (e.g., general PA as an indicator of extraversion).

irrelevant (e.g., active) and excludes items some find critical: researchers have different formal ideas of what PA and NA are *supposed* to be (i.e., different latent variable models). In contrast, Watson et al (1988) focused on the empirical nature of PA and NA and common criteria for reliable self-report assessments (e.g., low cross-loadings).

A second issue is that the empirical nature of PA and NA entangles valence and arousal. This is one reason why the PANAS does not have low-arousal positive emotions. PA and NA are varimax rotations of the unrotated valence and arousal dimensions (Watson et al., 1988). Importantly, this procedure does not prioritize orthogonalizing valence and arousal. Both researchers that prefer the PA-NA rotation and those that prefer the valence-arousal dimensions assumed PA-NA was a simple 45 degree rotation of valence-arousal (Watson et al., 1999; Yik et al., 1999). While both groups found PA-NA was not exactly a 45-degree rotation, they concluded they were both small variations of the same space. Practically, this means that moving up the PA dimension requires concordant movement up both (positive) valence and higher arousal. This was part of Watson et al.'s (1988) original description of PA. [3] See Figure 4 for reproductions of graphs depicting the empirical relationship between PANAS PA-NA and valence-arousal.

In sum, my assessment of many critiques of the PANAS is that they communicate different philosophical views of what PANAS PA and NA *should* measure. By pointing toward specific emotion states like gratitude, contentment, and sadness, it seems that there is a clear need for a measure of specific emotions, which is more consistent with a basic emotion perspective. As discussed earlier, basic emotion theory emphasizes specific emotion states, and research in this theoretical orientation occurred concurrently with the development of the PANAS. Recent theories conceptualize emotion as a feature-rich space of distinguishable and cross-culturally perceptible states (D. Cordaro et al., 2016, 2020; Cowen, Laukka, et al., 2019; Cowen et al., 2020; Monroy et al., 2022).

[3] "High PA is a state of **high energy**, full **concentration**, and pleasurable engagement, whereas low PAis characterized by sadness and **lethargy**" [emphasis added] (Watson et al., 1988, p. 1063).

Figure 4

Graphic representation of the entanglement between PA-NA and Valence-Arousal

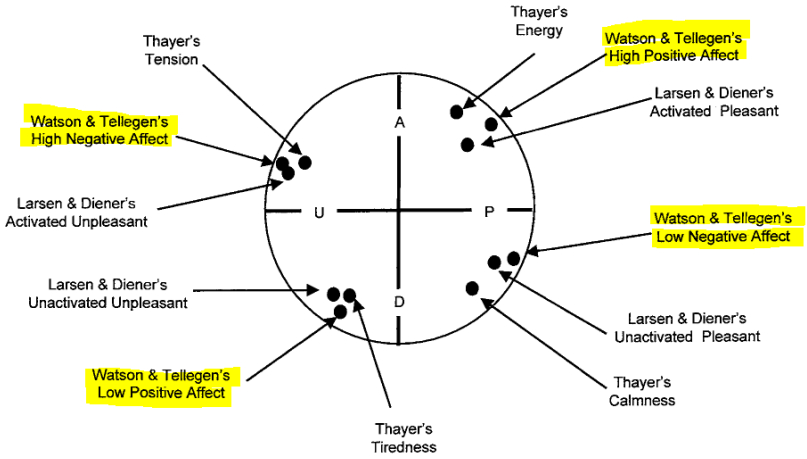


Figure 5. Twelve unipolar constructs in the integrated two-dimensional space. The horizontal and vertical axes were also assessed, but the scales are not shown. A = Activated; D = Deactivated; U = Unpleasant; P = Pleasant.

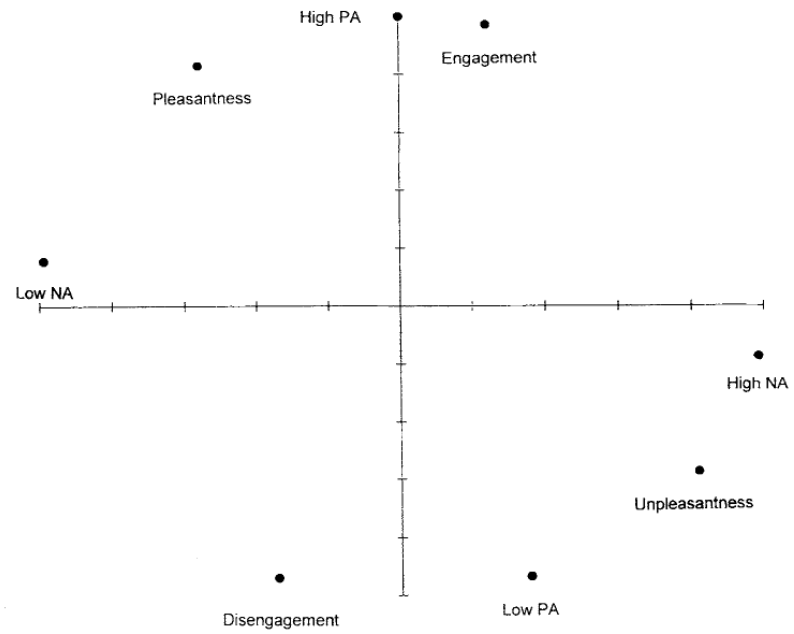


Figure 2. Mean polar angles (computed using CIRCUM) for the eight octant markers of the affect circumplex, averaged across all three analyses. PA = Positive Affect; NA = Negative Affect.

Note: *Top:* reproduced from Yik et al. (1999). *Bottom*: reproduced from Watson et al. (1999). In summary, authors that favored a Valence-Arousal perspective and authors that favored the PA-NA perspective both find that traveling along PA or NA implies increased arousal (engagement).

High-dimensional Perspective on Emotion

In the past 15 years, the science of emotion has expanded considerably. One line of studies proceeded in a top-down fashion and asked questions like: What emotions help humans form attachments with caregivers? How does emotion play out in the status moves of social

hierarchies? What emotions animate an individual's sense of collective identity? Relevant studies have characterized the experience, expression, and physiology of attachment-related emotions, in particular love, sexual desire, and sympathy (Diamond, 2003; Edelstein & Chin, 2018; Goetz et al., 2010; Impett & Muise, 2019). Studies have examined pride and triumph and their relationship to signaling status and group strength (Cheng et al., 2010; Tracy & Matsumoto, 2008; Tracy & Robins, 2008). A turn to the collective emotions has led to explorations of ecstasy and awe in religion, ceremony, music, and dance (Cowen et al., 2020; Van Cappellen, 2017). It is noteworthy that few of these emotional or affective states are captured by the PANAS.

While the modern high-dimensional perspective of emotion has its roots in older basic theories of emotion, the two are not entirely synonymous. The high-dimensional investigation of emotion shares a "higher *n"* answer to the *dimensionality* of emotion: there are many distinguishable emotional experiences and expressions. It also shares a "categorical" answer to the *conceptualization* of emotion: emotion categories better map onto experience and expression than valence, arousal, and appraisal dimensions. However, the high-dimensional perspective differs on the *distribution* of emotions: rather than categorically separate states, some emotions smoothly blend together while others are entirely separate (Cowen, Sauter, et al., 2019).

Secondly, older basic emotion theories tended to take a top-down approach that is limited by scientists' *a priori* assumptions about what emotions are (e.g., Cowen & Keltner, 2021; Russell, 1994). Recent open-ended, data driven studies, from the bottom up, speak as well to the richness of emotion beyond the Ekman 6 and valence and arousal (for review, see Cowen & Keltner, 2021). So while the high-dimensional perspective shares some conclusions about emotion, those answers were data-driven solutions rather than a priori assumptions.

This approach departs considerably from the contested methods of the past. Participants have rated their experiences in response to vast arrays of evocative stimuli, and on dozens of emotion words and appraisal terms. Rather than studying judgments of actors' portrayals of prototypical expressions, participants have offered interpretations of more naturalistic, spontaneous facial, vocal, and full-bodied expressions captured outside of the laboratory (D. Cordaro et al., 2020; Cowen, Laukka, et al., 2019; Monroy et al., 2022). These results converge across separate studies of: emotions elicited by music (Cowen et al., 2020), emotions perceived in facial expression, vocalization (Cowen, Elfenbein, et al., 2019), and prosody (Cowen, Laukka, et al., 2019), and studies of emotions in different cultures, including India, the US, and China. Across studies, 18 states can be reliably distinguished in facial-bodily and vocal expressions and can be evoked by distinct music samples or videos: amusement, anger, anxiety, awe, confusion, contentment, desire, disgust, elation, embarrassment, fear, interest, love, pain, relief, sadness, surprise, and triumph. These findings converge with recent summaries of emotion-related physiology and experience (Shiota et al., 2017; Weidman & Tracy, 2020) and extended with similar results to emotion-specific brain activation (Horikawa et al., 2020). In many of these investigations, the Ekman 6 and valence and arousal account for only 30% of emotion. Studies and debates that restrict themselves to the measurement of these six states are limited in the inferences they allow (for a fuller argument, see Cowen & Keltner, 2021).

These advances in emotion science and the messy nature of emotion measurement (Weidman et al., 2017) indicate a need for a unified approach to emotion measurement that faithfully reflects people's actual experience and, consequently, more powerfully relates to important outcomes like well-being and behavior. For example, theorizing and study of the self-transcendent positive emotions (Stellar et al., 2017) suggest a clear role for gratitude, awe, and compassion in social well-being; the PANAS does not measure these emotional states, now

widely studied in affective science. Similarly, recent work connecting awe to reductions in both daily subjective stress and physiological stress reactivity (Bai et al., 2021) and ongoing work on how culture shapes emotion experience, emotional social support seeking, emotion expression, and emotion norms (De Leersnyder et al., 2014; Keltner et al., 2022; Tamir et al., 2016; Tsai, 2007, 2017; Vishkin et al., 2023; Wu et al., 2021) require a measure of emotion from the high-dimensional perspective to fully explore.

Existing High-dimensional Measures of Self-reports of Emotional Experience

High-dimensional approaches to emotional experience have existed in different forms for decades, and consequently so too have higher-dimensional measures of emotion. These measures simply have not been as widely adopted as the PANAS. [4] For example, building on Carroll Izard's measure of ten "fundamental emotions," Fredrickson's (1998) modified differential emotion scale (mDES) added eight positive emotions. For the full scale, see Table 2.

Table 2
Items of the modified Differential Emotion Scale (mDES)

Item	Positive Emotions	Negative Emotions	Other Emotions
1	Grateful, appreciative, thankful	Angry, irritated, annoyed	Sympathy, Concern, Compassion
2	Interested, alert, curious	Sad, downhearted, unhappy	Surprise, amazed, astonished
3	Love, closeness, trust	Scared, fearful, afraid	
4	Amused, fun-loving, silly	Disgust, distaste, revulsion	
5	Glad, happy, joyful	Contemptuous, scornful, disdainful	
6	Hopeful, optimistic, encouraged	Embarrassed, self-conscious, blushing	
7	Sexual, desiring, flirtatious	Repentant, guilty, blameworthy	
8	Proud, confident / self-assured	Ashamed, humiliated, disgraced	
9	Content, serene, peaceful		
10	Awe, wonder, amazement		

More recently, Chung et al (2022) constructed a measure of within-person specific emotions using ecological momentary assessment that they called the Facets of Emotional

[4] As will be shown in the results, the items of the PANAS can be used as a high-dimensional measure and reliably outperforms aggregated PA and NA. However, it still includes adjectives few recognize as emotions.

Experiences in Everyday Life Scale (FEEELS). See Table 3 for the items in the FEEELS. Chung et al. did not explicitly organize their items or scales by valence.

Table 3

Structure of the Facets of Emotional Experiences in Everyday Life Scale (FEEELS)

Family	Scale	Items
Anger	**Irritation**	cranky, crabby, grouchy, grumpy
	Frustration	displeased, irked, annoyed, peeved
	Contempt	scornful, disdainful, contemptuous, revolted
	Fury	furious, incensed, enraged, vengeful
Fear	**Fear**	fearful, afraid, frightened, panicky
	Anxiety	stressed, overwhelmed, worried, agitated
	Trepidation	hesitant, doubtful, wary, unsure
Joy	**Joy**	elated, thrilled, *excited*
	Authentic Pride	accomplished, competent, determined, purposeful
	Contentment	relaxed, calm, peaceful, serene
	Hubristic Pride	cocky, arrogant, *egotistical*
	Amusement	amused, jovial, gleeful, light-hearted
	Curiosity	curious, inquisitive
Love	**Gratitude**	thankful, grateful, appreciative
	Sexual love	seductive, erotic, sensual, romantic
	Love	loving, compassionate, caring, adoring
	Heartbreak	desolate, brokenhearted, despondent, *miserable*
	Elevation	uplifted, elevated, *inspired*, *acknowledging*
	Nostalgia	reminiscing, nostalgic, longing
Sadness	**Distraughtness**	suffering, horrible, awful, painful
	Disappointment	unhappy, discouraged, gloomy, disappointed
	Guilt	ashamed, sorry, remorseful, guilty
	Embarrassment	embarrassed, awkward, inadequate
Surprise	Confusion	perplexed, puzzled, confused
	Horror	appalled, horrified, shocked, *dismayed*
	Awe	amazed, astonished, awed, *wonder*

Note: Bolded families and factors passed study 3's CFA criteria in Chung et al. (2022). Italicized items were part of exploratory item additions in study 3.

Development of the SEEQ

Notably, there is a lot of overlap between these higher dimensional measures of emotion experiences and our scale, the Specific Emotion Experience Questionnaire (SEEQ) (see Table 4). I developed the SEEQ with my collaborators primarily guided by the theoretical account discussed in semantic space theory, and particularly by the empirical data underlying cross-culturally interpretable dimensions of emotion experience (D. Cordaro et al., 2020; Cowen & Keltner, 2021; Keltner et al., 2023). In other words, I used past research to establish *a priori* specific emotion constructs I sought to measure. This contrasts with the PANAS, which primarily sought to measure a latent factors PA and NA (Watson et al., 1988). Following from this theoretical position, I also had practical aims for the scale: (1). to construct a statistically reliable

measure of emotion constructs with multi-item measures; (2). to aggregate PA and NA scores that performed similarly (if not better than) the PANAS PA and NA; (3). to create a short-form scale no longer than the PANAS made of single-item measures; and (4). to capture a high dimensional space of as many unique emotions as possible from a larger lexicon of possible states. These practical considerations emerged from our desire to not only reflect multiple distinct emotional experiences, but to provide similar (or better) incremental predictive validity above PANAS PA and NA with a comparably sized scale.

I validated and adjusted the scale empirically in two samples using a much larger list of emotion (and non-emotion) words, similar in method to the lexical approach widely used in the science of personality (for discussion of the lexical approach, see John & Srivastava, 1999). In addition to testing the reliability of the emotion composites, I also used confirmatory factor analysis to assess claims of different theoretical accounts about the structure of affect. One perspective particularly important in cultural research in emotion is the distinction between high-arousal and low-arousal PA and NA, four factors made of emotion concepts themselves made of multiple items (i.e., a hierarchical factor structure). Another is the traditional PA-NA view with two factors in a hierarchical structure. And the third, that emotions are distinct experiences not cleanly organized into PA and NA, corresponds to a model with freely correlating latent variables for each emotional experience (e.g., gratitude, love, and fear). While categorical conceptualizations of emotion are primary in experience, these latent variables freely correlate because emotions also show reliable patterns of experience, such as a smooth gradient between anxiety and fear (i.e., larger correlation) or the distinct separateness of sexual desire from fear (Cowen & Keltner, 2017, 2021). Empirically, freely correlated factors performed best, followed by the traditional two-factor model, and then the four-factor model. Additionally, I analyzed the uniqueness of each factor and how each factor explained the additional emotion terms in the large item set. This resulted in three major modifications: collapsing of triumph and pride; collapsing of embarrassment, shame, and guilt; and adding self-critical.

Table 4

Comparing Three High-Dimensional Scales of Emotion Experience

Row	mDES	FEELS	SEEQ
1	Amused, fun-loving, silly	**Amusement**: amused, jovial, gleeful, light-hearted	**Amused**, humorous, silly
2	Awe, wonder, amazement	**Awe**: amazed, astonished, awed, wonder	**Awe**, amazed, wonderment
3	Sympathy, Concern, Compassion	--- (but see love)	**Compassionate**, sympathetic, kind
4	Content, serene, peaceful	**Contentment**: relaxed, calm, peaceful, serene	**Contented**, serene, calm
5	Glad, happy, joyful	**Joy**: elated, thrilled, excited	**Elated**, blissful, ecstasy
6	Grateful, appreciative, thankful	**Gratitude**: thankful, grateful, appreciative	**Grateful**, thankful, appreciative
7	Interested, alert, curious	**Curiosity**: curious, inquisitive	**Interested**, curious, attentive
8	Love, closeness, trust	**Love**: loving, compassionate, caring, adoring	**Love**, affectionate, closeness
9	Proud, confident, self-assured	**Authentic Pride**: accomplished, competent, determined, purposeful	**Proud**, strong, determined
10	Sexual, desiring, flirtatious	**Sexual love**: seductive, erotic, sensual, romantic	**Sexual Desire**, lustful, horny

11	Hopeful, optimistic, encouraged	---	---
12	Scared, fearful, afraid	**Fear**: fearful, afraid, frightened, panicky	**Afraid**, terrified, scared
13	Angry, irritated, annoyed	**Frustration**: displeased, irked, annoyed, peeved	**Angry**, annoyed, irritated
14	---	**Irritation**: cranky, crabby, grouchy, grumpy	---
15	---	**Fury**: furious, incensed, enraged, vengeful	---
16	---	**Anxiety**: stressed, overwhelmed, worried, agitated	**Anxious**, worried, nervous
17	---	**Trepidation**: hesitant, doubtful, wary, unsure	---
18	Ashamed, humiliated, disgraced	**Guilt**: ashamed, sorry, remorseful, guilty	**Ashamed**, embarrassed, guilty
19		**Confusion**: perplexed, puzzled, confused	**Confused**, dumbfounded, perplexed
20	Disgust, distaste, revulsion	---	**Disgusted**, repulsed, revulsion (revolted?)
21	---	---	**Jealous**, envious
22	---	**Distraughtness**: suffering, horrible, awful, painful	**Pain**, distress, hurt
23	---	---	**Self-critical**, self-condemning, Concerned for myself
24	Sad, downhearted, unhappy	**Disappointment**: unhappy, discouraged, gloomy, disappointed	**Sad**, down, blue
25	Repentant, guilty, blameworthy	---	---
26	Contemptuous, scornful, disdainful	**Contempt**: scornful, disdainful, contemptuous, revolted	---
27	Embarrassed, self-conscious, blushing	**Embarrassment**: embarrassed, awkward, inadequate	---
28	Surprise, amazed, astonished	---	---
29	---	**Hubristic Pride**: cocky, arrogant, egotistical	---
30	---	**Heartbreak**: desolate, brokenhearted, despondent, miserable	---
31	---	**Elevation**: uplifted, elevated, inspired, acknowledging	---
32	---	**Nostalgia**: reminiscing, nostalgic, longing	---
33	---	**Horror**: appalled, horrified, shocked, dismayed	---

Note: The items of each scale are sorted by my own view of what constructs are similar to each other. This isn't meant to be a definitive sorting, but rather to give an impression of where the scales overlap. Red and Green denote explicitly valenced states, positive and negative, respectively.

Present Research

Animating this investigation is one necessary empirical goal and two research questions associated with four specific aims. The necessary and first goal is to develop and validate the SEEQ, a measure of emotion designed based the high-dimensional perspective of emotion outlined in Semantic Space Theory (Cowen & Keltner, 2021; Keltner et al., 2023). To test my research questions about the explanatory power of specific emotions in the second and third aim, I must prove in Aim 1 that the measure succeeds at both differentiating the distinct emotions and measuring them reliably. Afterward, I tackle Aim 2: do we learn more about the subjective lives of people, in terms of well-being, culture, gender, and personality, if measurement moves to a more specific level of analysis, focusing on distinct emotions rather than valence and arousal (e.g., Cowen et al., 2017)? This is a critical question in debates about the structure of emotion, namely does attention to specific emotions, as posited by Basic Emotion Theory, explain more variance than the two bipolar dimensions presupposed in core affect, constructivist accounts of emotion. For example, consider the case of psychological well-being: as laid out by Carol Ryff (1989, 2013), it is a complex, multidimensional construct whose elements include purpose in life, autonomy, relationships with others, personal growth, and environmental mastery. Do PA and NA adequately explain all facets of this well-being construct or do specific emotion experiences differentially relate to specific facets of well-being, and even prove to predict them with more power.

In the second study, I test Aim 3: do specific emotional experiences predict domain specific outcomes in daily life, a thesis in keeping with social functional accounts of emotion? As discussed earlier, PA and NA form the basis of a large amount of affective research, but these primarily represent high-arousal affect on the one hand and Extraversion (PA) and Negative Emotionality (NA) on the other. How do PA and NA differentiate more subtle experiences? Compare the love one feels watching their child graduate college compared to the pride of winning a competition. I hypothesize that PA and NA's low resolution on emotional experience cannot distinguish these experiences. So too, specific emotions differentially relate to different forms of daily well-being, such as life satisfaction and social connection.

Finally, I return to my overarching goal of measurement via Aim 4 and a new, non-college student sample: are there other specific emotions that the SEEQ could incorporate or that could be measured alongside it? While the original approach for the SEEQ emphasized cross-culturally expressed and recognized emotions, it is not a final list of measurable emotion experiences. For one, large-scale data analyses have shown that the number of consistently recognized emotions partly depends on the domain, such as music, the voice, or short video clips (D. Cordaro et al., 2016; Cowen et al., 2020; Cowen & Keltner, 2017). Additionally, the work underlying the high dimensional perspective of Semantic Space Theory is conceptualized as setting lower bounds for how many distinct emotions there are (e.g., Cowen, Sauter, et al., 2019).

To test these aims, detailed below, I relied on two cross-sectional samples of undergraduates, one daily diary sample of American adults, and one cross-sectional sample of American adults. The undergraduate samples addressed Aim 1 and Aim 2 and measured dispositional (over the past six months) emotion and multiple well-being indicators. The longitudinal sample addressed Aim 3 in a 15-day longitudinal study of daily emotional experiences and well-being. Finally, study 3 replicates Aim 1 and extends it by addressing Aim 4, what other emotion states can be reliably measured alongside the SEEQ?

Aim 1 – Does the SEEQ provide a reliable measure of the high-dimensional space of emotion experience? I assessed Aim 1 using two cross-sectional samples of undergraduate

students at universities at UC Berkeley (sample 1a and 1b). In sample 1a and 1b, I measured a large list of emotions and emotion-related words. The most straightforward test of the SEEQ is a confirmatory factor analysis (CFA) of both the full scale and its short form, the SEEQ-20. However, this does not address how well it represents the space of emotions. To investigate this question, I used a mixture of exploratory factor analysis and hierarchical agglomerative clustering to investigate unique emotion clusters not measured by the SEEQ and items of the SEEQ that tended to group together (i.e., be too correlated to measure separate experiences). These analyses resulted in confirmation of many factors in the SEEQ and a number of improvements, including measuring a distinctive emotion not yet on the SEEQ and identifying better items for subscales.

Aim 2 – Does a high-dimensional perspective of emotion explain more about well-being, personality, gender, and culture than PA and NA? I assessed Aim 2 in study 1 and study 3. In study 1, I used two cross-sectional samples of undergraduate students at UC Berkeley (sample 1a and 1b). In study 3, I used a cross-sectional sample of Americans using the online platform Cloud Research Connect. I measured many different forms of well-being with standard scales including constructs such as depression and subjective well-being, as well as the five-factor model of personality, and racial-ethnic identity and gender identity in study 1. In study 3, I aimed to replicate four findings from study 1 in a pre-registered study. This general aim is inherently multivariate, with many dependent variables and many independent variables in non-nested models. Consequently, I employed multiple analytic approaches to probe the robustness of the results. For example, one method is to use multivariate multiple regression and compare multivariate effect size estimates. A more granular approach is to compare robust R^2 estimators in separate multiple regression models. The general concept is to test the variance explained by PA and NA, all 20 PANAS items, and all 20 SEEQ items across the response variables.

Aim 3 – Do specific positive emotion experiences predict domain specific outcomes in daily life? I addressed Aim 2 in study 2 using daily diary data over 15 days and used multilevel multiple regression to analyze the unique contributions of 4 specific positive emotions: elation, contentment, gratitude, and sexual desire. While the constraints of the daily assessment meant I could not sample both PANAS and SEEQ emotions, I focus on these four positive emotions because they are representative of high-arousal positive (elation), low-arousal positive (contentment), prosocial positive (gratitude), and one overlooked emotion (desire). The results were analyzed at both the within-person and between-person level. This study was animated by a SFT approach to emotion, which posits that specific emotions serve specific social functions, and should therefore relate differentially to specific well-being outcomes. In the introduction to Study 2, I provide more detail to the hypotheses concerning elation, contentment, gratitude, and sexual desire.

Aim 4 – Are there other emotions that could be incorporated into the SEEQ or measured alongside it? I addressed Aim 4 in study 3 with a cross-sectional sample of Americans using the online platform Cloud Research Connect. I measured the SEEQ items, PANAS items, promising FEEELS subscales (Trepidation, Horror, Contempt, Elevation, and Hubristic Pride), mDES Hope, Boredom, Embarrassment, and Relief. Just as in Aim 1, the first test of the SEEQ is a confirmatory factor analysis (CFA) of the full scale and its short form, the SEEQ-20. However, this does not address how well it represents the space of emotions. To investigate how the other subscales relate to the SEEQ, I relied on two approaches. First, I used LASSO regression to identify the unique explanatory power of the new subscales for the well-being outcomes. LASSO enforces sparsity, selecting only those regressors that contribute enough toward explaining the

dependent variable; it also is better able to deal with collinearity (McNeish, 2015). Second, I used a mixture of the empirical correlations between the composite emotion scores, exploratory factor analysis, and hierarchical agglomerative clustering to investigate if the new items could be reliably distinguished from SEEQ subscales. In the conclusion of study 3, I synthesize the exploratory results into potential improvements of the SEEQ and distinct emotions that could be measured alongside it.

Part I. Measuring Emotion Experience in Self-Report: Preliminary Construction of the Specific Emotion Experience Questionnaire

In this section, I present the scale construction of the Specific Emotion Experience Questionnaire (SEEQ). As discussed previously, the impetus for developing the SEEQ grew out of the conceptualization of emotions as existing in a high-dimensional space of distinct experiences, as laid out by foundational work in Semantic Space Theory (Cowen, Sauter, et al., 2019; Cowen & Keltner, 2021; Keltner et al., 2023). Notably, this conceptualization of emotion led toward a number of departures from the normative scale construction practices used for scales such as the PANAS. Most critically, I was guided by *a priori*, empirically based considerations: measuring emotions that have been identified as distinct in terms of their experience, expression, and emotion recognition across cultures (D. Cordaro et al., 2020; Cowen, Elfenbein, et al., 2019; Cowen, Laukka, et al., 2019; Monroy et al., 2022). In contrast, the PANAS was entirely determined by factor analytic considerations that consistently yielded two empirical latent constructs, PA and NA (Watson et al., 1988). By leveraging this growing body of empirical work identifying cross-culturally understood emotions, the SEEQ also differs from other emotion scales grounded more deeply either in exploratory approaches or a more limited number of emotion experiences.

To reiterate, the goal of the SEEQ is to represent as much of the rich space of emotion experience as possible, given empirical findings in the literature. The aim of the SEEQ is not dimensionality reduction; that is, it was not designed to first measure the latent variables PA and NA. Instead, I first tested cross-cultural emotion experiences identified in previous research with small sub-scales of 3-items per emotion (D. Cordaro et al., 2020; Cowen, Sauter, et al., 2019; Keltner et al., 2023; Monroy et al., 2022). Nevertheless, I was also guided by pragmatism: the scale should be useful to the many researchers who may want to use it. In addition to the typical quantitative criteria such as adequate model fit in CFA, I also considered the ease of the scale's use in terms of number of items. Although our conceptual focus was on specific emotions, I interpret the longstanding interest in PA and NA to mean the scale would be less useful if it did not also reliably estimate PA and NA in a short form. Here, the extensive use of the PANAS in past research serves as useful benchmark for scale performance and length.

With these considerations in mind, I pursued Aim 1: empirically assess the reliability of triads of emotion items to measure twenty emotion concepts identified in Semantic Space Theory. While past work indicated that these emotions were meaningfully expressed and perceived, that was primarily via single-item indicators (e.g., see Methods of Cowen & Keltner, 2017). While single-item measures are perfectly useful in many applications, many researchers are averse to single-item measures (for brief discussion for and against single item measures, see Allen et al., 2022). For this reason and because two-item latent variables contribute to improper solutions in estimation programs, I aimed to construct a measure with three items per factor (Ding et al., 1995; Marsh et al., 1998). In this process I had two sub-goals: (1) adequate model fit in CFA and (2) empirical assessment of item suitability (i.e., adequate primary loadings and low

cross-loadings), the independent measurement of emotion latent variables, and an exploratory assessment of any additional emotions.

Method

Power and sample size

No a priori decisions regarding power were made. Instead, I set a specific goal of collecting as many participants as possible within the semesters I collected data.

Participants

597 undergraduate students from the a west-coast university (75.7% women, 21.6% men, 2.2% identifying as another gender) participated for course credit via their psychology research pool.[5] Their ethnic/racial demographics were typical for this university's undergraduate psychology research pool: 57.1% Asian, 18.4% White European, 12.9% Latinx, 2.3% Black or African American, and 6.5% other. I excluded 43 participants who did not pass two attention checks embedded in the survey. This leaves a total sample of 554. Because of sample size considerations, analyses related specifically to gender were restricted to only those identifying as a woman (N = 423) or a man (N = 117), and analyses related specifically to ethnicity were restricted to those identifying as Asian (N = 313), White non-Hispanic (N = 106), or Latinx (N = 72). The mean childhood family income was left-skewed with primarily higher incomes (M = 5.97, SD = 2.08, corresponding to $75,001 to $100,000; median = 7 corresponding to $100,001 to $150,000).

Measures

Self-report Emotion Experience

Specific emotions were measured using a battery of 99 emotions and affect-related words. The specific instructions were to "Please rate the extent to which you have felt each of these emotions **in general in the past 6 months**" from (0-*Not at all* to 6-*Extremely*). Included in these items were the items of the PANAS and the first version of the SEEQ. The SEEQ measured 11 positive emotions—interest, awe, love, desire, compassion, amusement, contentment, pride, triumph, joy, and gratitude—and nine negative emotion constructs—anger, fear, sadness, disgust, shame, embarrassment, confusion, pain, and anxiety (see Table 5). For the complete list of emotion items assessed, see Appendix, Table 1.

Table 5

Emotion Constructs of the SEEQ.

Positive	Items	Negative	Items
Interest	Interested, curious,	Anger	Angry, frustrated, irritable
Awe	Awe, amazement, wonder	Fear	Afraid, terrified, threatened
Love	Love, affectionate,	Sadness	Sadness, down, blue
Desire	Desire, lustful	Disgust	Disgusted, repulsed
Compassion	Compassionate,	Shame	Ashamed, self-critical, self-

[5] This is the same sample that we later refer to as sample 1b in Part II. Because it is the larger sample and tests more of the critical hypotheses, in Part II, I present it second.

Amusement	Amused, humorous, silly	Embarrassment	Embarrassed, blushed, shy
Contentment	Contented, serenity, calm	Confusion	Confused, dumbfounded,
Pride	Proud, confident, strong	Pain	Pain, hurt, distressed
Triumph	Triumphant, victorious,	Anxiety	Anxious, worried, tense
Joy	elated, joyful, exuberant		
Gratitude	Grateful, thankful,		

Analysis Strategy

First, I tested the coherence of the SEEQ using confirmatory factor analysis (CFA). I did this for the whole scale in freely correlated factors, as well as hierarchically arranged into PA and NA as higher order factors. For the long-form, I expected fairly poor fit for the hierarchical factor structure, given that our main argument is that too much information is lost by aggregating to PA and NA. Additionally, our primary aim was to meaningfully represent different emotional experiences, and so I examined fit indicators with the idea that the scale should at least be close to typical cut-offs (e.g., an RMSEA of .15 is clearly bad) or perform similarly to the PANAS for the short scale.

Second, I used an exploratory approach to assess which items in the whole dataset could represent unique experiences. I did this by looking at the residual correlation matrix of all the items after PA and NA were partialed out. As discussed previously, PA and NA are the two factors that emerge from mood and emotion terms in a 2-factor EFA using a varimax rotation. By visualizing the residual correlation matrix using hierarchical agglomerative clustering (with the corrplot package in R), I checked which emotion items clustered together in ways not driven by a general positive and negative factor, as well as the residual variance of the item that remained. I supplemented this analysis of the items with EFAs of the most correlated factors.

Results

CFA of the Alpha SEEQ

First, I assessed the overall fit of the alpha SEEQ in a CFA using the lavaan package in R. Model 1 included latent variables (LVs) for each emotion construct of the alpha SEEQ indicated by each of its items, using the full-information maximum likelihood estimator (FIML) and freely correlated LVs. Model 2 had the same LVs and indicators, but a hierarchical structure with positive and negative emotions loading onto one of two second-order hierarchical LVs, PA and NA. Model 1 showed acceptable if imperfect fit (SRMR = .068, RMSEA = .046, TLI = .892, CFI = .908), and Model 2 was clearly worse (SRMR = .100, RMSEA = .055, TLI = .842, CFI = .850). This is what I expected given our primary argument that individual emotion is more complex than the reduction to PA and NA. The short version of the SEEQ, that I will refer to as the SEEQ-20, had a slightly better fit (SRMR = .063, RMSEA = .073, TLI = .882, CFI = .896) than the PANAS (SRMR = .070, RMSEA = .083, TLI = .862, CFI = .877).

Additionally, I tested an alternative factor structure that splits high-arousal and low-arousal forms of PA and NA via a partial EFA. I fixed loadings for prototypical high/low PA and NA to 1 for each of the four target dimensions: Elation for high PA, Contented for low PA,

Anger for high NA, and Sadness for low NA. The other items loaded freely onto each higher-order factor. The model fit was similar to model 1 (SRMR = .076, RMSEA = .046, TLI = .902, CFI = .910), but the loadings did not neatly separate emotions into the proposed classifications. For example, high PA included significant loadings from only Awe, Pride, and Jealousy, and all were positive loadings. Low NA had significant positive loadings from Interest, Love, Desire, Compassion, Anxiety, and Self-Critical. These results are not consistent with a theoretical account of low and high-arousal forms of PA and NA.

Despite acceptable fit for SEEQ model 1, the factor loadings and correlations indicated some issues: a) the loading for blushed onto Embarrassed was fairly low (loading = .40); b) Joy was highly correlated with other positive LVs (*r*s = [.90, .89, .87, .83, .82, .82, .76, .60, .57, .55]); c) Pride and Triumph were highly correlated ($r = .89$); d) Embarrassed and Shame were highly correlated ($r = .87$). See Table 6 for the model implied correlations between the latent variables. I expected some large correlations ($r \geq .50$) driven by shared valence (e.g., good feelings feel good, so they naturally correlate) but considered very large correlations ($r \geq .80$) problematic. I emphasized very large correlations because while CFA correlations between latent variables minimize the impact of measurement error, they also can result in upwardly biased estimates by assuming zero cross-loadings (Marsh et al., 2009, 2020; Shao et al., 2022).

Table 6

Correlation between the latent factors of emotion in CFA

	V1	V2	V3	V4	V5	V6	V7	V8	V9	V10	V11	V12	V13	V14	V15	V16	V17	V18	V19
V1 interest	1																		
V2 awe	**.83**	1																	
V3 love	.68	.60	1																
V4 desire	.53	.56	.61	1															
V5 compas	.61	.61	.74	.45	1														
V6 Amuse	.74	.75	.73	.55	.60	1													
V7 content	.76	.77	.61	.48	.40	.72	1												
V8 pride	**.84**	.77	.66	.55	.49	.75	**.84**	1											
V9 triumph	.68	.76	.51	.49	.29	.62	.78	**.89**	1										
V10 joy	**.82**	**.90**	.73	.57	.55	**.84**	**.87**	**.89**	**.82**	1									
V11 grat	.65	.63	.66	.42	.77	.59	.63	.63	.42	.66	1								
V12 anger	-.06	.02	.05	.06	.24	.07	-.24	-.15	-.10	-.10	.00	1							
V13 fear	.02	.21	.03	.11	.26	.01	-.11	-.05	.09	.04	.07	.72	1						
V14 sad	-.14	-.09	-.04	.04	.18	-.11	-.28	-.29	-.19	-.23	-.06	.78	.62	1					
V15 disgus	.10	.25	.06	.15	.20	.12	.02	.07	.25	.08	-.01	.69	.72	.52	1				
V16 shame	-.05	.02	.09	.18	.25	.04	-.22	-.22	-.09	-.12	-.01	.78	.68	**.85**	.67	1			
V17 embar	.18	.27	.14	.25	.31	.20	.08	.01	.20	.17	.06	.61	.65	.60	.77	**.87**	1		
V18 confus	.22	.35	.20	.29	.41	.37	.11	.11	.22	.23	.22	.74	.73	.57	.70	.74	.77	1	
V19 pain	.01	.12	.12	.16	.31	.03	-.17	-.07	.05	-.02	.03	**.87**	**.80**	**.85**	.71	**.87**	.71	.71	1
V20 anxiet	-.06	-.06	.03	.05	.33	-.04	-.30	-.26	-.21	-.21	.06	**.84**	.69	.78	.48	.79	.59	.70	.77

Note. Latent correlations above .80 are bolded. In particular, joy is highly related to many other positive emotions.

EFA and Potential Unique Emotion Constructs

The previous analyses established the reliability of the a priori factor structure, but it also indicated that some of the emotion factors were highly correlated. To investigate further, I used exploratory analyses of the individual items in the SEEQ as well as the whole set of emotions I measured. Specifically, I approached two goals with two converging but different methods: (1) to explore the total set of emotion items, I assessed the residual correlations between all 99 items after factoring out PA and NA in EFA, and (2) EFA between highly correlated emotions to assess how well the items differentiated the two emotions (i.e., low cross-loadings).

After submitting the residual correlation matrix to the hierarchical agglomerative clustering algorithm in the corrplot package, I output a 99 by 99 correlation matrix with items in the order suggesting by hierarchical clustering. The matrix is impractically large to print, but for a visual impression of the matrix, see Appendix, Figure 1. This matrix allowed me to assess which items are most unique from general positivity and negativity (i.e., residual *SD*), and to see which items clustered together empirically. First, I examined the item-level information in terms of the residual *SD*. The residual *SD* suggested that many items had residual variance not explained by PA or NA (standardized residual *SD* far from 0 in metric from 0 to 1), including sympathetic (*SD* = .71), love (*SD* = .68), disgusted (*SD* = .62), and anxious (*SD* = .57). In contrast, some items had much less residual variability, such as joyful (*SD* = .30), enthusiastic (*SD* = .34), upset (*SD* = .38), and sadness (*SD* = .41). Lower residual variance is not necessarily bad; it just indicates that the item loads strongly onto an overall PA and NA. However, if the aim of an emotion measure is to sample the high dimensional space of emotion (represented here by 99 items), such a measure should sample more of the unique emotions. These residual variances will be useful for future development of the SEEQ and items will return in Part IV: study 3 (see Table 7 for the residual *SD* of each item).

Table 7

Residual standard deviation of each item after two-factor EFA

item	SD	item	SD	item	SD	item	SD
Nostalgic	.85	*Threatened*	.64	**Anxious**	.57	**Blue**	.50
Bored*	.85	**Closeness to another**	.64	**Nervous**	.57	**Contented**	.49
Lustful	.82	**Curiosity**	.64	Relieved*	.57	Unpleasant	.48
Shy	.79	**Repulsed**	.64	**Self-condemning**	.56	**Interested**	.47
Superior	.77	**Affectionate**	.64	*Irritable*	.56	**Hurt**	.45
Concerned for another	.77	**Calm**	.63	**Terrified**	.56	Energetic	.45
Contempt*	.77	**Annoyed**	.62	*Triumphant*	.55	**Confident**	.44
Alert	.75	**Disgusted**	.62	**Scared**	.55	**Amazement**	.44
Silly	.71	**Humorous**	.62	*Frustrated*	.54	**Elated**	.44
Sympathetic	.71	Relaxed	.62	**Ashamed**	.54	Bad	.44
Concerned for self	.71	**Embarrassed**	.61	Admiration*	.53	**Proud**	.43
Blushed	.70	**Ecstasy**	.61	**Distressed**	.53	Excited	.42
Perplexed	.69	**Appreciative**	.61	**Afraid**	.53	**Sadness**	.41
Active	.68	**Determined**	.61	**Guilty**	.53	Unhappy	.41
Jealous	.68	**Grateful**	.61	**Shameful**	.53	Negative	.41
Love	.68	*Tense*	.61	Peaceful	.52	**Down**	.41
Desire	.68	**Confused**	.60	**Strong**	.52	Good	.39
Compassionate	.68	**Wonder**	.60	*Exuberant*	.52	Upset	.38
Dumbfounded	.67	Lonely	.59	**Awe**	.52	Pleasant	.36
Jittery	.67	**Self-critical**	.59	Inspired*	.52	Cheerful	.35
Envious	.66	**Serenity**	.59	**Amused**	.51	Positive	.34
Hostile	.66	**Thankful**	.59	**Blissful**	.51	Enthusiastic	.34
Devotion	.66	*Victorious*	.59	**Worried**	.51	Happy	.33
Surprise	.65	**Angry**	.58	**Pain**	.50	*Joyful*	.30
Attentive	.65	Bitter	.58	**Disappointed**	.50		

Note. Bolded items are measured in the latest version of the SEEQ. Italicized items were measured in the first version but removed. Items with * return for further analysis in Part IV: study 3.

Second, the residual correlation matrix also provided a data-driven method to examine which items formed empirical clusters. For example, we see that the SEEQ's gratitude measure, appreciative, thankful, and grateful, empirically cluster together with the highest residual correlations with each other (residual *r*s include .38, .28, .32). Meanwhile, guilty, embarrassed, and ashamed clustered together, rather than clustering separately into a priori Shame and Embarrassment clusters (see relevant parts of the correlation matrix in Table 8 and 9).

In summary, these residual correlations confirmed our a priori items for Awe, Compassion, Gratitude, Amusement, Contentment, Desire, Sadness, and Disgust. The residual correlations suggested better items for Anxious (nervous instead of tense), Fear (scared instead of

terrified), Joy (renamed elation, with items elated, blissful, and ecstasy), Love (closeness to another instead of devotion), and Anger (annoyed instead of frustrated). In particular, the word joyful was too closely associated with general positivity. As demonstrated shortly, joy did not differentiate itself very well from other positive emotions. Finally, the residual correlations indicated unique clusters for Self-critical feelings (self-critical and self-condemning) and Jealousy (jealous and envious), and that shame, guilt, and embarrassment cluster together, as do Pride and Triumph. In terms of the SEEQ, this means that most of the mini-scales for each emotion already worked quite well, but that I must decide whether to throw out items for scales that overlap too much (e.g., Triumph and Pride) or put together items into a slightly different emotion construct (e.g., Embarrassment and Shame). I turn to this question in the next set of analyses.

Table 8

Partial Residual Correlation Matrix (Upper-left, rows 1 thru 9, columns 1 thru 9)

	Concerned (for another)	Sympa-thetic	Compass-ionate	Nostalgic	Appre-ciative	Grateful	Thankful	Active	Strong
Concerned (for another)	.77	.18	.18	.07	.16	.10	.10	-.04	.01
Sympathetic	.18	.71	.32	.07	.24	.20	.17	-.04	-.02
Compassionate	.18	.32	.68	.12	.19	.21	.16	-.04	-.01
Nostalgic	.07	.07	.12	.85	.14	.13	.13	-.04	-.02
Appreciative	.16	.24	.19	.14	.61	.28	.32	-.01	-.01
Grateful	.10	.20	.21	.13	.28	.61	.38	.02	-.01
Thankful	.10	.17	.16	.13	.32	.38	.59	-.02	-.02
Active	-.04	-.04	-.04	-.04	-.01	.02	-.02	.68	.12
Strong	.01	-.02	-.01	-.02	-.01	-.01	-.02	.12	.52

Note. The diagonal is the residual *SD* after partialing out PA and NA.

Table 9

Partial Residual Correlation Matrix (Lower-right, rows 92 thru 99, columns 92 thru 99)

	Desire	Lustful	Guilty	Embarrassed	Ashamed	Shameful	Shy	Blushed
Desire	.68	.34	.03	-.01	.01	.05	-.02	.05
Lustful	.34	.82	.07	.01	.05	.06	-.04	.08
Guilty	.03	.07	.53	.14	.18	.16	.05	.02
Embarrassed	-.01	.01	.14	.61	.20	.18	.14	.08
Ashamed	.01	.05	.18	.20	.54	.24	.06	.06
Shameful	.05	.06	.16	.18	.24	.53	.10	.09
Shy	-.02	-.04	.05	.14	.06	.10	.79	.09
Blushed	.05	.08	.02	.08	.06	.09	.09	.70

Note. The diagonal is the residual *SD* after partialing out PA and NA.

In addition to the residual correlation matrix, I explored how well the items for specific emotions differentiated between highly correlated emotions in EFA using a varimax rotation for competing item sets. My target was that the items adequately loaded onto their target factor (loading $\geq .50$ for these mini scales) and did not load too highly onto competing factors (loading $\leq .40$, considering the inherently correlated nature of emotions). To illustrate examples of these analyses, when submitting the items for Joy and Pride to a two-factor EFA, I found that the term joyful loaded onto both factors (see Table 10). In contrast, when removing the term joyful and adding blissful and ecstasy (implied by the residual correlation matrix), the two factors showed improved simple structure (see Table 11). Furthermore, when determining whether to combine

the items for Pride and Triumph together, I ultimately decided against it because triumph and victorious had higher cross-loadings with other positive emotions (see Table 12).

Table 10
Joy and Pride Two-Factor EFA Loadings

Item	FA1	FA2
Joyful	.55	.59
Elated	.37	.70
Exuberant	.33	.70
Proud	.65	.43
Confident	.73	.33
Strong	.68	.33

Table 11
Second Joy and Pride Two-Factor EFA Loadings

Item	FA1	FA2
Elated	.64	.43
Exuberant	.71	.35
Blissful	.69	.33
Ecstasy	.70	.26
Proud	.38	.67
Confident	.32	.73
Strong	.28	.72

Table 12
Third Joy and Pride Two-Factor EFA Loadings

Item	FA1	FA2
Elated	.43	.63
Exuberant	.36	.70
Blissful	.34	.68
Ecstasy	.25	.73
Proud	.72	.36
Confident	.68	.34

Strong	.70	.28
Determined	.60	.22
Superior	.42	.39
Triumphant	.61	.45
Victorious	.63	.40

Synthesis and Revised SEEQ Scale Items

Granted that our goal was firstly driven by theory, I considered more than just the results of factor analysis; nevertheless, I identified a number of improvements. For the full list of changes, see Table 13. Here, I highlight some of the major changes. First, I removed Triumph and its items. While Triumph was related to Pride, the Triumph items also cross-loaded onto Elated unfavorably. Second, I collapsed Embarrassment and Shame into one construct (Self-conscious negative emotions): shame, embarrassment, and guilt. The residual correlation matrix and cross-loadings in two-factor EFA justified this decision, but it also was supported by past conceptualizations of these emotions as part of a coherent family of negative emotions (e.g., Tracy & Robins, 2004a). Finally, I added two specific emotion experiences: Jealousy and Self-critical feelings. While Shame and Embarrassment were highly related, the other Shame items persisted as their own unique cluster joined by "concerned for self." Jealous and envious formed their own cluster, as well. Researchers have assessed Jealousy as a unique emotion in previous work (e.g., M. Chung & Harris, 2018), and while this study does not indicate a suitable third item, its identification awaits future research. The revised SEEQ showed acceptable fit (SRMR = .051, RMSEA = .039, TLI = .922, CFI = .934), and the short scale continued to perform slightly better than the PANAS (SRMR = .067, RMSEA = .073, TLI = .876, CFI = .889). In a second but smaller sample (N = 298, sample 1b from study 1), the full SEEQ showed acceptable fit (SRMR = .055, RMSEA = .048, TLI = .894, CFI = .910) with the hierarchical model showing worse fit (SRMR = .089, RMSEA = .058, TLI = .845, CFI = .853). The SEEQ-20 did perform worse (SRMR = .082, RMSEA = .082, TLI = .856, CFI = .873) when loading onto PA and NA than the PANAS (SRMR = .071, RMSEA = .079, TLI = .875, CFI = .889) in this sample.

Table 13

Revisions of the SEEQ

Emotion Construct	Original Items	Changes	Reasoning
Interest	Interested, curious, attentive	---	Factor loadings > .50; highest residual cor.
Awe	Awe, amazement, wonder	---	Factor loadings > .50; Highest residual cor.
Love	Love, affectionate, devotion	Love, affectionate, closeness (to another)	Closeness higher residual cor.
Desire	Desire, lustful	Add third item: horny	Factors should be indicated by at least three items if possible
Compassion	Compassionate, sympathetic, concerned	Compassionate, sympathetic, kind	Grateful, appreciative had stronger residual cor. than concerned for another.
Amusement	Amused, humorous, silly	---	Factor loadings > .50; Highest residual cor.
Contentment	Contented, serenity, calm	---	Factor loadings > .50; Highest residual cor. (synonym relaxed
Pride	Proud, confident, strong	Proud, strong, determined	Determined separated Proud from Elated; confident did not.
Triumph	Triumphant, victorious, superior	Removed	Residual correlation matrix showed high overlap with pride, but the items had
Joy	elated, joyful, exuberant	Elated, blissful, ecstasy	Joyful indicated a general positivity; new items suggested by residual cor.
Gratitude	Grateful, thankful, appreciative	---	Factor loadings > .50; highest residual cor. Tried and tested in literature.
Anger	Angry, frustrated, irritable	Angry, annoyed, irritated	Loadings > .50, but highest residual cor. was annoyed; irritable (trait) changed to
Fear	Afraid, terrified, threatened	Afraid, terrified, scared	Loadings > .50, but threatened highest residual cors. = superior, hostile; highest
Sad	Sadness, down, blue	---	Loadings > .50; highest resid. cors of sadness (changed to sad).
Disgust	Disgusted, repulsed	Add third item: revulsion	Factors should be indicated by at least three items if possible
Shame / Self-conscious	Ashamed, self-critical, self-condemning	Ashamed, embarrassed, guilty	While loadings > .50, highest residual cors. were the new items
Embarrassed	Embarrassed, blushed, shy	Collapsed with shame and guilt	Blushed loading = .40; not separable from shame in 2-factor EFA; residual
Confused	Confused, dumbfounded,	---	Loadings > .50; highest resid cors of confused = perplexed; perplexed =
Pain	Pain, distressed, hurt	---	Loadings > .50; consider replacing distressed in future.
Anxiety	Anxious, worried, tense	Anxious, worried, nervous	While loadings > .50, residual cors suggested nervous is better
Jealousy	---	Jealous, envious	Suggested by residual correlations; bitter could be third item, but relates most to
Self-critical	---	Self-critical, self-condemning, concerned	Suggested by residual correlations.

Part II: Specific Emotions and Individual Differences
STUDY 1 – What Specific Emotion Experiences Reveal About People's Well-being, Personality, Gender, and Culture

Here, I present samples 1a and 1b together as two cross-sectional, correlational surveys that investigate the explanatory power of specific emotions as measured by the short form of the SEEQ (the SEEQ-20) in predicting multiple well-being outcomes, such as loneliness and life satisfaction. These analyses compare the SEEQ to three different forms of conceptualizing PA and NA: the items "positive" and "negative," the PA and NA composites from the PANAS, and the 20 individual items of the PANAS, to maintain the same number of predictors between the SEEQ. These two samples use data from larger studies of well-being, personality, culture, and emotion.

At stake is a critical question of whether high dimensional accounts of specific emotions explain life outcomes and individual differences above and beyond valence and arousal (or PA and NA). Empirical research on well-being, personality, gender, and affect are extensive, but often aggregate reports of affect or emotion to PA and NA. On the one hand, this aggregate approach is consistent with core affect and other constructivist accounts of the basic ingredients of emotion. On the other hand, basic emotion theory and SFT suggests that this sacrifices reliable associations between specific emotions and specific outcomes. Particularly for well-being, the relationships to affect are many. For example, Lyubomirsky et al.'s (2005) review relate PA alone to physical health, positive social relationships, and mental well-being (e.g., lower depression, lower anxiety, higher self-esteem). Given the breadth of outcomes, do specific emotions tell us more than what is learned by measuring PA and NA?

Grounded in the claims of basic emotion theory and SFT, I hypothesized that the SEEQ-20 would explain a greater proportion of variance in most well-being indicators compared to the twenty items of the PANAS, and even more than PA and NA. In the personality domain, I hypothesized that the SEEQ would explain more about individual differences in Agreeableness than the twenty items of the PANAS, given the SEEQ's more precise measurement of prosocial emotions like love and gratitude. By contrast, I expected the PANAS to explain more about individual differences in Extraversion, given its more extensive coverage of high arousal, activated positive states.

The gender and culture analyses were more exploratory in this study. For gender, I expected the SEEQ may be slightly better at differentiating men from women based on their self-reported emotional experiences, but that the overall accuracy would still be quite low. On the one hand, the SEEQ explores more emotions that show more consistent gender differences (e.g., women report feeling more compassion than men), but on the other hand, the effects of gender differences are more pronounced in expression than experience and vary by context and culture (Brody et al., 2016). For specific emotions, Brody et al. (2016) also documented that women tended to report experiencing more love, sympathy, fear, sadness, anxiety, and shame. For culture, I did not expect many differences. While research in cultural psychology document important cultural differences in emotions between collectivist and individualist societies (Kitayama & Salvador, 2024), these differences are often situated as inter-country comparisons (see also Kitayama et al., 2022). My samples are entirely within the United States and primarily lifelong residents. Similarly, Tsai's (2007, 2017) work on ideal affect shows that culture modulates which emotions are prioritized, but that this has more consequences for behavior than experience. To the extent differences exist, they are more likely to relate to measures more central to individual identity, acculturation, and cultural orientation.

Method

Power and sample size

No a priori decisions regarding power were made. Instead, I set a specific goal of collecting as many participants as possible within each semester. Additionally, it is not entirely clear from past research and practices in the field how to assess power when comparing non-nested models.[6]

Participants

In the first sample, 315 undergraduate students from a west-coast university (68.9% women, 30.5% men, 0.6% identifying as another gender) participated for credit via the psychology research pool. Their ethnic/racial demographics were typical for these universities' undergraduate psychology research pools: 47.3% Asian, 20.3% White, 19.0% Latinx, 1.3% Black or African American, 11.1% other, 1.0% declined to state. I excluded 43 participants who did not pass two attention checks embedded in the surveys. This leaves a total sample of 272 participants. Because of sample size considerations, analyses related specifically to gender were restricted to only those identifying as a woman (N = 186) or man (N = 84), and analyses related specifically to ethnicity were restricted to those identifying as Asian (N = 129), White non-Hispanic (N = 60), or Latinx (total N = 47). SES indicators were not collected for this sample.

In the second sample, 597 undergraduate students from the same university (75.7% women, 21.6% men, 2.2% identifying as another gender) participated for course credit via their psychology research pool. Their ethnic/racial demographics were typical for this university's undergraduate psychology research pool: 57.1% Asian, 18.4% White European, 12.9% Latinx, 2.3% Black or African American, and 6.5% other. I excluded 43 participants who did not pass two attention checks embedded in the survey. This leaves a total sample of 554. Because of sample size considerations, analyses related specifically to gender were restricted to only those identifying as a woman (N = 423) or a man (N = 117), and analyses related specifically to ethnicity were restricted to those identifying as Asian (N = 313), White non-Hispanic (N = 106), or Latinx (N = 72). The mean childhood family income was left-skewed with primarily higher incomes (M = 5.97, SD = 2.08, corresponding to $75,001 to $100,000; median = 7 corresponding to $100,001 to $150,000).

Measures

Self-report Emotion Experience

In sample 1a and sample 1b, specific emotions were measured using a battery of 235 and 99 emotional, affective, and physical (e.g., short) words, respectively. Included in these items were the 20 items of the PANAS, 20 items of the SEEQ-20, and 59 items of the larger SEEQ. The following analyses are focused on the 20 items of the PANAS and the SEEQ-20, and the words "positive" and "negative". Four items of the SEEQ-20 overlap with the PANAS, and so there were 36 unique emotion items between them. The single items positive and negative were also used to set a baseline for explanatory power with single-item, face-valid indicators.

Well-being

[6] The best approach is likely to be a Monte Carlo simulation based on the predicted distribution of differences in AIC between the two models, but I am not confident about this approach. Alternatively, I might be able to simulate the 95% confidence intervals of multivariate (or univariate) effect size statistics that represent the explained variance in the outcomes. The goal would be to find the sample size required to reliably separate the 95%CIs of small R2 differences 80% of the time (i.e., with a power of 80 %).

In sample 1, well-being was assessed with a battery of standardized inventories that measured depression (CES-D), life satisfaction (riverside life satisfaction scale), self-esteem (SISE), and 1-item from the Ryff Scale for each of the following domains of Ryff's model: positive relationships, personal growth, purpose in life, self-esteem, and two items for environmental mastery (from Ryff scale).

In sample 1b, well-being was assessed in a more extensive battery of inventories measuring depression (α = .91, Beck et al., 1961), life satisfaction (α = .87, Margolis et al., 2019), self-esteem (Robins et al., 2001), perceived stress (α = .78, Cohen et al., 1983), loneliness (α = .89, Hays & DiMatteo, 1987), trait anxiety (α = .87, Spielberger et al., 1970), self-concept clarity (α = .87, Campbell et al., 1996), the interpersonal support evaluations list (αs > .87, Cohen et al., 1985), and psychological well-being (4 items each; αs are: autonomy = .54, environmental mastery = .62, personal growth = .58, purpose in life = .63, positive relationships = .71, self-acceptance = .75) (Ryff, 1989).

Personality

In both sample 1a and sample 1b, personality was assessed with the five-factor model with the full BFI-2 (Soto & John, 2017). The BFI-2 assesses the five domains with twelve items each. The five domains are further divided into three facets, each comprised of four of the twelve domain items. Analyses are presented at both the domain and facet levels.

Analysis Strategy

At the heart of our proposal is the general argument that specific emotion states often explain more than valence in predicting life outcomes of different kinds. This is inherently an argument about the relative efficacy of non-nested models across multiple outcomes. While there are statistical tests for non-nested models for the univariate (i.e., single outcome) case (e.g., Vuong's test), to my knowledge there is not a standard method for doing so in the multivariate (i.e., multiple outcomes) case in the present study. My primary concern about the multivariate outcomes is unfairly capitalizing on outcome overlap. And so, where possible, I supplement my analyses by using the dimensions of the well-being outcomes calculated from factor analysis using a varimax rotation.

To compare the explanatory power of specific emotions compared to valence across many outcomes, I first present the variance explained for each outcome using robust multiple regression implemented by the robustbase package (Maechler et al., 2023, version 0.99-0) in *R* across four models with differing independent variables: the words positive and negative, PANAS PA and NA, the 20 items of the PANAS, and the 20 items of the SEEQ. Robust R^2 estimates express how much we learn about the outcome. Finally, I compare the SEEQ-20 to the 20 items of the PANAS as a stand-in for the valence approach using Vuong's (1989) test in the nonnest2 package (Merkle et al., 2023, version 0.5-6), a way to statistically test the superiority (i.e., model fit) of non-nested models.

Finally, I also analyzed gender and culture differences based on emotion. For binary gender (men and women), this could be directly tested using Vuong's test of regressing gender onto the emotion items in logistic regressions. For ethnicity, there was not a direct way to compare the models, but I provided descriptive comparisons about how well emotions map to culture.

Results

Well-being and Emotional Experience

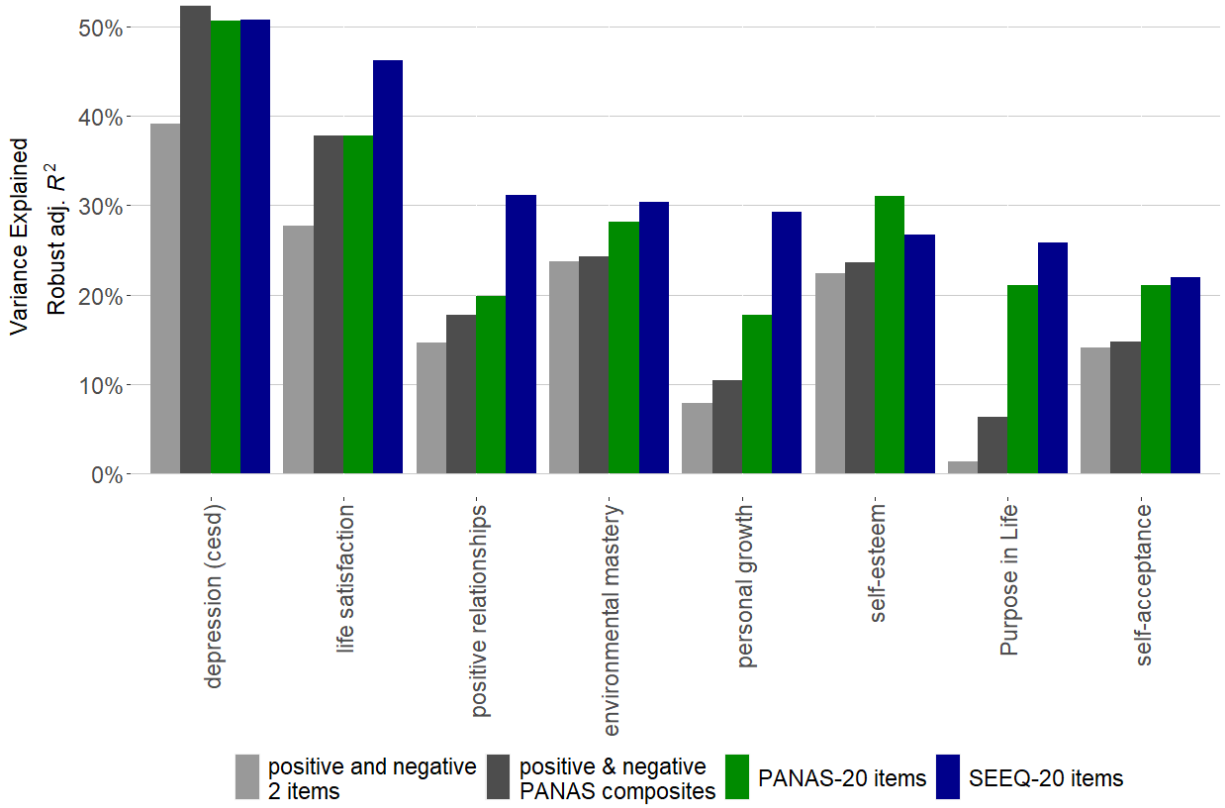
First, I assessed the overall explanatory power of the SEEQ-20 in self-reported well-being with a descriptive comparison of robust variance explained (adjusted R^2) among 4 sets of

predictors: the items "positive" and "negative," PANAS PA and NA, the 20 items of the PANAS, and the 20 items of the SEEQ-20. I hypothesized that the SEEQ-20 would explain a greater proportion of variance in most well-being indicators compared to the 20 items of the PANAS.

First, it is notable that the words positive and negative alone explain a substantial proportion of many well-being outcomes when compared to composite PA and NA (see Figure 5 and Figure 6). Second, both the PANAS 20 items and SEEQ-20 explain more than PA and NA alone for most well-being indicators. Furthermore. the SEEQ-20 (in blue) explains at least 1% more variance than the 20 items of the PANAS (in green) for over half (11 of 17) of well-being outcomes, while the PANAS performed better on only three in the larger sample1b (see Figure 6). In particular, the SEEQ-20 better explained social dimensions of well-being, like loneliness (SEEQ robust adj. R^2 = 41%, PANAS robust adj. R^2 = 31%) and Ryff positive relationships (SEEQ robust adj. R^2 = 29%, PANAS robust adj. R^2 = 19%).

Figure 5

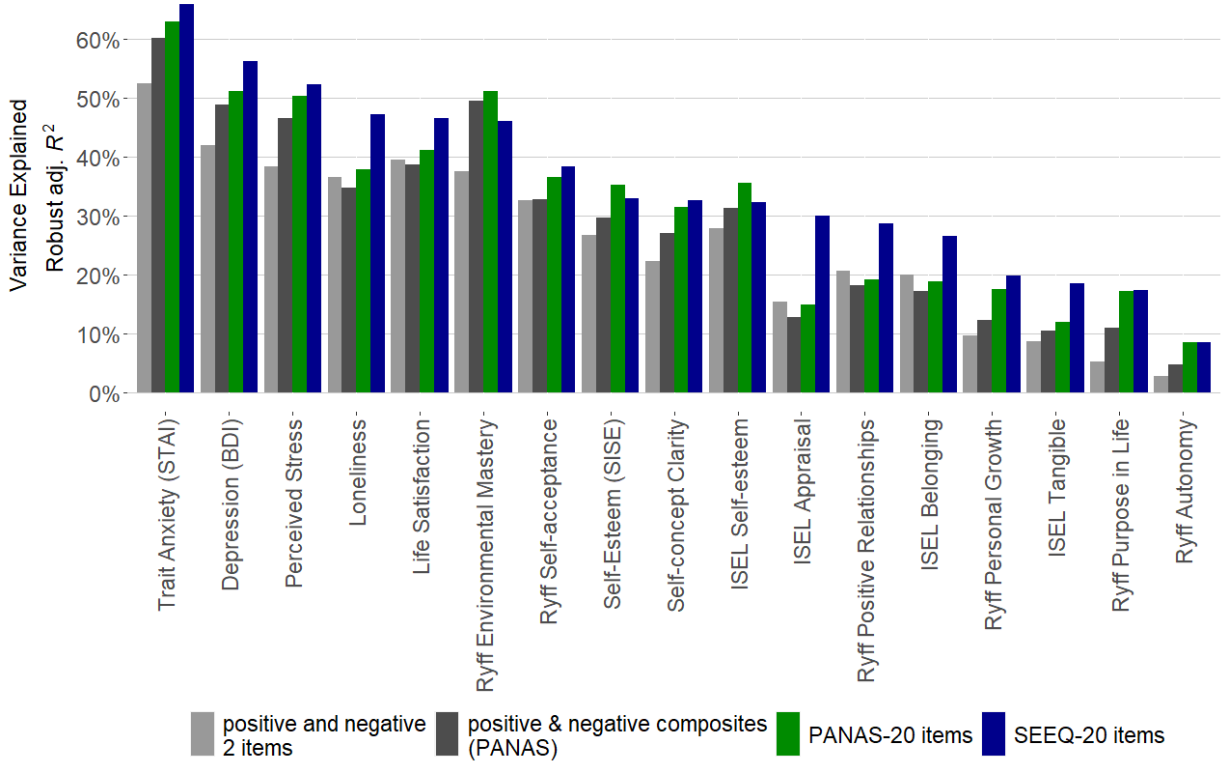
Sample 1a. Comparing the Variance of Well-being Explained by "Positive" and "Negative" Items, PANAS PA and NA, the 20 Items of the PANAS, and the 20 Items of the SEEQ-20.



Note. Robust regression analyses performed using the robustbase package to provide a robust estimate of adjusted R^2. Robust regression down-weights outliers and influential observations. In light grey, each well-being outcome is regressed onto two single-item indicators (positive and negative). This serves as a convenient baseline performance.

Figure 6

Sample 1b. Comparing the variance of well-being explained by items "positive" and "negative," PANAS PA and NA, the 20 items of the PANAS, and the 20 items of the SEEQ-20.



Note. Robust regression analyses performed using the robustbase package to provide a robust estimate of adjusted R^2. In light grey, each well-being indicator is regressed onto two single-item indicators (positive and negative). This serves as a convenient baseline performance.

Finally, I applied Vuong's test on the OLS regression models to assess whether the SEEQ-20 (m2) significantly outperformed the PANAS 20 items[7] (m1) on each well-being indicator. Vuong's test follows two steps. First, the models are tested for distinguishability: based on the sample data, is it likely that the models are distinguishable at the population level? The models must be distinguishable to validly compare their performance. The second step compares the likelihoods of the models and tests the superiority of model 1 to model 2, and model 2 to model 1. For these comparisons, see Table 14 and Table 15.

[7] I focus on comparing the SEEQ-20 to the PANAS *items* rather than the PA and NA composites because it keeps the number of predictor variables constant.

Table 14

Vuong's test comparing PANAS (m1) to SEEQ-20 (m2) applied to sample 1a outcomes.

Well-being Outcome	Omega Statistic	Distinguishability Test (*p*-value)	LRT z-statistic	H1a: *p*(m1 > m2)	H1b: *p*(m1 < m2)
Life Satisfaction*	**0.185**	**.027**	**-2.21**	**.986**	**.014**
Ryff Positive Relationships*	**0.279**	**.004**	**-1.94**	**.974**	**.026**
Ryff Purpose in Life	0.301	.006	-1.61	.946	.054
Ryff Personal Growth	0.406	.000	-1.38	.917	.083
Ryff Environmental Mastery	0.177	.054	-0.76	.776	.224
Ryff Self-Acceptance	0.330	.000	0.08	.467	.533
Depression (CES-D)	0.246	.004	0.28	.388	.612
Self-Esteem (SISE)	0.335	.000	1.35	.088	.912

***p < .001 **p < .01 *p < .05 for focal test: SEEQ-20 superiority to PANAS.

Note. Both H1a and H1b are inherently one-tailed tests, and the null is that H1a = H1b. Outcomes where the SEEQ-20 performs significantly better are bolded.

Table 15

Vuong's test comparing PANAS (m1) to SEEQ-20 (m2) applied to sample 1b outcomes.

Well-being Outcome	Omega Statistic	Distinguishability Test (*p*-value)	LRT z-statistic	H1a: *p*(m1 > m2)	H1b: *p*(m1 < m2)
ISEL Appraisal* **	**0.21**	**.000**	**-4.88**	**1.000**	**.000**
Ryff Positive Relationships* **	**0.19**	**.000**	**-3.64**	**1.000**	**.000**
Loneliness **	**0.30**	**.000**	**-2.88**	**.998**	**.002**
Life Satisfaction*	**0.19**	**.000**	**-2.26**	**.988**	**.012**
ISEL Belonging*	**0.17**	**.000**	**-2.14**	**.984**	**.016**
Depression (BDI)*	**0.27**	**.000**	**-2.10**	**.982**	**.018**
ISEL Tangible*	**0.17**	**.000**	**-1.77**	**.962**	**.038**
Trait Anxiety*	**0.38**	**.000**	**-1.72**	**.957**	**.043**
Perceived Stress	0.26	.000	-1.26	.896	.104
Self-concept Clarity	0.16	.000	-1.00	.842	.158
Ryff Personal Growth	0.16	.000	-0.72	.764	.236
Ryff Self-Acceptance	0.13	.001	-0.65	.743	.257
Ryff Autonomy	0.11	.011	-0.11	.543	.457
Self-Esteem (SISE)	0.19	.000	-0.04	.516	.484
Ryff Purpose in Life	0.16	.000	0.09	.464	.536
ISEL Self-esteem	0.16	.001	1.00	.158	.842
Ryff Environmental Mastery	0.21	.000	1.55	.060	.940

***p < .001 **p < .01 *p < .05 for focal test: SEEQ-20 superiority to PANAS.

Note. Both H1a and H1b are inherently one-tailed tests, and the null is that H1a = H1b. Outcomes where the SEEQ-20 performs significantly better are bolded.

Specifically, the SEEQ-20 performed significantly better than the PANAS items in sample 1a for life satisfaction and Ryff positive relationships. In sample 1b, the SEEQ-20 performed better at a number of outcomes, including those related to social connection, such as

loneliness (z = -3.02, p = .001), Ryff positive relationships (z = -1.94, p = 0.26 in Sample 1a, z = -3.64, p <.001 in Sample 1b), and all subscales of the ISEL, (z = -4.88, p <.001 for Appraisal, z = -2.14, p = .016 for Belonging, and z = -1.77, p = .038 for Tangibility). This advantage of the SEEQ over the PANAS also extends to measures of psychological dysfunction such as depression (z = -2.10, p =.018) and anxiety (z = -1.72, p =.043), and those related to general well-being such as life satisfaction (z = -2.26, p =.012).

One limitation of the previous analysis is that the SEEQ may be better at predicting *only* socially relevant aspects of well-being, and perhaps most of our well-being measures are sensitive to social well-being. It would be useful to know how the SEEQ explains exclusive components of well-being. One way to answer this question is to construct uncorrelated well-being dimensions using factor analysis of the well-being measures. Using the larger sample, I extracted three factors suggested by Horn's parallel analysis using a varimax rotation. While the three factors did not have perfect simple structure (see Table 16), they represent uncorrelated aspects of well-being. Based on the loadings, factor one corresponded to positive self-regard and better psychological functioning (e.g., lower depression and greater self-esteem), factor two was primarily about social well-being outcomes (e.g., all ISEL subscales and positive relationships), and the third factor primarily reflected purpose in life and growth. The SEEQ explained more about positive psychological functioning (factor one) than the PANAS items (z = -1.74, p = .041) and more about social well-being (factor two) (z = -2.97, p = .001), but there were no significant differences explaining purpose and meaning (factor three) (z = -0.42, p = .337). Thus, the SEEQ not only taps more into social well-being, but also more general aspects of well-being.

Table 16

Three-factor varimax rotated loadings for well-being indicators.

Well-being Outcome	FA1 Loading	FA2 Loading	FA3 Loading
Trait Anxiety	**-0.90**	-0.27	-0.11
Perceived Stress	**-0.74**	-0.20	0.00
Depression (BDI)	**-0.71**	-0.32	-0.05
Environmental Mastery	**0.66**	0.33	0.25
Self-Acceptance	**0.64**	0.32	0.39
Self-Esteem (SISE)	**0.63**	0.22	0.22
Self-concept Clarity	**0.63**	0.22	0.19
Life Satisfaction	**0.64**	**0.40**	0.32
ISEL Self-Esteem	**0.56**	**0.55**	0.35
Loneliness	**-0.54**	**-0.71**	-0.06
ISEL Tangible	0.12	**0.70**	0.22
Positive Relationships	0.31	**0.72**	0.22
ISEL Belonging	0.27	**0.90**	0.06
ISEL Appraisal	0.21	**0.80**	0.15
Personal Growth	0.21	0.23	**0.68**
Purpose in Life	0.15	0.30	**0.56**
Autonomy	0.31	0.01	0.36

Note. Three-factor varimax rotated factor loadings. Loadings ≥ .40 are bolded.

Personality and Emotion

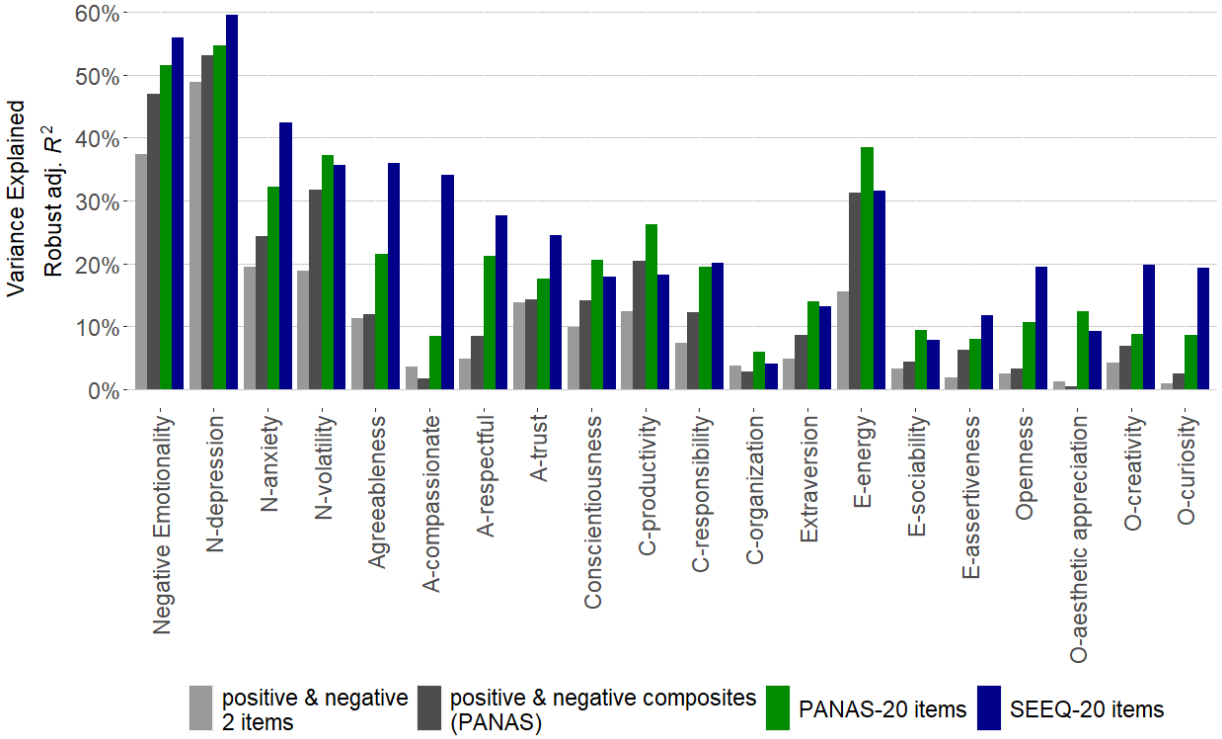
Just as in well-being, I assessed the overall explanatory power of the SEEQ-20 as a measure of personality using the same procedure as before. Past research has shown that PANAS PA and NA relate quite strongly to Extraversion and Negative Emotionality (Clark et al., 1994;

Watson & Clark, 1984, 1992). In contrast, the SEEQ capitalizes particularly on other-oriented positive emotions like gratitude, and this, I hypothesize, should be related to trait Agreeableness. This follows from reasoning that individual differences in Agreeableness reflect broader differences (e.g., in neurophysiology and appraisal tendencies) that should then be expressed through emotional experience (Keltner & Shiota, 2021).

To test these hypotheses, the same analyses as before were performed for personality at both the domain-level (i.e., the five factors of the big five) and the facet-level (i.e., the 15 facets assessed by the BFI-2). See Figure 7 and 8 for robust adjusted R^2 and Table 17 and 18 for the significance tests. Overall, variation explained in personality by the SEEQ and PANAS showed that the PANAS and SEEQ explain different aspects of personality: the SEEQ appears to capture variability in Agreeableness and its facets better, whereas the PANAS items explained variability in Extraversion (specifically energy) and, unexpectedly, Conscientiousness.

Figure 7

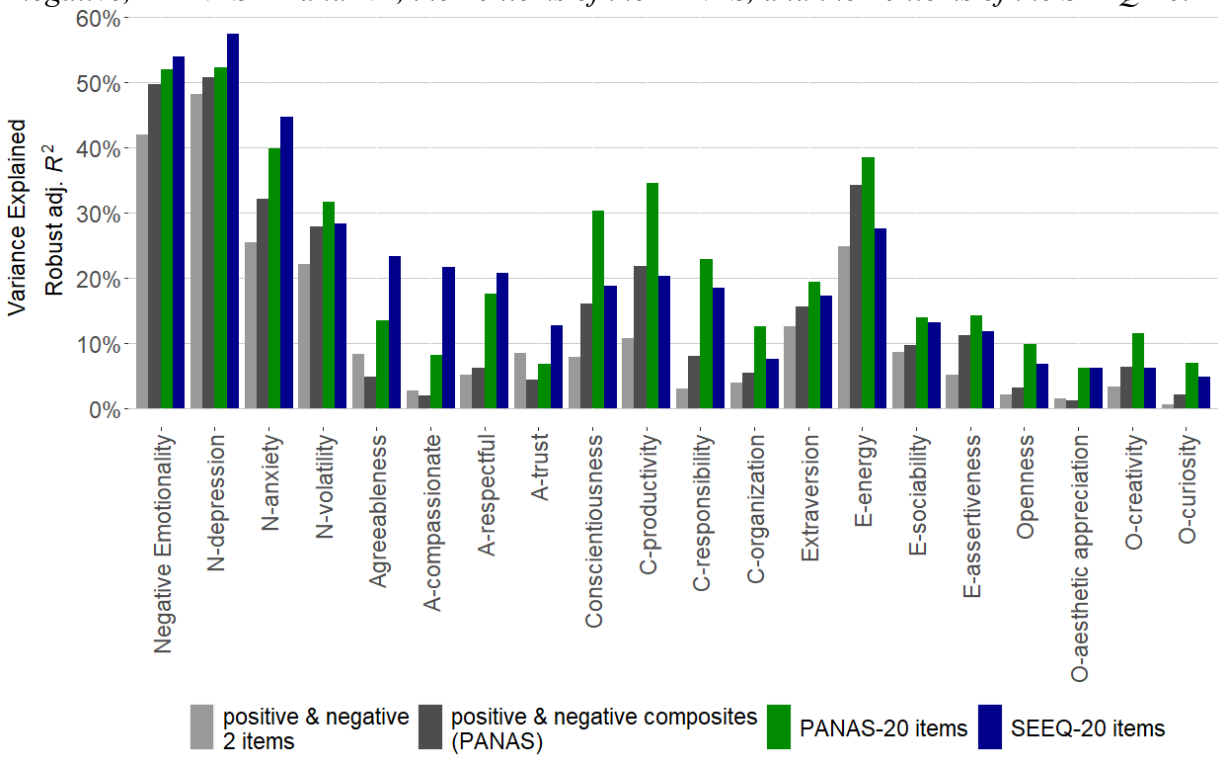
Sample 1a. Comparing the variance of personality explained by: items "positive" and "negative," PANAS PA and NA, the 20 items of the PANAS, and the 20 items of the SEEQ-20.



Note. Robust regression analyses performed using the robustbase package to provide a robust estimate of adjusted R^2. In light grey, each well-being indicator is regressed onto two single-item indicators (positive and negative). This serves as a convenient baseline performance.

Figure 8

Sample 1b. Comparing the variance of personality explained by: items "positive" and "negative," PANAS PA and NA, the 20 items of the PANAS, and the 20 items of the SEEQ-20.



Note. Robust regression analyses performed using the robustbase package to provide a robust estimate of adjusted R^2. In light grey, each well-being indicator is regressed onto two single-item indicators (positive and negative). This serves as a convenient baseline performance.

Finally, Vuong's test on OLS regression models indicated the SEEQ-20 fit as well as or better than the PANAS items on all personality domains except Conscientiousness, C: Productivity and E: Energy in sample 1b. For full results, see Table 17 and Table 18. In general, the SEEQ-20 related most reliably to Agreeableness (z = -3.37, p < .001 in Sample 1a, z = -3.01, p = .001 in Sample 1b) and Agreeableness facet compassionate (z = -4.15, p < .001 in Sample 1a, z = -3.93, p < .001 in Sample 1b). Across both samples, the effects were marginal or significant for Agreeableness facet respectfulness (z = -1.49, p = .068 in Sample 1a, z = -1.69, p = .045 in Sample 1b), and trusting (z = -1.59, p = .056 in Sample 1a, z = -2.07, p = .019 in Sample 1b), and Negative Emotionality facet anxiety (z = -2.31, p = .011 in Sample 1a, z = -1.62, p = .053 in Sample 1b). There were also clearly inconsistent results between the two samples. In sample 1a but not 1b, the SEEQ-20 related more to Openness and two of its facets than the PANAS (see Table 17 and 18).

The PANAS also had personality facets that it predicted better. The PANAS items specifically were better related to Conscientiousness facet productivity (z = 1.46, p = .072 in Sample 1a, z = 2.93, p = .002 in Sample 1b) and Extraversion facet energy (z = 1.51, p = .065 in Sample 1a, z = 2.89, p = .002 in Sample 1b). The PANAS inconsistently related to overall Conscientiousness in sample 1b (z = 2.38, p = .009) but not the smaller sample 1a (z = -0.69, p = .244).

Table 17

Vuong's test comparing PANAS (m1) to SEEQ-20 (m2) applied to sample 1a personality.

Well-being Outcome	Omega Statistic	Distinguishability Test (*p*-value)	LRT z-statistic	H1a: *p*(m1 > m2)	H1b: *p*(m2 > m1)
Negative Emotionality	0.49	.000	-0.17	.432	.568
N: Depression	0.60	.000	-0.32	.627	.373
N: Anxiety*	**0.34**	**.000**	**-2.31**	**.989**	**.011**
N: Volatility	0.32	.002	1.21	.113	.887
Agreeableness***	**0.24**	**.001**	**-3.37**	**1.000**	**.000**
A: Compassionate***	**0.33**	**.000**	**-4.15**	**1.000**	**.000**
A: Respectful	0.31	.007	-1.49	.932	.068
A: Trust	0.24	.002	-1.59	.944	.056
Conscientiousness	0.34	.000	0.69	.244	.756
C: Productivity	0.35	.000	1.46	.072	.928
C: Responsibility	0.29	.002	0.02	.491	.509
C: Organization	0.19	.006	0.32	.375	.625
Extraversion	0.24	.004	0.24	.404	.596
E: Energy	0.37	.000	1.51	.065	.935
E: Sociability	0.20	.014	0.24	.406	.594
E: Assertiveness	0.24	.001	-0.72	.765	.235
Openness*	**0.22**	**.010**	**-1.82**	**.966**	**.034**
O: Aesthetic	0.20	.013	0.44	.331	.669
O: Creativity*	**0.19**	**.032**	**-2.08**	**.981**	**.019**
O: Curiosity*	**0.23**	**.008**	**-1.98**	**.976**	**.024**

***p < .001 **p < .01 *p < .05

Note. Both H1a and H1b are inherently one-tailed tests, and the null hypothesis is that H1a = H1b. Outcomes where the SEEQ-20 performs significantly better are bolded.

Table 18

Vuong's test comparing PANAS (m1) to SEEQ-20 (m2) applied to sample 1b personality.

Well-being Outcome	Omega Statistic	Distinguishability Test (*p*-value)	LRT z-statistic	H1a: *p*(m1 > m2)	H1b: *p*(m2 > m1)
Negative Emotionality	0.27	.000	-1.43	.924	.076
N: Depression**	**0.28**	**.000**	**-2.62**	**.996**	**.004**
N: Anxiety	0.28	.000	-1.62	.948	.053
N: Volatility	0.16	.000	0.72	.235	.765
Agreeableness**	**0.24**	**.000**	**-3.01**	**.999**	**.001**
A: Compassionate***	**0.23**	**.000**	**-3.93**	**1.000**	**.000**
A: Respectful*	**0.21**	**.000**	**-1.69**	**.955**	**.045**
A: Trust*	**0.13**	**.001**	**-2.07**	**.981**	**.019**
Conscientiousness	*0.28*	*.000*	*2.38*	*.009*	*.991*
C: Productivity	*0.31*	*.000*	*2.93*	*.002*	*.998*
C: Responsibility	0.17	.000	0.96	.169	.831
C: Organization	0.17	.000	1.19	.117	.883
Extraversion	0.16	.000	0.70	.242	.758
*E: Energy***	*0.22*	*.000*	*2.89*	*.002*	*.998*
E: Sociability	0.14	.000	0.27	.392	.608
E: Assertiveness	0.14	.001	0.50	.308	.692
Openness	0.09	.033	0.93	.175	.825
O: Aesthetic	0.08	.129	-0.45	.674	.326
O: Creativity	0.09	.032	1.40	.081	.920
O: Curiosity	0.10	.006	0.48	.316	.685

***p < .001 **p < .01 *p < .05

Note. Both H1a and H1b are inherently one-tailed tests, and the null hypothesis is that H1a = H1b. Outcomes where the SEEQ-20 performs significantly better are bolded. Outcomes where the PANAS performs significantly better are underlined and italicized.

Gender, Culture, and Emotion

Gender

Studies of binary gender (man and woman) differences in affect have yielded mixed evidence. While some research finds small differences in self-reported emotion such that women self-report more negative affect than men (e.g., Crawford & Henry, 2004), others find little to no difference (e.g., Burns & Machin, 2010). Additionally, self-reported emotion over general time-spans rather than in-the-moment may reflect people's beliefs about gender and emotion rather than their own experience (Shields, 2013). Still, in a review of gender differences, Brody et al. (2016) found that women reported more consistent differences for sympathy, anxiety, love, fear, sadness, and shame, but that these differences were more pronounced in expression than experience. The SEEQ measures many of these states, and thus I hypothesized that the SEEQ may be slightly better at differentiating men from women based solely on their self-reported emotional experiences. However, I still suspected that the overall accuracy would be low. For their part, Watson et al. (1988) noted that PANAS PA and NA did not show substantial gender differences, but that future measures should still investigate if they exist. To that end, I compared gender differences in self-reported emotion. Even if the differences reflect more general beliefs about emotion and gender rather than actual experience, what are they and how does the SEEQ compare to the PANAS?

Similar to Watson et al. (1988), the significant gender differences tended to be relatively small (below medium effects, Cohen's $d < 0.50$) and primarily reflected greater self-reported negative emotion by women than by men. In the larger sample 1b, women also self-reported lower levels of two positive emotions: desire and pride. See Table 19 and Table 20 for the complete results.

Table 19

Mean Differences in Specific Emotions by Gender in Sample 1a

Scale	Emotion	*M* Women	*SD* Women	*M* Men	*SD* Men	Welch *p*	Holm *p*	Cohen's *d*
SEEQ	**Sadness**	**1.90**	**1.20**	**1.38**	**1.11**	**.001**	**.014**	**.44**
SEEQ	**Anxious**	**2.38**	**1.17**	**1.90**	**1.07**	**.001**	**.026**	**.42**
PANAS	**Nervous**	**2.37**	**1.14**	**1.92**	**1.06**	**.002**	**.034**	**.41**
SEEQ	**Confused**	**2.08**	**1.10**	**1.74**	**0.97**	**.012**	.218	.32
PANAS	**Active**	**1.73**	**1.14**	**2.07**	**1.10**	**.019**	.358	-.31
PANAS	**Upset**	**1.73**	**1.06**	**1.44**	**0.95**	**.029**	.521	.28
SEEQ	Disgusted	1.05	1.12	0.79	0.99	.050	.856	
SEEQ	Compassionate	2.38	1.07	2.11	1.06	.057	.910	
Both	Interested	2.22	0.96	2.26	0.97	.745	1.000	
Both	Afraid	1.48	1.21	1.21	1.07	.067	1.000	
Both	Ashamed	1.26	1.15	1.30	1.22	.802	1.000	
Both	Proud	1.70	1.04	1.87	1.06	.237	1.000	
PANAS	Excited	1.98	1.00	1.94	1.00	.772	1.000	
PANAS	Strong	1.72	1.08	1.76	1.04	.765	1.000	
PANAS	Enthusiastic	1.98	1.11	1.96	1.00	.917	1.000	
PANAS	Alert	1.77	0.99	1.73	0.96	.739	1.000	
PANAS	Inspired	1.94	1.14	2.04	1.02	.497	1.000	
PANAS	Determined	2.24	1.07	2.36	0.93	.368	1.000	
PANAS	Attentive	2.03	0.98	1.99	0.95	.759	1.000	
PANAS	Distressed	1.91	1.18	1.67	1.12	.101	1.000	
PANAS	Guilty	1.26	1.17	1.12	1.08	.341	1.000	
PANAS	Scared	1.57	1.16	1.32	1.15	.104	1.000	
PANAS	Hostile	0.89	1.08	0.76	1.04	.346	1.000	
PANAS	Irritable	1.66	1.13	1.42	1.17	.111	1.000	
PANAS	Jittery	1.52	1.17	1.27	0.92	.068	1.000	
SEEQ	Awe	1.51	1.04	1.58	1.08	.579	1.000	
SEEQ	Love	2.23	1.25	1.95	1.30	.100	1.000	
SEEQ	Amused	1.90	1.04	1.85	0.99	.691	1.000	
SEEQ	Contented	1.81	1.06	1.92	1.03	.444	1.000	
SEEQ	Elated	1.46	1.05	1.57	0.96	.379	1.000	
SEEQ	Grateful	2.45	1.05	2.42	1.06	.801	1.000	
SEEQ	Desire	2.01	1.12	1.94	1.08	.626	1.000	
SEEQ	Angry	1.35	1.08	1.23	1.07	.382	1.000	
SEEQ	Pain	1.44	1.15	1.25	1.11	.197	1.000	
SEEQ	Jealous	1.27	1.00	1.13	0.89	.259	1.000	
SEEQ	Self-critical	2.34	1.22	2.37	1.20	.849	1.000	

Note. Cohen's *d* listed for significant effects determined by welch-corrected *t*-test.

Table 20

Mean Differences in Specific Emotions by Gender in Sample 1b

Scale	Emotion	*M* Women	*SD* Women	*M* Men	*SD* Men	Welch *p*	Holm *p*	Cohen's *d*
PANAS	**Nervous**	**3.76**	**1.48**	**3.06**	**1.50**	**.000**	**.000**	**.47**
SEEQ	**Anxious**	**4.05**	**1.46**	**3.38**	**1.51**	**.000**	**.001**	**.45**
PANAS	**Upset**	**3.07**	**1.44**	**2.46**	**1.36**	**.000**	**.001**	**.43**
PANAS	**Scared**	**2.62**	**1.63**	**2.05**	**1.47**	**.001**	**.009**	**.36**
SEEQ	**Angry**	**2.42**	**1.48**	**1.95**	**1.31**	**.001**	**.024**	**.33**
PANAS	**Irritable**	**3.12**	**1.40**	**2.67**	**1.37**	**.003**	**.043**	**.32**
SEEQ	**Sadness**	**3.30**	**1.54**	**2.80**	**1.54**	**.003**	**.048**	**.33**
Both	**Proud**	**2.61**	**1.37**	**3.08**	**1.51**	**.004**	.062	-.33
SEEQ	**Desire**	**2.94**	**1.54**	**3.40**	**1.45**	**.004**	.062	-.30
PANAS	**Jittery**	**2.83**	**1.65**	**2.36**	**1.55**	**.005**	.076	.29
Both	**Afraid**	**2.64**	**1.57**	**2.22**	**1.49**	**.011**	.165	.27
SEEQ	**Pain**	**2.41**	**1.59**	**2.01**	**1.56**	**.019**	.262	.25
SEEQ	Love	3.64	1.52	3.33	1.64	.071	.917	
PANAS	Distressed	3.18	1.54	2.88	1.66	.079	1.000	
SEEQ	Grateful	4.00	1.38	3.72	1.48	.080	.954	
PANAS	Strong	2.67	1.40	2.94	1.43	.082	1.000	
SEEQ	Disgusted	1.80	1.45	1.55	1.30	.082	.954	
SEEQ	Amused	3.03	1.40	3.29	1.40	.085	.954	
SEEQ	Self-critical	4.05	1.40	3.82	1.53	.162	1.000	
SEEQ	Elated	2.36	1.43	2.57	1.57	.209	1.000	
PANAS	Guilty	2.19	1.63	2.01	1.44	.259	1.000	
SEEQ	Compassionate	3.76	1.36	3.60	1.32	.268	1.000	
PANAS	Active	2.68	1.50	2.86	1.58	.296	1.000	
PANAS	Inspired	2.93	1.35	3.09	1.54	.311	1.000	
SEEQ	Confused	3.12	1.54	2.98	1.55	.415	1.000	
SEEQ	Awe	2.33	1.43	2.45	1.49	.481	1.000	
PANAS	Enthusiastic	2.89	1.42	2.99	1.55	.544	1.000	
SEEQ	Jealous	2.06	1.50	1.96	1.59	.585	1.000	
PANAS	Hostile	1.56	1.43	1.50	1.41	.668	1.000	
SEEQ	Contented	2.91	1.35	2.97	1.45	.678	1.000	
PANAS	Determined	3.22	1.44	3.29	1.50	.702	1.000	
PANAS	Alert	2.93	1.41	2.88	1.42	.765	1.000	
PANAS	Excited	3.03	1.34	3.07	1.54	.816	1.000	
PANAS	Attentive	3.02	1.33	3.04	1.36	.849	1.000	
Both	Ashamed	1.90	1.58	1.92	1.53	.904	1.000	
Both	Interested	3.23	1.31	3.21	1.44	.905	1.000	

Note. Cohen's *d* listed for significant effects determined by welch-corrected *t*-test.

One limitation of these univariate analyses is that it is still unclear if the significant differences in the SEEQ amount to a meaningful difference to those in the PANAS. To address this question directly, I again turned to Vuong's test. Vuong's test can be applied to logistic

regression (Vuong, 1989). To perform the test, I regressed gender onto either the PANAS items or the SEEQ items in logistic regression. In this case, the two models were indistinguishable ($\omega^2 = 0.15$, $p = .159$ in sample 1a and $\omega^2 = 0.08$, $p = .117$ in sample 1b) and could not be compared. However, even ignoring the distinguishability test, neither model was significantly superior to the other ($z = -1.28$, $p(PANAS > SEEQ) = .899$ and $p(SEEQ > PANAS) = .101$ in sample 1a; $z = -1.40$, $p(PANAS > SEEQ) = .919$ and $p(SEEQ > PANAS) = .081$ in sample 1b). Descriptively, this is shown by the small magnitude of accuracy improvement for determining gender from emotions. For example, in the logistic model from sample 1b, the PANAS items had a balanced accuracy of 55.82%.[8] This means that in a balanced sample of men and women, the model did not perform better than chance, 50% ($p = .477$). [9] While the SEEQ balanced accuracy was slightly better at 59.2%, it was also still not better than chance ($p = .073$).

Culture

Similar to research on gender differences in self-reported emotion, there is mixed evidence about cultural differences. Here, I operationalize culture as self-reported race and ethnicity. In describing research on Affect Valuation Theory, Tsai (2017) suggests there are clearer differences in how cultural groups *want* to feel (ideal affect), but less evidence this informs how they *actually* feel. These cultural differences in ideal affect may be reflected in self-reported affect over general timespans (e.g., past 6 months). In line with AVT research Asian students might report greater feelings of contentment on the SEEQ than their White peers because it is a low-arousal positive emotion (Tsai, 2007). In contrast, the PANAS does not have low-arousal positive emotion items (McManus et al., 2019). It is less clear how Latinx students might respond to the SEEQ. On the one hand, research establishes high positivity, low negativity, and freely offering social support as part of Latinx cultural values (Acevedo et al., 2020; Campos & Kim, 2017; Corona et al., 2020; Senft et al., 2020). This might be reflected in higher levels of positive emotions in general, particularly compassion, and also lower levels of negative emotions. On the other hand, my own past data suggests Latinx students tend to be of lower socioeconomic status and more stressed than their White and Asian peers, which should have negative consequences on both specific positive emotions and feelings of anxiety, sadness, and potentially shame (Eisenberg et al., 2013; Lipson et al., 2022).

Surprisingly, there were few significant differences when accounting for multiple comparisons (i.e., holm corrected *p*-values for twenty one-way ANOVAs per the SEEQ and separately the PANAS). See Table 21 and 22 for the mean cultural differences in emotion for the significant effects of culture. For all emotion-specific means and standard deviations by cultural group, see Table 3 & 4 in the Appendix.

[8] Balanced accuracy takes the raw accuracy of the model and projects it onto a balanced sample (i.e., $N_{men} = N_{women}$). In the actual data, there were less men than women; this means any model could achieve over 50% *raw accuracy* by assuming everyone was a woman. For simpler interpretation, I reported balanced accuracy.

[9] These *p*-values reflect significance tests of the raw accuracy rate in the data compared to the no-information rate. For this specific example, raw accuracy = .6926 and the no-information rate = .6889 (the proportion of women).

Table 21

Mean Differences on Emotion Items by Cultural Group in Sample 1a

Scale	Emotion	Latinx	Asian	White
PANAS	Guilty	M = 1.77^{A,W} SD = 1.34	M = 1.11^{L} SD = 1.03	M = 1.10^{L} SD = 1.10
SEEQ	Sadness	M = 2.36^{A,W} SD = 1.29	M = 1.62^{L} SD = 1.14	M = 1.67^{L} SD = 1.07

Note. Significant mean differences at holm-adjusted $p < .05$ in *t*-tests indicated by superscript of first letter of the group.

Table 22

Mean Differences on Emotion Items by Cultural Group in Sample 1b

Scale	Emotion	Latinx	Asian	White
SEEQ	Anxious	M = 4.00 SD = 1.55	M = 3.75^{W} SD = 1.50	M = 4.38^{A} SD = 1.35

Note. Significant mean differences at holm-adjusted $p < .05$ in standard *t*-tests indicated by superscript of first letter of the group.

Although there are other significant effects when not applying the holm correction, the primary question is whether the total set of emotions provides greater differentiation between groups. Because there are three groups in this analysis, I was unable to perform Vuong's test using standard procedures. However, I calculated balanced accuracy estimates by using linear discriminant analysis (LDA). LDA transforms the input variables into $N_{group} - 1$ linear dimensions that maximally separate the groups from each other, can be used to create classification rules, and is applicable for more than two groups (Boedeker & Kearns, 2019).

In sample 1a, LDA showed that neither the PANAS (accuracy = .589, $p = .107$) nor the SEEQ (accuracy = .589, $p = .107$)[10] performed better than chance in discerning distinct emotion profiles of the cultural groups (no-information rate = .547). As shown in the overall accuracies, both performed essentially the same. For specific cultural groups, the SEEQ descriptively performed better (balanced accuracy for Latinx = .609, Asian = .611, White = .602) than the PANAS (balanced accuracy for Latinx = .591, Asian = .583, White = .594), but the difference is negligible. In sample 1b, LDA again showed that neither the PANAS (accuracy = .67, $p = .096$) nor the SEEQ (accuracy = .65, $p = .370$) performed better than chance (no-information rate = .64). For specific cultural groups, the PANAS descriptively performed better for more groups (balanced accuracy for Latinx = .529, Asian = .572, White = .557) than the SEEQ (balanced accuracy for Latinx = .560, Asian = .559, White = .546).

Part III: Specific Emotions in Daily Life

STUDY 2 – Specific Emotion Experiences Tell Us About Day-to-Day Well-being

In the present investigation, I provide evidence for the unique role of specific emotions in the day-to-day well-being of adults using a longitudinal sample. To be clear, this is about the covariation of daily well-being with specific emotions on the same day. From a social functional perspective, emotions solve specific problems and meet opportunities in our highly social lives. Emotional experience tracks specific relational concerns, like status, justice, or harm, and

[10] The specific confusion matrices were different despite the same overall accuracy.

animates actions that meet those concerns (e.g., Keltner et al., 2022). This would suggest that specific emotional experiences are related to specific domains of well-being.

Here, I focus on four positive emotions: elation as an indicator of high-arousal PA (i.e., one synonym for excited and enthusiastic as in the PANAS), contentment as an indicator of low-arousal PA (Tsai, 2007), gratitude as a self-transcendent positive emotion (Stellar et al., 2017), and sexual desire as an often overlooked positive emotion (Diamond, 2003; Gonzaga et al., 2001; Impett & Muise, 2019). Past work has found that PANAS PA exclusively reflects high-arousal positive emotion, neglecting or obscuring the role of other positive emotions (McManus et al., 2019). As a marker of low-arousal PA, contentment is an important emotion in cross-cultural analysis (e.g., Tsai, 2007), often appearing as between-person differences in the desirability or impact of low-arousal vs. high-arousal PA. In a social functionalist account, gratitude serves the important role of motivating reciprocity that binds people together (Algoe, 2012), which should be reflected in feelings of social connection. Finally, sexual desire is ubiquitous and consequential in close relationships, sexual behavior, and also identity (Diamond, 2003; Gonzaga et al., 2001; Impett & Muise, 2019).

To summarize, based on theoretical accounts of specific positive emotions, I expected gratitude to have the largest effect in daily social connection, contentment in daily stress, and sexual desire to sexual behavior. Elation is less straightforward. While a cultural account suggests elation (as a high-arousal positive emotion) should be more consistent with how Americans conceptualize life satisfaction, this is relative to other groups rather than an all-or-nothing difference (Tsai, 2007).

Methods

Overview

Here, I present results from a larger longitudinal study of awe, spirituality, and ritual. As part of the study, participants answered a daily questionnaire that included items about different aspects of well-being and the twenty items of the SEEQ-20 from 4008 daily reports from 296 individuals across up to 15 days.

Power and sample size

Data collection was administered from the power considerations of another study. Sensitivity analyses show that the final sample size (N = 296) can detect significant fixed effects of β = .02 or greater with 80% power in the multilevel multiple regression models reported.

Participants

378 adults from across the United States (56.3% men, 42.6% women, 0.8% non-binary, 1 participant selecting “other or prefer not to say”) participated in up to 15 days of daily assessment. Their ethnic/racial characteristics were: 80.1% White, 6.9% Black, 3.4% East Asian, 3.2% Latin American, 3.2% Bi- or multi-ethnic, 1.9% South Asian, and 0.5% “A different ethnic/racial background not captured in this list.” On average, people completed 11.27 days (SD = 4.88), with a median of 14 days. I excluded participants with fewer than 7 days of diary data (21.7% of participants) as indexed by whether they answered the daily life satisfaction question or not that day. Therefore, the final sample consists of 296 adults (58.1% men, 40.5% women, 1% non-binary, 1 participant “other or prefer not to say”) with 4008 daily reports across up to 15 days. Their ethnic/racial characteristics were: 80.1% White, 5.7% Black, 4.4% East Asian, 3.7% Latin American, 3.4% Bi- or multi-ethnic, 2.0% South Asian, and 0.7% “A different ethnic/racial background not captured in this list.” Because of sample size considerations, analyses related specifically to gender are restricted to only those identifying as a men (N = 213) or women (N = 161).

Measures

Self-report Emotion Experience

Specific emotions were measured as snapshots using the 20 single-item measures of the SEEQ-20 in response to the statement "Below are a number of words that describe different feelings and emotions. Read each and indicate to what extent you currently feel this way, that is, how you feel RIGHT NOW. Select one option for each emotion word from the rating scale below. Some words may seem similar; however, it is important to rate each one" on a scale from 1—*Not at all* to 7—*Extremely*.

Well-being

Single item indicators measured daily life satisfaction ("All things considered, how satisfied are you with your life today?") (Cheung & Lucas, 2014), ability to handle stress ("How would you rate your ability to handle stress today?") (Littman et al., 2006), and face-valid measures of amount of stress ("How would you rate the amount of stress in your life today?"), social connection ("Today, did you feel distant and cut off from other people or connected to other people"), and meaning in life ("All things considered, how meaningful do you consider your life today?") on sliding scales from 0 to 10.

Personality

Personality was assessed with the five factor model using the BFI-2-XS (Soto & John, 2017) which measures personality at the domain level.

Analysis Strategy

I analyzed the average within-person effects of daily emotional experience of elation (high-arousal positive emotion), contentment (low arousal positive emotion), gratitude (self-transcendent positive), and sexual desire. The daily diaries consisted of multiple data points nested within individuals, violating the assumption of independence of observations. Thus, I used two-level multilevel models with observations nested in participants to conduct the analyses. I also person-centered the emotions (predictor variables) to isolate the within-person effects (e.g., what happens when the average participant feels more gratitude than they normally do?) from the between-person effects (Wang & Maxwell, 2015). Level 1 intercepts were allowed to vary for the individual, and level 1 slopes were allowed to vary within the individual. These analyses were conducted using the *nlme* package in the statistical program R so that I could also account for autocorrelation in the residuals. Finally, I report the significance of random effects via model comparison between a model with the random effect and a model without it.

Results

Preliminary Analyses

Describing Daily Emotion Experiences

Before turning to the primary analyses, there are a number of descriptive features in people's daily experience of emotion that are worth noting. The between-subject and within-subject descriptive statistics are in Table 23. One notable finding is that most negative emotions were rare. This is expressed in both low mean-levels as well as the large percentage of participants who never reported changes in day-to-day emotional experience. For example, 70% of participants never reported changes in jealousy. In contrast, positive emotions were much more variable day-to-day. Except for sexual desire, more individuals reported daily variability in

each positive emotion (i.e., *highest* proportion of zero variance was awe at 21%) than for any of their negative emotions (*lowest* proportion of zero variance was self-critical at 24%).

Table 23

Between-subject and within-subject descriptive statistics of daily emotional experience

	Between Subject *M* and *SD*					Within Subject Variability (*SD*)						
Positive Emotions	M_{sbj}	*Trait spread* SD_M	*daily* SD_{total}	ICC_{sbj}	$\Phi_{AR\text{-}1}$	M_{SDwin}	*% reporting zero variance*	Min_{SDwin}	$Q1_{Sdwin}$	$Q2_{SDwin}$	$Q3_{SDwin}$	Max_{SDwin}
Elated	3.03	1.75	2.02	72%	.19	0.90	14%	0.00	0.51	0.89	1.24	2.34
Contented	4.75	1.57	1.83	71%	.19	0.83	8%	0.00	0.52	0.77	1.08	2.70
Love	4.54	1.82	2.06	77%	.11	0.85	9%	0.00	0.53	0.81	1.17	2.94
Grateful	4.76	1.60	1.84	73%	.14	0.82	8%	0.00	0.52	0.78	1.09	2.21
Compassion	4.03	1.81	2.12	70%	.12	1.00	6%	0.00	0.63	0.92	1.35	2.93
Proud	3.66	1.87	2.09	78%	.21	0.81	15%	0.00	0.51	0.77	1.13	2.76
Interested	4.73	1.59	1.87	70%	.22	0.87	8%	0.00	0.51	0.83	1.13	2.67
Desire	2.11	1.36	1.69	60%	.21	0.78	31%	0.00	0.00	0.72	1.31	2.55
Awe	2.30	1.52	1.90	61%	.15	0.93	21%	0.00	0.27	0.88	1.45	3.01
Amused	2.55	1.47	1.82	62%	.26	0.93	13%	0.00	0.52	0.93	1.32	3.04
Negative Emotions	M_{sbj}	*Trait spread* SD_M	*daily* SD_{total}	ICC_{sbj}	$\Phi_{AR\text{-}1}$	M_{SDwin}	*% reporting zero variance*	Min_{SDwin}	$Q1_{Sdwin}$	$Q2_{SDwin}$	$Q3_{SDwin}$	Max_{SDwin}
Sad	1.70	1.06	1.40	52%	.27	0.68	32%	0.00	0.00	0.53	1.12	3.10
Ashamed	1.32	0.75	0.95	58%	.14	0.34	58%	0.00	0.00	0.00	0.53	2.62
Disgusted	1.29	0.71	0.95	54%	.15	0.34	60%	0.00	0.00	0.00	0.58	2.79
Afraid	1.42	0.89	1.14	57%	.28	0.41	57%	0.00	0.00	0.00	0.74	2.91
Angry	1.36	0.71	1.03	43%	.19	0.45	49%	0.00	0.00	0.26	0.77	2.81
Anxious	1.92	1.25	1.55	63%	.22	0.68	29%	0.00	0.00	0.63	1.09	2.99
Confused	1.30	0.62	0.90	42%	.23	0.39	52%	0.00	0.00	0.00	0.58	2.46
Pain	1.53	0.93	1.20	54%	.31	0.51	44%	0.00	0.00	0.27	0.90	2.75
Jealous	1.21	0.60	0.78	55%	.22	0.24	70%	0.00	0.00	0.00	0.29	2.47
Self-critical	2.03	1.35	1.61	67%	.18	0.70	24%	0.00	0.26	0.63	1.09	2.28

Note. On the left- the descriptive statistics at the between-subject level. For example, the average of people's average daily experience of sadness is 1.70 with a *SD* = 1.06 describing the distribution of 2-week averages between people. Daily SD_{total} is the SD across all days and all people. The *ICC* represents the percentage of the daily variability that is attributable to stable differences between subjects. $\Phi_{AR\text{-}1}$ is the degree of first-order autocorrelation for that emotion. On the right- the descriptive statistics of within-subject variability. Across 15-days, every person has their own amount of variability. Noted are the average, percent of subjects with zero variance for that emotion, and the quartiles of within-subject variability.

Week-to-Week Stability of Average Emotional Experience

At the between-person level are people's average emotional experiences: for example, some individuals experience more gratitude on average than others. With two weeks of data for most participants, I also assessed the week-to-week stability of average emotional experience by emotion (a form of test-retest reliability). Similar to past work on the stability of longitudinal

reports of PA and NA (e.g., Metler & Busseri, 2017), week 1 to week 2 stabilities were generally high ($r > .70$). See Table 24 for the full results. This corroborated the notion of a large effect of individual differences in emotional experience.

Table 24
Within-person stability of average emotion in week 1 to average emotion in week 2

Positive Emotions	Week 1 to Week 2 *r*	**Negative Emotions**	Week 1 to Week 2 *r*
Elated	**.91**	Sad	.73
Contented	**.90**	Ashamed	.84
Love	.93	Disgusted	.81
Grateful	**.91**	Afraid	.81
Compassion	.91	Angry	.73
Proud	.92	Anxious	.83
Interested	.90	Confused	.73
Desire	**.85**	Pain	.75
Awe	.87	Jealous	.81
Amused	.85	Self-critical	.88

Note. The focal emotions in this study are bolded. Week 1 and week 2 averages were computed using all available data for each subject.

Gender and Emotion

Similar to study one, I also calculated the average gender differences by emotion, and also whether there were between-gender differences in the day-to-day variability of each emotion (see Table 25). This facilitates comparisons of average self-reported daily emotional experience to the cross-sectional self-reports by gender in study one. In this sample of daily life among adults, women reported more anxiety and pain than men, and less elation, amusement, and desire. This replicates the results for the larger sample of study 1 for anxiety, pain, and desire, but not elation and amusement. Interestingly, men and women were not significantly different on other-focused emotions like gratitude and compassion, nor were they different on stereotypically male emotions like anger and pride.

Table 25

Gender differences in mean level and variability of emotions across days

Emotion	M_{men}	M_{women}	*95% CI*$_{dif}$	*Var* Women : *Var* Men	χ^2	*p*
Elated	**3.24 [2.98, 3.50]**	**2.74 [2.43, 3.05]**	**-0.50 [-0.91, -0.10]**	**1.16**	**42.00**	**< .001**
Contented	4.80 [4.56, 5.03]	4.72 [4.44, 5.00]	-0.07 [-0.44, 0.29]	**1.07**	**7.74**	**.005**
Love	4.55 [4.28, 4.82]	4.54 [4.22, 4.87]	-0.01 [-0.43, 0.42]	1.04	2.93	.087
Grateful	4.74 [4.51, 4.98]	4.83 [4.54, 5.11]	0.08 [-0.29, 0.45]	**1.06**	**6.85**	**.009**
Compassionate	4.01 [3.74, 4.37]	4.05 [3.72, 4.37]	0.03 [-0.39, 0.46]	**1.11**	**18.63**	**< .001**
Proud	3.79 [3.52, 4.07]	3.49 [3.15, 3.82]	-0.31 [-0.74, 0.13]	**1.11**	**19.80**	**< .001**
Interested	4.82 [4.58, 5.06]	4.61 [4.32, 4.89]	-0.21 [-0.58, 0.16]	**1.05**	**4.68**	**.031**
Desire	**2.35 [2.15, 2.55]**	**1.80 [1.56, 2.04]**	**-0.55 [-0.86, -0.23]**	**0.85**	**45.52**	**< .001**
Awe	2.39 [2.16, 2.62]	2.19 [1.91, 2.46]	-0.20 [-0.56, 0.16]	**1.19**	**55.49**	**< .001**
Amused	**2.75 [2.53, 2.97]**	**2.29 [2.03, 2.55]**	**-0.46 [-0.80, -0.12]**	0.97	1.53	.216
Sad	1.60 [1.44, 1.76]	1.81 [1.63, 2.00]	0.21 [-0.03, 0.46]	**1.19**	**55.78**	**< .001**
Ashamed	1.31 [1.20, 1.42]	1.32 [1.19, 1.45]	0.01 [-0.17, 0.18]	**0.97**	**1.32**	**.250**
Disgusted	1.28 [1.18, 1.39]	1.31 [1.18, 1.44]	0.03 [-0.14, 0.19]	**0.91**	**15.61**	**< .001**
Afraid	1.38 [1.24, 1.51]	1.48 [1.32, 1.64]	0.10 [-0.11, 0.31]	**1.15**	**32.15**	**< .001**
Angry	1.36 [1.25, 1.47]	1.36 [1.23, 1.49]	0.00 [-0.17, 0.17]	**0.94**	**5.74**	**.017**
Anxious	**1.77 [1.58, 1.95]**	**2.11 [1.89, 2.33]**	**0.34 [0.05, 0.63]**	**1.14**	**29.76**	**< .001**
Confused	1.32 [1.22, 1.41]	1.28 [1.16, 1.39]	-0.04 [-0.19, 0.11]	1.03	1.82	.178
Pain	**1.41 [1.27, 1.55]**	**1.68 [1.52, 1.85]**	**0.27 [0.06, 0.48]**	**1.22**	**70.93**	**< .001**
Jealous	1.26 [1.17, 1.35]	1.15 [1.04, 1.26]	-0.11 [-0.25, 0.03]	**0.72**	**180.74**	**< .001**
Self-critical	2.02 [1.82, 2.22]	2.03 [1.79, 2.27]	0.01 [-0.31, 0.32]	**1.06**	**6.43**	**.011**

Note. Right: point estimates and 95%CIs of the average experience by gender and the average difference between men and women. Left: variance expressed as the ratio of variability in women's self-reports to men's variability. E.g., values >1 indicate women self-reported more daily variability on average. Significant differences are bolded.

Daily life satisfaction and emotion

First, I assessed the between-subject variability and autocorrelation of daily life satisfaction using an intercept-only model with first-order autoregression. Based on the model, 76.1% of the variance in daily life satisfaction was between people ($\tau_{subject}$ = 5.65, σ^2 = 1.77). Daily life satisfaction also demonstrated a significant amount of autocorrelation (Φ = .224, χ^2 = 135.56, $p < .001$).

Next, I assessed the bivariate relationships between each emotion and daily life satisfaction to estimate the simple relationship for the average person (the fixed-effect slope) and the between-person variability around the average (the random-effect variance). All four emotions positively related to daily life satisfaction such that daily fluctuations in life satisfaction corresponded to daily changes in person-centered emotion, and all three had significant between person variability (see Table 26).

Table 26

Daily life satisfaction and specific emotions in bivariate regression.

Person-centered Predictors	*B*	$\beta_{w/in}$	*df*	*t*	*p*	SD_B	$\chi^2(2)$	*p*
Elated	0.39 (0.03)	.15	3711	12.85	**< .001**	0.35	142.14	**< .001**
Contented	0.54 (0.03)	.18	3711	15.61	**< .001**	0.42	264.39	**< .001**
Grateful	0.46 (0.03)	.15	3711	14.54	**< .001**	0.34	115.56	**< .001**
Desire	0.19 (0.03)	.07	3711	7.43	**< .001**	0.20	38.21	**< .001**

Note. Each line represents a separate bivariate regression model. βs calculated by z-scoring the predictor variables and outcome across all observations. Theoretically, one could estimate the average within-subject correlation instead, which is generally bigger (e.g., Elated average r = .30 compared to β = .15). But this is complicated by the question of what to do with people with no variability (and therefore, no within-person correlation).

Directly relevant to my hypotheses, I estimated unique effects for the average person in multilevel multiple regression (see Table 27). All four emotions remained significant predictors of daily life satisfaction for the average person. However, contrary to my hypothesis about elation, the relationship for daily elation was significantly *smaller* than both contentment ($\chi^2(1)$ = 37.30, $p < .001$) and gratitude ($\chi^2(1)$ = 5.96, p = .015), but not significantly different than desire ($\chi^2(1)$ = 1.88, p = .171).

Table 27

Daily life satisfaction and specific emotions in multiple regression.

Person-centered Predictors	*B*	$\beta_{w/in}$	*df*	*t*	*p*	SD_B	$\chi^2(4)$	*p*
Intercept	6.53 (0.14)	—	—	—	—	2.39	1574.89	**< .001**
Elated	0.13 (0.02)	.05	3708	6.52	**<0.001**	0.08	11.90	**.036**
Grateful	0.22 (0.03)	.07	3708	8.42	**<0.001**	0.17	23.87	**< .001**
Contented	0.37 (0.03)	.13	3708	11.60	**<0.001**	0.33	149.70	**< .001**
Desire	0.09 (0.02)	.03	3708	4.42	**<0.001**	0.13	22.20	**< .001**

Note. βs calculated by z-scoring the predictor variables and outcome across all observations.

Social connection and emotion

First, I assessed the between-subject variability and autocorrelation of daily life satisfaction using an intercept-only model with first-order autoregression. Based on the model, 53.0% of the variance in daily life satisfaction was between people ($\tau_{subject}$ = 5.45, σ^2 = 4.83). Daily social connection also demonstrated a significant amount of autocorrelation (Φ = .128, χ^2 = 43.48, p < .001).

Next, I assessed the bivariate relationships between each emotion and daily social connection as I did previously for life satisfaction. All four emotions positively related to daily life satisfaction such that daily fluctuations in life satisfaction corresponded to daily changes in person-centered emotion, and all three had significant between person variability (see Table 28).

Table 28

Daily social connection and specific emotions in bivariate regression.

Person-centered Predictors	*B*	$\beta_{w/in}$	*df*	*t*	*p*	SD_B	$\chi^2(2)$	*p*
Elated	0.25 (0.04)	.17	3732.00	5.83	**< .001**	0.37	28.17	**< .001**
Contented	0.36 (0.05)	.19	3732.00	7.48	**< .001**	0.41	45.92	**< .001**
Grateful	0.37 (0.05)	.17	3732.00	8.14	**< .001**	0.36	21.64	**< .001**
Desire	0.17 (0.04)	.10	3732.00	4.13	**< .001**	0.28	11.81	**.003**

Note. βs calculated by z-scoring the predictor variables and outcome across all observations.

Directly relevant to my hypothesis, I estimated the unique effects for the average person in multilevel multiple regression (see Table 29). All four emotions remained significant predictors of daily social connection. However, contrary to my hypothesis about gratitude, daily gratitude did not covary with daily social connection more strongly than elation ($\chi^2(1) = 2.99$, $p = .084$), contentment ($\chi^2(1) = 0.07$, $p = .795$), or desire ($\chi^2(1) = 2.38$, $p = .123$).

Table 29

Daily social connection and specific emotions in multiple regression.

Person-centered Predictors	*B*	$\beta_{w/in}$	*df*	*t*	*p*	SD_B	$\chi^2(4)$	*p*
Intercept	5.59 (0.14)	—	—	—	—	2.35	1553.65	**< .001**
Elated	0.10 (0.04)	.03	3729.00	2.25	**.025**	0.25	14.59	**.012**
Grateful	0.21 (0.05)	.06	3729.00	4.49	**< .001**	0.24	8.72	.121
Contented	0.19 (0.05)	.05	3729.00	3.81	**< .001**	0.31	23.29	**< .001**
Desire	0.11 (0.04)	.04	3729.00	2.78	**.006**	0.26	11.55	**.042**

Note. βs calculated by z-scoring the predictor variables and outcome across all observations.

Stress and emotion

First, I assessed the between-subject variability and autocorrelation of daily stress intensity using an intercept-only model with first-order autoregression. Based on the model, 62.0% of the variance in daily stress intensity was between people ($\tau_{subject}$ = 4.80, σ^2 = 2.94). Daily stress intensity also demonstrated a significant amount of autocorrelation (Φ = .189, X^2 = 102.32, p < .001).

Next, I assessed the bivariate relationships between each emotion and daily stress intensity. All four emotions positively related to daily stress intensity such that daily fluctuations in stress intensity corresponded to daily changes in person-centered emotion, and all three had significant between person variability (see Table 30).

Table 30

Daily stress intensity and specific emotions in bivariate regression.

Person-centered Predictors	*B*	$\beta_{w/in}$	*df*	*t*	*p*	SD_B	$\chi^2(2)$	*p*
Elated	-0.19 (0.04)	-.07	3731.00	-5.11	**< .001**	0.36	52.50	**< .001**
Contented	-0.42 (0.04)	-.13	3731.00	-9.88	**< .001**	0.46	131.23	**< .001**
Grateful	-0.25 (0.04)	-.08	3731.00	-6.28	**< .001**	0.40	74.88	**< .001**
Desire	-0.10 (0.03)	-.04	3731.00	-2.92	**.004**	0.25	22.96	**< .001**

Note. βs calculated by z-scoring the predictor variables and outcome across all observations.

Directly relevant to my hypothesis, I estimated the unique effects for the average person in multilevel multiple regression (see Table 31). Only contentment and desire remained significant predictors of daily stress intensity. Daily contentment also covaried with daily stress intensity more strongly than gratitude ($\chi^2(1)$ = 29.78, p < .001), elation ($\chi^2(1)$ = 46.11, p < .001), and desire ($\chi^2(1)$ = 42.49, p < .001).

Table 31

Daily stress intensity and specific emotions in multiple regression.

Person-centered Predictors	*B*	$\beta_{w/in}$	*df*	*t*	*p*	SD_B	$\chi^2(4)$	*p*
Intercept	3.57 (0.13)	—	—	—	—	2.20		
Elated	-0.02 (0.03)	-.01	3728	-0.76	0.448	0.11	6.25	.181
Grateful	-0.05 (0.04)	-.02	3728	-1.28	0.201	0.27	13.99	**.007**
Contented	-0.39 (0.04)	-13	3728	-9.22	**<0.001**	0.39	72.09	**< .001**
Desire	-0.06 (0.03)	-.02	3728	-1.96	**0.050**	0.39	72.09	**< .001**

Note. βs calculated by z-scoring the predictor variables and outcome across all observations.

Part IV: Replication and Additional Distinct Emotions

STUDY 3 – Specific Emotion Experiences Tell Us About Day-to-Day Well-being

In the present investigation, I present data that achieves two aims: (1) a nearly direct and successful replication of the SEEQ outperforming PA and NA as measured by the PANAS on key well-being outcomes and (2) exploration of additional emotions that might supplement or improve the SEEQ. The replication is important for two reasons. One, pre-registered data collection, hypotheses, and analytic plans have become increasingly expected in the field (Lindsay, 2018; Nosek et al., 2018). Many see pre-registration as one of the strongest forms of confirmatory hypothesis testing (e.g., Wagenmakers et al., 2012). An even more important reason for this replication is that the factor structure and items of the SEEQ were informed by one of the datasets (sample 1b) used to assess the SEEQ's performance. While I did show complementary findings from a smaller and entirely unrelated sample (1a), it is possible the SEEQ's performance was mostly driven by the dual use of one dataset. An entirely novel, large sample would be a more robust test of my core hypothesis about the utility of specific emotions as measured by the SEEQ vis-à-vis PA and NA measured in the PANAS. The novel sample also benefits generalizability because it is comprised of adults across the United States rather than undergraduates at one university.

On the second aim for this study, I included other emotion items to assess whether other emotions could be either incorporated into the SEEQ or used in conjunction with it. As discussed previously, the SEEQ was designed from the high-dimensional perspective of emotion based in Semantic Space Theory (Keltner et al., 2023). While I anchored the original set of emotions in empirical work on cross-culturally expressed and recognized emotions, much of this work shows that the number of distinct emotions varies by domain, such as in music, the voice, or full body expressions (D. Cordaro et al., 2016, 2020; Cowen et al., 2020). Additionally, I weighed the

practical goal of measurement reliability within and between the miniscales of the SEEQ. Based on the empirical data from sample 1b, I made some decisions to change items, combine measures, and add some new emotion measures to the SEEQ, such as Jealousy (for a list of these changes, see Table 13 above). Nevertheless, there were a number of unique emotions unmeasured in the SEEQ but documented in the emotion literature (e.g., Boredom, Elevation, Contempt; see Table 7 above). For this reason, I selected emotions measured by the FEEELS (J. M. Chung et al., 2022) (Horror, Trepidation, Contempt, Hubristic Pride, Elevation), mDES (Hope), and some novel items I generated to measure Relief and to separate Shame, Embarrassment, and Guilt.

Based on the results from Part I and Part II of this manuscript, I hypothesize the SEEQ-20 to outperform the PANAS at predicting positive relationships with others, life satisfaction, depression, and loneliness. Afterward, I will assess the SEEQ as a reliable measure and how the additional emotions relate to it. Specifically, I hypothesize the SEEQ to show adequate fit in CFA with freely correlated latent variables (LVs) and worse fit when forced into a hierarchical organization with PA and NA as second-order factors. The freely correlated LVs correspond more to the discrete emotion perspective where each emotion is distinct, but also related to some emotions (e.g., a smooth gradient between anxiety and fear) (Cowen & Keltner, 2017, 2021). I also expect the SEEQ-20 to perform about as well as the PANAS at indicating PA and NA. Finally, I expect Horror and Trepidation to be difficult to disentangle from SEEQ Anxiety and Fear; mDES Hope to be difficult to disentangle with FEEELS Elevation; Boredom, Contempt, Hubristic Pride will be relatively separate from the SEEQ; and finally, that Embarrassment, Shame, and Guilt will continue to be difficult to separate.

Methods

Overview

Here, I present the analyses of the pre-registered replication of the SEEQ's superior performance to the PANAS on four well-being outcomes. I measured a smaller set of well-being outcomes in this study, but they span positive psychological functioning (e.g., purpose in life), psychological dysfunction (e.g., depression), and general well-being outcomes (e.g., life satisfaction).

Power and sample size

This present study has the same issue as studies one and two from Part II in that there is no clear established method to estimate power for Vuong's test that I could identify and replicate. Nevertheless, I aimed for a target sample size of 600 participants, similar in size to study 1b from Part II.

Participants

600 adults from across the United States were recruited from Cloud Research's online platform, Connect. Our criteria for exclusion included failing both attention checks, but no participant failed both checks (12 participants failed one attention check). However, two participants submitted the Connect task without completing the survey. Therefore, the final sample consists of 598 adults (53.0% men, 45.2% women, 1.5% non-binary, 1 participant selecting "prefer not to say" and 1 participant selecting "Additional gender category/identity not listed). Their ethnic/racial characteristics were: 67.0% White European, 14.2% Black or African American, 9.3% Asian, 6.8% Latinx, 1.7% Native American or Alaskan Native, and 1.0% other.

Measures

Self-report Emotion Experience

I measured emotions using the most recent version of the SEEQ and its new items, unique items from the PANAS, and the following subscales from the FEEELS: Trepidation, Contempt, Hubristic Pride, Elevation, and Horror. In addition, I included items for Hope from the mDES; exploratory items for a Bored factor and Relief factor; and finally, items to attempt to separate Shame, Embarrassment, and Guilt (see Appendix, Table 5 for all items). For specific emotions of the SEEQ, see Table 32.

Table 32
SEEQ Items

Positive Emotion	Items	Negative Emotion	Items
Interest	Interested, curious, attentive	Anger	Angry, annoyed, irrita**ted**
Awe	Awe, amazed, wonderment	Fear	Afraid, terrified, scared
Love	Love, closeness (to another), affectionate	Sadness	Sad, down, blue
Desire (sexual)	Desire (sexual), lustful, **horny**	Disgust	Disgusted, repulsed, **revulsion**
Compassion	Compassionate, sympathetic, **kind**	Self-conscious Neg. Emotions	Ashamed, embarrassed, guilty
Amusement	Amused, humorous, silly	Confusion	Confused, dumbfounded, perplexed
Contentment	Contented, serene, calm	Pain	Pain, distressed, hurt
Pride	Proud **of myself**, strong, determined	Anxiety	Anxious, worried, nervous
Elation	Elated, blissful, ecstatic	Jealousy	Jealous, envious
Gratitude	Grateful, thankful, appreciative	Self-critical	Self-critical, Self-condemning, Concerned for myself

Note. SEEQ-20 item underlined. New item or changes to an item are bolded.

Well-being

In this sample, I assessed well-being using four different scales. The measures were depression (α = .95, Beck et al., 1961), life satisfaction (α = .91, Margolis et al., 2019), self-esteem (Robins et al., 2001), loneliness (α = .93, Hays & DiMatteo, 1987), and psychological

well-being (4 items each; αs are: autonomy = .61, environmental mastery = .75, personal growth = .64, purpose in life = .65, positive relationships = .82, self-acceptance = .80) (Ryff, 1989).

Analysis Strategy

First, I replicated the analyses from Part II of this manuscript: in this non-college student sample, does the SEEQ-20 continue to outperform the PANAS in explaining important aspects of well-being, descriptively in terms of robust adjusted R^2 and statistically using Vuong's test? Subsequently, I tested the factor structure of the SEEQ and SEEQ-20 using CFA. Then, I assessed whether the novel emotions were promising candidates for measures that work well with the SEEQ. To do this, I first used LASSO regression with the composite scores of each emotion predicting each well-being outcome to identify which emotions were most promising in terms of their relation to well-being. Afterward, I used the EFA and residualization techniques from Part I of this manuscript to then investigate if these novel measures could be separated from highly correlated measures in the SEEQ (i.e., primary loadings $\geq .50$ and cross-loadings $\leq .40$).

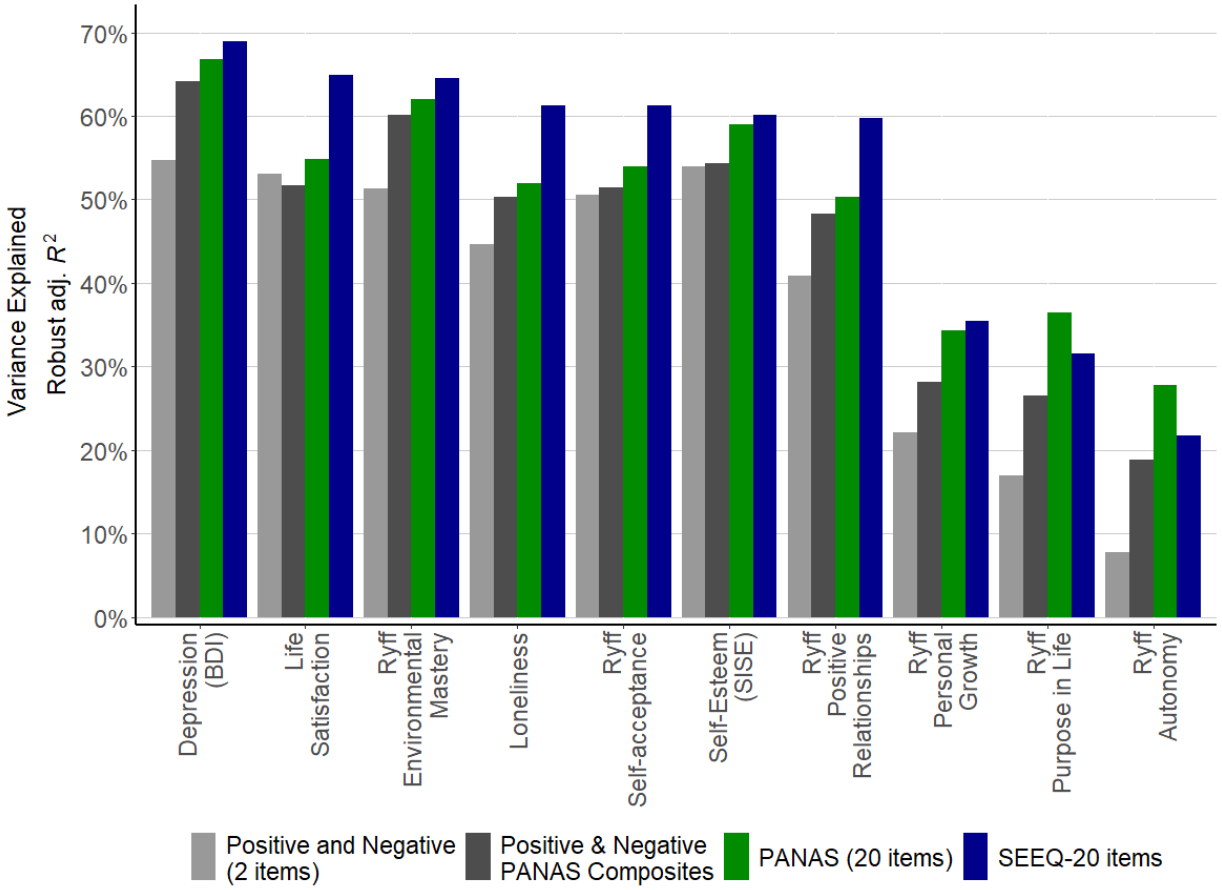
Results

Well-being and Emotional Experience

Just as in Part II of this manuscript, I assessed the overall explanatory power of the SEEQ-20 in self-reported well-being with a descriptive comparison of robust variance explained (adjusted R^2) among 4 sets of predictors: the items "positive" and "negative," PANAS PA and NA, the 20 items of the PANAS, and the 20 items of the SEEQ-20. As predicted, the SEEQ-20 items performed better at explaining more well-being outcomes: seven of the ten measured (see Figure 9). Specifically, the SEEQ replicated better performance than the PANAS for depression, life satisfaction, loneliness, self-acceptance, positive relationships with others, and personal growth. Contrary to the previous results, the SEEQ performed better at explaining environmental mastery and self-esteem in this sample. Also contrary to the previous study, the PANAS explained purpose in life and autonomy better than the SEEQ.

Figure 9

Replication Study: Comparing the variance of well-being explained by: items "positive" and "negative," PANAS PA and NA, the 20 items of the PANAS, and the 20 items of the SEEQ-20.



Note. Robust regression analyses performed using the robustbase package to provide a robust estimate of adjusted R^2. In light grey, each well-being outcome is regressed onto two single-item indicators, positive and negative. This serves as a convenient baseline for explanatory power. In dark grey, well-being is regressed onto the two composite scores for PANAS PA and NA. In green, all 20 items of the PANAS are simultaneous regressors. In blue, all 20 items of the SEEQ-20 are simultaneous regressors.

To test whether the SEEQ-20 (m2) significantly outperformed the PANAS items (m1) on each well-being indicator, I used Vuong's test (1989). To review, the two models were first tested for distinguishability: based on the sample data, is it likely that the models make distinguishable predictions at the population level? The models must be distinguishable to validly compare their performance. The second step compares the likelihoods of the models and tests the superiority of model 1 to model 2, and model 2 to model 1. For these comparisons, see Table 33.

Table 33

Vuong's test comparing PANAS (m1) to SEEQ-20 (m2)

Well-being Outcome	Omega Statistic	Distinguishability Test (*p*-value)	LRT z-statistic	Which is better?	Replicated?
Loneliness* **	**0.329**	**.000**	**-4.66*** **	**SEEQ-20**	**Replicated**
Life Satisfaction* **	**0.253**	**.000**	**-4.29*** **	**SEEQ-20**	**Replicated**
Ryff Positive Relationships* **	**0.364**	**.000**	**-4.01*** **	**SEEQ-20**	**Replicated**
Ryff Self-Acceptance* **	**0.189**	**.000**	**-3.67*** **	**SEEQ-20**	**New**
Ryff Environmental Mastery	0.262	.000	-1.06		
Depression (BDI)	0.301	.000	-0.92		Non-replication
Self-Esteem (SISE)	0.201	.000	-0.54		
Ryff Personal Growth	0.211	.000	-0.19		
Ryff Autonomy* **	**0.179**	**.000**	**1.85*** **	**PANAS**	**New**
Ryff Purpose in Life* **	**0.246**	**.000**	**1.98*** **	**PANAS**	**New**

*** p < .001 ** p < .01 * p < .05 for focal test: SEEQ-20 superiority to PANAS.

Note. These *z*-statistics are inherently one-tailed tests where negative values indicate the superiority of the SEEQ-20 over the PANAS in explaining a well-being outcome, and vice versa for positive values. The table is sorted by better performance of the SEEQ-20 at the top to better performance of the PANAS at the bottom. Significant differences are bolded.

As shown in Table 33, the SEEQ-20 performed significantly better than the PANAS at predicting loneliness, life satisfaction, positive relationships with others, and self-acceptance. Meanwhile, the PANAS performed significantly better on two outcomes: autonomy and purpose in life. There are few notable differences in these results compared to the studies from Part II. First, the SEEQ-20 was significantly better at predicting self-acceptance in this sample. Second, the SEEQ-20 was not significantly better at predicting depression here, but it was in sample 1b from Part II. Third, the PANAS was significantly better at predicting autonomy and purpose in life in. On the whole, I replicated three of four pre-registered hypotheses (positive relationships with others, loneliness, and life satisfaction, but not depression).

CFA of the Original SEEQ

I assessed the overall fit of the SEEQ in a CFA using the lavaan package in R. Model 1 included latent variables (LVs) for each emotion of the SEEQ, using the maximum likelihood estimator (ML) and freely correlated LVs. Model 2 had the same LVs and indicators, but a hierarchical structure with positive and negative emotions loading onto correlated, second-order factors, PA and NA. As hypothesized, model 1 showed acceptable fit (SRMR = .061, RMSEA = .043, TLI = .932, CFI = .942), and Model 2 was clearly worse (SRMR = .113, RMSEA = .056, TLI = .886, CFI = .891). The short version, the SEEQ-20, showed a worse fit in this sample (SRMR = .085, RMSEA = .081, TLI = .885, CFI = .898) than the PANAS (SRMR = .055, RMSEA = .084, TLI = .904, CFI = .898) on more fit indices, contrary to my hypothesis.

Other Dimensions of Emotion

Variable Selection for Explanatory Power via LASSO

To investigate the question of how the other sub-scales relate to the SEEQ, I first focused on a practical issue: do these other emotions predict well-being outcomes above-and-beyond the SEEQ measures?[11] Given the highly correlated nature of the variables, I used LASSO regression to do this. LASSO has better performance for correlated predictors (McNeish, 2015). First, I created composite scores for each emotion by adding its items together and z-scoring them. Then I submitted these composite scores as predictors of each dependent variable in separate LASSO regressions using 5-fold cross-validation to select the LASSO penalty, lambda. See Table 34 for the results of this analysis.

[11] Because I am interested in how these subscales relate to the current SEEQ, I did not include Embarrassment, Shame, and Guilt in these analyses.

Table 34

LASSO regression coefficients for each well-being outcome predicted by emotion composites

	Well-being Outcomes									
	BDI	Lone-liness	Life satisfaction	Ryff EM	Ryff SA	Ryff PR	Ryff PG	Ryff PL	Ryff AU	SISE
Trepidation	.	0.02	-0.03	-0.14	.	-0.01	.	.	.	.
Contempt	.	.	.	.	.	-0.02	-0.05	-0.10	.	.
Hubristic pride	.	.	.	.	.	.	.	-0.01	.	0.09
Elevation	.	.	.	.	.	.	.	.	.	0.06
Horror	.	.	.	.	.	.	.	-0.01	.	.
Hope	-0.09	.	0.03	0.06	0.07	.	0.02	.	.	0.20
Boredom	0.14	0.16	-0.01	-0.10	-0.05	-0.17	-0.12	-0.17	.	-0.02
Interest	-0.01	.	.	.	.	.	0.10	0.05	0.13	.
Awe	.	.	.	.	.	.	.	.	.	.
Love	.	-0.29	0.18	0.09	0.14	0.34	0.10	0.03	.	.
Desire	.	.	.	.	.	.	.	.	.	.
Compassion	.	.	0.00	.	.	0.07	0.07	.	.	.
Amusement	.	.	.	.	.	.	.	.	.	.
Content	-0.04	-0.02	0.15	0.11	0.07	.	.	.	.	.
Pride	-0.01	.	0.14	0.09	0.16	.	0.00	0.04	.	0.22
Elated	.	.	0.05	.	0.02	.	.	.	.	.
Gratitude	.	.	0.01	0.01	0.01	0.01	0.07	0.16	.	.
Anger	.	.	.	.	.	.	.	.	.	.
Fear	.	.	.	.	.	.	.	.	.	.
Sadness	0.32	0.22	-0.22	-0.15	-0.16	-0.14	.	-0.01	.	-0.13
Disgust	.	.	.	.	.	.	-0.01	-0.09	.	.
Shame	0.06	0.05	.	-0.07	-0.06	-0.08	-0.09	0.00	-0.15	-0.07
Confused	.	.	.	.	.	.	.	-0.06	-0.04	.
Pain	0.13	.	.	-0.02	.	.	.	.	.	.
Anxiety	.	.	.	.	.	.	.	.	.	-0.02
Jealous	.	0.01	-0.06	.	-0.01	.	.	.	-0.14	.
Self-critical	0.03	0.07	-0.18	-0.04	-0.13	-0.05	.	.	.	-0.07

Note. The first seven rows are new emotions. The SEEQ composite emotions follow. Each column represents a separate LASSO regression model.

The LASSO results highlighted the importance of some emotions over others in relation to the well-being measures included in this study. First, Hope and Boredom related to many of the well-being outcomes measured in this study. These results indicated something important is captured by these specific emotions that is not completely explained by other SEEQ emotions. Trepidation was also related to multiple outcomes and most strongly to Environmental Mastery, surpassed only by Sadness. Interestingly, contempt was third most strongly related to Purpose in Life. Both Hubristic Pride and Elevation primarily related to Self Esteem, and Horror only slightly to purpose in life. This may indicate that Hope and Boredom are particularly unique measures, and that the others are more redundant with measures in the SEEQ. However, this alone analysis is just one guide. For example, it is possible these emotional experiences are strongly related to other important but unmeasured variables. This is one reason that the

underwhelming performance of SEEQ Anger and SEEQ Fear do not necessarily mean they are unimportant or redundant. And while LASSO is better at accommodating collinearity, it enforces sparsity (fewer predictors) by definition; while a desirable property, LASSO alone cannot indicate if emotions should instead be combined rather than removed (Altelbany, 2021; McNeish, 2015; Tibshirani, 2011). I turn to the question of uniqueness and measurement in the next section.

Factor Structure of the Related SEEQ Mini-Scales and New Emotion Scales

To understand how the new emotion scales related to the existing scales in the SEEQ, I computed the empirical correlation between the composite scores of each emotion (for new emotion to SEEQ emotions, see Table 35; for full correlation table, see Appendix, Table 6). I considered correlations of $r \geq .80$ as very high and necessary to investigate in smaller EFAs. I also referenced the residual correlation matrix of all the items. This was the same approach as discussed in Part I of this manuscript: submit the items to a two-factor EFA with a varimax rotation (i.e., PA and NA) and submit the residual correlation matrix to a hierarchical agglomerative clustering algorithm. See Appendix, Figure 2 for a heatmap of the matrix. In the following paragraphs, I review many, but not all EFAs I performed.

Table 35

Correlation matrix of the composite emotion scores

	Trepida-tion	Con-tempt	Hubristic Pride	Eleva-tion	Horror	Hope	Boredom
Trepidation	1.00	.63	.34	-.16	.68	-.37	.76
Contempt	.63	1.00	.57	.15	.77	-.05	.55
Hubristic	.34	.57	1.00	.30	.49	.20	.30
Inspired	-.16	.15	.30	1.00	.14	.81	-.27
Horror	.68	.77	.49	.14	1.00	-.07	.54
Hope	-.37	-.05	.20	.81	-.07	1.00	-.45
Boredom	.76	.55	.30	-.27	.54	-.45	1.00
Interested	-.18	.00	.16	.68	.04	.69	-.35
Awe	-.02	.26	.36	.78	.25	.67	-.14
Love	-.23	-.03	.13	.68	.01	.68	-.37
Desire	.16	.25	.35	.41	.23	.32	.10
Compassion	-.08	.02	.08	.65	.11	.60	-.18
Amusement	.08	.14	.32	.56	.21	.48	-.03
Contented	-.39	-.09	.17	.67	-.13	.74	-.42
Pride	-.29	.04	.26	.79	.03	***.83***	-.40
Elation	-.12	.20	.36	***.81***	.19	.74	-.19
Gratitude	-.24	-.09	.07	.70	-.04	.76	-.39
Anger	.75	.63	.36	-.16	.67	-.34	.72
Fear	.76	.65	.36	-.05	.74	-.25	.65
Sad	.76	.53	.21	-.28	.55	-.48	***.80***
Disgust	.58	***.82***	.52	.16	***.81***	-.04	.52
Shame	.74	.61	.41	-.07	.62	-.25	.70
Confusion	.71	.67	.50	.15	.78	-.05	.55
Pain	***.80***	.62	.34	-.11	.68	-.31	.73
Anxiety	***.81***	.47	.23	-.22	.57	-.40	.70
Jealousy	.61	.61	.43	.02	.56	-.14	.59
Self-critical	.70	.53	.28	-.06	.53	-.26	.64

Note. Empirical correlations $r \geq .80$ bolded and italicized.

The correlations between the composite scores showed Trepidation correlated strongly ($r \geq .80$) with SEEQ Pain and SEEQ Anxiety. The clustered residual correlation matrix also

showed that FEEELS Trepidation item “unsure” clustered with SEEQ Anxiety items (anxious, worried, nervous), which were the three largest residual correlations for “unsure.” To explore further, I submitted the items for SEEQ Anxiety and FEEELS Trepidation to a two-factor EFA with varimax rotation (see Table 36). While both factors showed high cross-loadings (≥ .40), items unsure and worried especially loaded onto both factors. The items hesitant, wary, and doubtful from FEEELS Trepidation were somewhat better, but still had relatively high cross-loadings. Alternatively, the SEEQ Anxiety items showed high cross-loadings.

Table 36

Anxiety and Trepidation Two-Factor EFA Loadings

Item	FA1	FA2
Anxious	.46	.76
Worried	.51	.68
Nervous	.46	.74
Hesitant	.69	.40
Wary	.66	.40
Doubtful	.68	.42
Unsure	.60	.54

I proceeded to look at a three-factor EFA including SEEQ Pain because FEEELS Trepidation was also correlated with Pain. Several issues with the Trepidation items became clearer at this step (see Table 37). Even for SEEQ Pain, the item distressed loaded almost equally onto Anxiety. This indicated a need for an alternative item for Pain. The other items for SEEQ Anxiety and SEEQ Pain showed better simple structure; however, the FEEELS items were relatively equally spread across all three factors. For example, doubtful loadings were .43, .47, and .49 for factors one through three, respectively.

Table 37

Anxiety, Trepidation, and Pain Three-Factor EFA Loadings

Item	FA1	FA2	FA3
Anxious	.75	.34	.30
Worried	.70	.39	.31
Nervous	.75	.32	.31
Pain	.30	.64	.27
Distressed	.52	.57	.31
Hurt	.33	.71	.29
Hesitant	.41	.41	.55
Wary	.41	.41	.50
Doubtful	.43	.47	.49
Unsure	.56	.38	.45

FEEELS Contempt showed the highest correlation with SEEQ Disgust. Likely the biggest problem, the SEEQ Disgust scale uses *revulsion* as an item, and the FEEELS Contempt scale uses *revolted* as an item. It is possible revolted really does belong more with contempt, but the residual correlation matrix suggested it clusters more with disgust. As additional information, the highest residual correlations for revolted were repulsed (r = .27), revulsion (r = .25), appalled

(r = .22), disgusted (r = .19), horrified (r = .14), and *then* contemptuous (r = .12) and scornful (r = .12). Submitting the items to an EFA further clarified that a contemptuous factor could potentially be separated from disgust, but currently lacks a third item (see Table 38). Scornful loaded almost equally across both factors and revolted loaded primarily on the Disgust factor. Contemptuous and disdainful showed better simple structure (primary loadings ≥ .70, cross-loadings ≤ .40).

Table 38

Disgust and Contempt Two-Factor EFA Loadings

Item	FA1	FA2
Disgusted	.67	.43
Repulsed	.78	.40
Revulsion	.77	.39
Scornful	.48	.50
Contemptuous	.36	.76
Disdainful	.38	.77
Revolted	.76	.37

FEEELS Elevation showed the highest correlation with SEEQ Elation and mDES Hope. Interestingly, the clustered residual correlation matrix neatly separated Elation from both Hope and Elevation. The Hope and Elevation items were a bit more mixed. Submitting the items to a three-factor EFA showed that the Elevation items, uplifted, elevated, and inspired, showed multiple high cross-loadings (≥ .40) (see Table 39). Uplifted and elevated loaded almost equally on at least two factors. Separating Hope from Elation showed more promise via the items Hopeful and Optimistic. In two-factor EFA with only the Elation and Hope items, the highest cross-loadings were from elated and encouraged (see Table 40).

Table 39

Elated, Inspired, and Hope Three-Factor EFA Loadings

Item	FA1	FA2	FA3
Elated	.69	.40	.33
Blissful	.70	.33	.31
Ecstatic	.74	.27	.32
Hopeful	.31	.70	.40
Optimistic	.36	.81	.25
Encouraged	.40	.57	.53
Uplifted	.50	.48	.47
Elevated	.51	.37	.50
Inspired	.44	.43	.54
Acknowledging	.34	.27	.49

Table 40
Elated and Hope Two-Factor EFA Loadings

Item	FA1	FA2
Elated	.74	.45
Blissful	.75	.38
Ecstatic	.77	.33
Hopeful	.37	.80
Optimistic	.40	.80
Encouraged	.50	.67

Bored showed the highest correlation with SEEQ Sad. The clustered residual correlation matrix did separate Sad from Bored, however. Bored items did not come from an existing scale, but its candidate items included: bored, uninterested, disengaged, meaningless, and restless.[12] The residual correlation matrix suggested that all items but restless clustered together. Submitting these items to an EFA further clarified that the item down from SEEQ Sadness and items disengaged and uninterested from Bored had high cross-loadings (see Table 41). Additionally, meaningless loaded most onto factor 1, which was more clearly Sadness. While not perfect, the items bored, uninterested, and disengaged might be the most promising for future study, as well as alternative items for Sadness.

Table 41
Sad and Bored Two-Factor EFA Loadings

Item	FA1	FA2
Sad	.80	.38
Down	.79	.44
Blue	.79	.39
Bored	.31	.62
Disengaged	.45	.76
Meaningless	.63	.51
Uninterested	.41	.76

Finally, I turned to separating Shame, Guilt, and Embarrassment. The residual correlation matrix showed some promise because embarrassed formed a cluster with bashful, awkward, and shy. However, guilty, ashamed, blameworthy, and regretful formed their own cluster rather than separate clusters for guilt and shame. I had included apologetic and remorseful as potential items, but they formed their own two-item cluster. In EFA, the results reiterated that the items ashamed, guilty, and embarrassed loaded onto the same factor (see Table 42). However, bashful, shy, and awkward seemed like potential candidates for a separate construct, though it is not clear from this data alone if it is still Embarrassment.

[12] For reference, the correlation between interested and uninterested was $r(592) = -.34$, $p < .001$ (emotion items were in randomized order for each participant). A three-factor EFA with Interest items also easily disentangled Interest from both Sadness and Boredom. In addition to measurement issues like acquiescence or low attention, my intuition is that there is a meaningful semantic difference between low interest and being *un*interested.

Table 42

Ashamed, Guilty, and Embarrassed Three-Factor EFA Loadings

Item	FA1	FA2	FA3
Ashamed	.71	.35	.33
Disappointed with myself	.77	.35	.10
Regretful	.79	.26	.20
Guilty	.65	.31	.38
Blameworthy	.69	.23	.42
Remorseful	.57	.22	.50
Apologetic	.25	.26	.67
Embarrassed	.54	.52	.32
Shy	.22	.77	.15
Awkward	.38	.69	.15
Bashful	.20	.55	.30

Synthesis of Results Regarding the Measure of Specific Emotion Experiences

Taken together, the previous results suggested several improvements for developing a third version of the SEEQ and measures that work well with it. First, the subscale for Pain could use a better third item to replace distressed so that it is separate from Anxiety. Second, scales that measure Contempt, Hope, and Boredom are potential candidates for supplemental emotion measures that work well with the SEEQ. The SEEQ began from a high-dimensional conceptualization of emotional experience as stated in Semantic Space Theory (Keltner et al., 2023). As such, the SEEQ was always intended as only a sample of the conceptual space of emotion; more distinct emotions could be measured alongside or incorporated directly into the SEEQ.

The emotions I identified as likely to work well with the SEEQ are also theoretically relevant, not just empirically derived. Contempt has a long history of empirical research (e.g., Fischer & Roseman, 2007; Matsumoto, 1992), and in this data, LASSO suggested it uniquely contributed to (lack of) purpose in life and personal growth above the other dimensions measured in the SEEQ. Hope similarly contributed to (reduced) depression and (enhanced) self-esteem with items that could conceivably be separated from Elation. This contrasts with the Elevation items that cross-loaded onto both Elation and Hope. Finally, Boredom is both a common and consequential experience that has been linked, for example, to depression (Goldberg et al., 2011) and achievement (Camacho-Morles et al., 2021; Pekrun et al., 2010). In my own results, LASSO regression showed Boredom relates to nearly all the well-being measures in this study.

General Discussion

The subjective experience of emotion is central to conscious experience. It plays large roles across different levels of life, from moment-to-moment decision-making to enduring cultural norms across society that influence emotional experience and expression (e.g., Lerner & Keltner, 2001; Tsai, 2007). Like other sciences, measurement is critical to the study of subjective emotional experience, but unfortunately, emotion research lacks a unified approach to emotion measurement (Weidman et al., 2017). The most frequently used measure, the PANAS, primarily reflects more basic, non-emotional processes as conceptualized in the valence-arousal dimensions in core affect (Russell, 2003; Watson et al., 1988, 1999; Yik et al., 1999). If emotion researchers hope to truly understand the role of emotional experiences like love, gratitude, and

shame, we must seek to both sample the many kinds of emotional experiences people have and measure these experiences in consistent (ideally, the same) ways.

Across three studies, my general aim in this paper was to show that measures of specific emotions reliably and more powerfully relate to specific, important outcomes. In the first study, I used a between-subjects approach in cross-sectional self-report surveys. First, I tested, modified, and validated the SEEQ and SEEQ-20 in one large sample of undergraduate students and a smaller separate sample of undergraduate students. Second, I moved to the critical question of how well the SEEQ performs at predicting important outcomes. Across most indicators of well-being, I found three important results. First, that one-item indicators, Positive and Negative, often explain nearly as much as 10-item composite PA and NA in simple regression. If one is taking this aggregation approach in regression models, consider how necessary 18 extra items really are. Second, *disaggregating*, using the individual items, can explain a substantial amount more than PA and NA, even in the classic measure, the PANAS. And third, the emotional experiences in the SEEQ are more powerful predictors of many domains of well-being, in particular the social ones, than the PANAS.

In the second study, I adopted a within-subject daily diary approach. In keeping with the overall aim of highlighting the utility of specific emotion experiences, I compared the relative fixed effects of four specific positive emotion experiences: one high-arousal positive (elation), one low-arousal positive (contentment), one self-transcendent positive (gratitude), and the often-overlooked emotion of sexual desire. While some of my specific emotion hypotheses were not supported (e.g., elation did not most strongly relate to life satisfaction), the overall implication is that specific emotions differentially relate to daily well-being.

Finally, I replicated the results of the first study in study 3 and investigated the potential contribution of novel emotion measures. The replication served to validate the SEEQ and generalize the results of study 1 to a sample of adults across the United States. Again, the SEEQ explained more than the PANAS on most well-being indicators I measured, including three that were significantly better in pre-registered replications. Finally, I used subscales and items from other important emotion constructs to assess how to improve or supplement the SEEQ's measures of emotion. In line with my general argument that specific emotions matter in different ways, I provided evidence that multiple novel emotion constructs show promise by uniquely predicting well-being outcomes and by being separable from related SEEQ emotion scales.

Across these studies, I used my in-house scale, the Specific Emotion Experience Questionnaire (SEEQ), which was developed primarily from high-dimensional theoretical perspective of emotion experiences, Semantic Space Theory (Cowen & Keltner, 2021). As study three makes clear, the SEEQ is not a "final taxonomy" of emotion states. The "size" of meaningful and distinguishable emotion states varies depending on level of measurement and the specific phenomena: for example, 27 dimensions surface in self-report (Cowen & Keltner, 2017) and 24 dimensions from recognition of emotion in the voice (Cowen, Elfenbein, et al., 2019). Instead, the SEEQ is a convenient tool for sampling a richer variety of emotion states, and it is the tool I used for demonstrating why we should strive to represent this variety.

Implications

There are many important applications of the SEEQ and, more broadly, a high-dimensional conceptualization of emotion. For example, past research connects emotional complexity, emodiversity, not only to important mental health outcomes but also physical health (Ong et al., 2018; Quoidbach et al., 2014). However, measuring emodiversity is limited by the number of distinct emotions researchers choose to measure. This is also true for many measures

of affect dynamics. For example, in a critical analysis of the utility of affect dynamics across 15 datasets, Dejonckheere et al.'s (2019) data sources include as few as two positive and three negative emotions. The SEEQ should provide a more accurate portrayal of measures like emodiversity because it samples a richer variety of emotional experiences. In a similar vein, broader emotion dynamics—the ways in which emotions change, fluctuate, and covary over time—is a critical factor in psychological dysfunction and psychological well-being (Houben et al., 2015; Kuppens & Verduyn, 2017). For example, Kelley et al. (2023) found that individual emotion network dynamic connectivity related to depression variability with a subset of PANAS items. The dynamic association of specific emotions to each other is consequential, and I contend that there is much more to learn by incorporating more specific emotions, like SEEQ gratitude, jealousy, and love.

Outside the domain of health and well-being, the SEEQ can aid the study of culture and diversity. There are multiple foundational theories in cultural psychology explicitly about emotion, including Affect Valuation Theory (Tsai, 2007, 2017) and theories linking different forms of interdependence to the self, emotion, and social behavior (Kitayama et al., 2022; Kitayama & Park, 2007). Studies drawing on these literatures are often concerned with specific emotions not included on, for example, the PANAS, such as relational emotions like gratitude or less expressive emotions like calm. The SEEQ could be used to standardize measurement across such studies and benefits by drawing primarily on the cross-culturally expressed and recognized emotions.

Limitations

There are a number of important limitations to both the construction of the SEEQ and the analyses presented in this manuscript. First, the SEEQ was validated primarily in cross-sectional data. This contrasts with the exploratory approach applied to within-person emotional experiences over time that Chung et al. (2022) employed. While both the SEEQ and FEEELS converge on many emotions, future studies should confirm that the full SEEQ performs adequately in within-person data. Additionally, investigations of state experience, such as in response to controlled stimuli, are best suited to testing the independence of emotions, such as disentangling Shame, Guilt, and Embarrassment or the experience of Pride from Triumph. Another limitation that presents an opportunity for future work is to assess how well the SEEQ performs in different populations. In addition to gender and race or ethnicity, there are important demographic variables related to language, such as education (e.g., via vocabulary knowledge) and geographic region (e.g., via dialect). Methodologically, it will be important to assess the power inherent to the application of Vuong's test or to investigate and apply advances in non-nested model comparison.

Conclusion

To capture the richness of emotional experience and create the most replicable and generalizable science of emotion, researchers require a standard measure of specific emotions. The Specific Emotion Experience Questionnaire (SEEQ) provides such a measure. The SEEQ leverages recent data-driven advances in emotion conceptualization and dimensionality to sample a greater variety of distinct emotional experiences. These experiences relate more powerfully to critical well-being outcomes such as positive relationships with others. The SEEQ's blend of specific emotional experiences provides a foundation for the comprehensive study of emotion in well-being, daily life, and other domains, such as culture.

References

Acevedo, A. M., Herrera, C., Shenhav, S., Yim, I. S., & Campos, B. (2020). Measurement of a Latino cultural value: The Simpatía scale. *Cultural Diversity and Ethnic Minority Psychology*, *26*(4), 419–425. https://doi.org/10.1037/cdp0000324

Algoe, S. B. (2012). Find, Remind, and Bind: The Functions of Gratitude in Everyday Relationships. *Social and Personality Psychology Compass*, *6*(6), 455–469. https://doi.org/10.1111/j.1751-9004.2012.00439.x

Allen, M. S., Iliescu, D., & Greiff, S. (2022). Single Item Measures in Psychological Science. *European Journal of Psychological Assessment*, *38*(1), 1–5. https://doi.org/10.1027/1015-5759/a000699

Altelbany, S. (2021). Evaluation of Ridge, Elastic Net and Lasso Regression Methods in Precedence of Multicollinearity Problem: A Simulation Study. *Journal of Applied Economics and Business Studies*, *5*(1), Article 1. https://doi.org/10.34260/jaebs.517

Bai, Y., Ocampo, J., Jin, G., Chen, S., Benet-Martinez, V., Monroy, M., Anderson, C., & Keltner, D. (2021). Awe, daily stress, and elevated life satisfaction. *Journal of Personality and Social Psychology*, *120*(4), 837–860. https://doi.org/10.1037/pspa0000267

Barrett, L. F. (2017). The theory of constructed emotion: An active inference account of interoception and categorization. *Social Cognitive and Affective Neuroscience*, *12*(1), 1–23. https://doi.org/10.1093/scan/nsw154

Barrett, L. F. (2022). Context reconsidered: Complex signal ensembles, relational meaning, and population thinking in psychological science. *American Psychologist*, *77*(8), 894–920. https://doi.org/10.1037/amp0001054

Barrett, L. F., Mesquita, B., Ochsner, K. N., & Gross, J. J. (2007). The Experience of Emotion. *Annual Review of Psychology*, *58*(1), 373–403. https://doi.org/10.1146/annurev.psych.58.110405.085709

Barrett, L. F., & Westlin, C. (2021). Chapter 2—Navigating the science of emotion. In H. L. Meiselman (Ed.), *Emotion Measurement (Second Edition)* (pp. 39–84). Woodhead Publishing. https://doi.org/10.1016/B978-0-12-821124-3.00002-8

Beck, A., Ward, C., Mendelson, M., Mock, J., & Erbaugh, J. (1961). An Inventory for Measuring Depression. *Archives of General Psychiatry*, *4*(6), 561–571. https://doi.org/10.1001/archpsyc.1961.01710120031004

Boedeker, P., & Kearns, N. T. (2019). Linear Discriminant Analysis for Prediction of Group Membership: A User-Friendly Primer. *Advances in Methods and Practices in Psychological Science*, *2*(3), 250–263. https://doi.org/10.1177/2515245919849378

Bollen, K. A. (2002). Latent Variables in Psychology and the Social Sciences. *Annual Review of Psychology*, *53*(1), 605–634. https://doi.org/10.1146/annurev.psych.53.100901.135239

Borsboom, D., Mellenbergh, G. J., & van Heerden, J. (2003). The theoretical status of latent variables. *Psychological Review*, *110*(2), 203–219. https://doi.org/10.1037/0033-295X.110.2.203

Brody, L. R., Hall, J. A., & Stokes, L. R. (2016). Gender and emotion: Theory, findings, and context. *Handbook of Emotions*, *4*, 369–392.

Brouwers, C., Mommersteeg, P. M. C., Nyklíček, I., Pelle, A. J., Westerhuis, B. L. W. J. J. M., Szabó, B. M., & Denollet, J. (2013). Positive affect dimensions and their association with inflammatory biomarkers in patients with chronic heart failure. *Biological Psychology*, *92*(2), 220–226. https://doi.org/10.1016/j.biopsycho.2012.10.002

Burger, J. M., & Caldwell, D. F. (2000). Personality, Social Activities, Job-Search Behavior and Interview Success: Distinguishing Between PANAS Trait Positive Affect and NEO Extraversion. *Motivation and Emotion*, *24*(1), 51–62. https://doi.org/10.1023/A:1005539609679

Burns, R. A., & Machin, M. A. (2010). Identifying gender differences in the independent effects of personality and psychological well-being on two broad affect components of subjective well-being. *Personality and Individual Differences*, *48*(1), 22–27. https://doi.org/10.1016/j.paid.2009.08.007

Camacho-Morles, J., Slemp, G. R., Pekrun, R., Loderer, K., Hou, H., & Oades, L. G. (2021). Activity Achievement Emotions and Academic Performance: A Meta-analysis. *Educational Psychology Review*, *33*(3), 1051–1095. https://doi.org/10.1007/s10648-020-09585-3

Campbell, J. D., Trapnell, P. D., Heine, S. J., Katz, I. M., Lavallee, L. F., & Lehman, D. R. (1996). Self-concept clarity: Measurement, personality correlates, and cultural boundaries. *Journal of Personality and Social Psychology*, *70*(1), 141–156. https://doi.org/10.1037/0022-3514.70.1.141

Campos, B., & Kim, H. S. (2017). Incorporating the cultural diversity of family and close relationships into the study of health. *American Psychologist*, *72*(6), 543–554. https://doi.org/10.1037/amp0000122

Cheng, J. T., Tracy, J. L., & Henrich, J. (2010). Pride, personality, and the evolutionary foundations of human social status. *Evolution and Human Behavior*, *31*(5), 334–347. https://doi.org/10.1016/j.evolhumbehav.2010.02.004

Cheung, F., & Lucas, R. E. (2014). Assessing the validity of single-item life satisfaction measures: Results from three large samples. *Quality of Life Research*, *23*(10), 2809–2818. https://doi.org/10.1007/s11136-014-0726-4

Chung, J. M., Harari, G. M., & Denissen, J. J. A. (2022). Investigating the within-person structure and correlates of emotional experiences in everyday life using an emotion family approach. *Journal of Personality and Social Psychology*, *122*(6), 1146–1189. https://doi.org/10.1037/pspp0000419

Chung, M., & Harris, C. R. (2018). Jealousy as a Specific Emotion: The Dynamic Functional Model. *Emotion Review*, *10*(4), 272–287. https://doi.org/10.1177/1754073918795257

Clark, L. A., Watson, D., & Mineka, S. (1994). Temperament, personality, and the mood and anxiety disorders. *Journal of Abnormal Psychology*, *103*(1), 103–116. https://doi.org/10.1037/0021-843X.103.1.103

Cohen, S., Kamarck, T., & Mermelstein, R. (1983). A Global Measure of Perceived Stress. *Journal of Health and Social Behavior*, *24*(4), 385–396. https://doi.org/10.2307/2136404

Cohen, S., Mermelstein, R., Kamarck, T., & Hoberman, H. M. (1985). Measuring the Functional Components of Social Support. In I. G. Sarason & B. R. Sarason (Eds.), *Social Support: Theory, Research and Applications* (pp. 73–94). Springer Netherlands. https://doi.org/10.1007/978-94-009-5115-0_5

Cordaro, D., Keltner, D., Tshering, S., Wangchuk, D., & Flynn, L. (2016). The Voice Conveys Emotion in Ten Globalized Cultures and One Remote Village in Bhutan. *Emotion*, *16*(1), 117–128. https://doi.org/10.1037/emo0000100

Cordaro, D., Sun, R., Kamble, S., Hodder, N., Monroy, M., Cowen, A. S., Bai, Y., & Keltner, D. (2020). The Recognition of 18 Facial-Bodily Expressions Across Nine Cultures. *Emotion (Washington, D.C.)*, *20*(7), 1292–1300. https://doi.org/10.1037/emo0000576

Cordaro, D. T., Bai, Y., Bradley, C. M., Zhu, F., Han, R., Keltner, D., Gatchpazian, A., & Zhao, Y. (2024). Contentment and Self-acceptance: Wellbeing Beyond Happiness. *Journal of Happiness Studies*, *25*(1), 15. https://doi.org/10.1007/s10902-024-00729-8

Corona, K., Senft, N., Campos, B., Chen, C., Shiota, M., & Chentsova-Dutton, Y. E. (2020). Ethnic variation in gratitude and well-being. *Emotion*, *20*(3), 518–524. https://doi.org/10.1037/emo0000582

Cowen, A. S., Elfenbein, H. A., Laukka, P., & Keltner, D. (2019). Mapping 24 emotions conveyed by brief human vocalization. *American Psychologist*, *74*(6), 698–712. https://doi.org/10.1037/amp0000399

Cowen, A. S., Fang, X., Sauter, D., & Keltner, D. (2020). What music makes us feel: At least 13 dimensions organize subjective experiences associated with music across different cultures. *Proceedings of the National Academy of Sciences*, *117*(4), 1924–1934. https://doi.org/10.1073/pnas.1910704117

Cowen, A. S., & Keltner, D. (2017). Self-report captures 27 distinct categories of emotion bridged by continuous gradients. *Proceedings of the National Academy of Sciences*, *114*(38), E7900–E7909. https://doi.org/10.1073/pnas.1702247114

Cowen, A. S., & Keltner, D. (2021). Semantic Space Theory: A Computational Approach to Emotion. *Trends in Cognitive Sciences*, *25*(2), 124–136. https://doi.org/10.1016/j.tics.2020.11.004

Cowen, A. S., Laukka, P., Elfenbein, H. A., Liu, R., & Keltner, D. (2019). The primacy of categories in the recognition of 12 emotions in speech prosody across two cultures. *Nature Human Behaviour*, *3*(4), 369–382. https://doi.org/10.1038/s41562-019-0533-6

Cowen, A. S., Sauter, D., Tracy, J. L., & Keltner, D. (2019). Mapping the Passions: Toward a High-Dimensional Taxonomy of Emotional Experience and Expression. *Psychological Science in the Public Interest*, *20*(1), 69–90. https://doi.org/10.1177/1529100619850176

Crawford, J. R., & Henry, J. D. (2004). The Positive and Negative Affect Schedule (PANAS): Construct validity, measurement properties and normative data in a large non-clinical sample. *British Journal of Clinical Psychology*, *43*(3), 245–265. https://doi.org/10.1348/0144665031752934

Cunningham, W. A., Dunfield, K. A., & Stillman, P. E. (2013). Emotional States from Affective Dynamics. *Emotion Review*, *5*(4), 344–355. https://doi.org/10.1177/1754073913489749

De Leersnyder, J., Mesquita, B., Kim, H., Eom, K., & Choi, H. (2014). Emotional fit with culture: A predictor of individual differences in relational well-being. *Emotion*, *14*(2), 241–245. https://doi.org/10.1037/a0035296

Dejonckheere, E., Mestdagh, M., Houben, M., Rutten, I., Sels, L., Kuppens, P., & Tuerlinckx, F. (2019). Complex affect dynamics add limited information to the prediction of psychological well-being. *Nature Human Behaviour*, *3*(5), 478–491. https://doi.org/10.1038/s41562-019-0555-0

Deniz, M. E., & Işik, E. (2010). Positive and Negative Affect, Life Satisfaction, and Coping with Stress by Attachment Styles in Turkish Students. *Psychological Reports*, *107*(2), 480–490. https://doi.org/10.2466/02.09.10.20.PR0.107.5.480-490

DeYoung, C. G., & Krueger, R. F. (2020). To Wish Impossible Things: On the Ontological Status of Latent Variables and the Prospects for Theory in Psychology. *Psychological Inquiry*, *31*(4), 289–296. https://doi.org/10.1080/1047840X.2020.1853462

Diamond, L. M. (2003). What does sexual orientation orient? A biobehavioral model distinguishing romantic love and sexual desire. *Psychological Review*, *110*(1), 173–192. https://doi.org/10.1037/0033-295X.110.1.173

Diener, E. (2009). Subjective Well-Being. In E. Diener (Ed.), *The Science of Well-Being: The Collected Works of Ed Diener* (pp. 11–58). Springer Netherlands. https://doi.org/10.1007/978-90-481-2350-6_2

Ding, L., Velicer, W. F., & Harlow, L. L. (1995). Effects of estimation methods, number of indicators per factor, and improper solutions on structural equation modeling fit indices. *Structural Equation Modeling: A Multidisciplinary Journal*, *2*(2), 119–143. https://doi.org/10.1080/10705519509540000

Dixon, T. (2012). "Emotion": The History of a Keyword in Crisis. *Emotion Review*, *4*(4), 338–344. https://doi.org/10.1177/1754073912445814

Dukes, D., Abrams, K., Adolphs, R., Ahmed, M. E., Beatty, A., Berridge, K. C., Broomhall, S., Brosch, T., Campos, J. J., Clay, Z., Clément, F., Cunningham, W. A., Damasio, A., Damasio, H., D'Arms, J., Davidson, J. W., de Gelder, B., Deonna, J., de Sousa, R., … Sander, D. (2021). The rise of affectivism. *Nature Human Behaviour*, *5*(7), Article 7. https://doi.org/10.1038/s41562-021-01130-8

Edelstein, R. S., & Chin, K. (2018). Hormones and close relationship processes: Neuroendocrine bases of partnering and parenting. In *Routledge International Handbook of Social Neuroendocrinology*. Routledge.

Eisenberg, D., Hunt, J., & Speer, N. (2013). Mental Health in American Colleges and Universities: Variation Across Student Subgroups and Across Campuses. *The Journal of Nervous and Mental Disease*, *201*(1), 60. https://doi.org/10.1097/NMD.0b013e31827ab077

Ekman, P. (1992). An argument for basic emotions. *Cognition and Emotion*, *6*(3–4), 169–200. https://doi.org/10.1080/02699939208411068

Ekman, P., Sorenson, E. R., & Friesen, W. V. (1969). Pan-Cultural Elements in Facial Displays of Emotion. *Science*, *164*(3875), 86–88. https://doi.org/10.1126/science.164.3875.86

Fischer, A. H., & Roseman, I. J. (2007). Beat them or ban them: The characteristics and social functions of anger and contempt. *Journal of Personality and Social Psychology*, *93*(1), 103–115. https://doi.org/10.1037/0022-3514.93.1.103

Fredrickson, B. L. (1998). What Good Are Positive Emotions? *Review of General Psychology*, *2*(3), 300–319. https://doi.org/10.1037/1089-2680.2.3.300

Fredrickson, B. L. (2001). The role of positive emotions in positive psychology: The broaden-and-build theory of positive emotions. *American Psychologist*, *56*(3), 218–226. https://doi.org/10.1037/0003-066X.56.3.218

Fredrickson, B. L., & Cohn, M. A. (2008). Positive emotions. In *Handbook of emotions, 3rd ed* (pp. 777–796). The Guilford Press.

Gendron, M., Roberson, D., van der Vyver, J. M., & Barrett, L. F. (2014). Perceptions of emotion from facial expressions are not culturally universal: Evidence from a remote culture. *Emotion*, *14*(2), 251–262. https://doi.org/10.1037/a0036052

Goetz, J. L., Keltner, D., & Simon-Thomas, E. (2010). Compassion: An Evolutionary Analysis and Empirical Review. *Psychological Bulletin*, *136*(3), 351–374. https://doi.org/10.1037/a0018807

Goldberg, Y. K., Eastwood, J. D., LaGuardia, J., & Danckert, J. (2011). Boredom: An Emotional Experience Distinct from Apathy, Anhedonia, or Depression. *Journal of Social and Clinical Psychology*, *30*(6), 647–666. https://doi.org/10.1521/jscp.2011.30.6.647

Gonzaga, G. C., Keltner, D., Londahl, E. A., & Smith, M. D. (2001). Love and the commitment problem in romantic relations and friendship. *Journal of Personality and Social Psychology*, *81*(2), 247–262. https://doi.org/10.1037/0022-3514.81.2.247

Hays, R. D., & DiMatteo, M. R. (1987). A Short-Form Measure of Loneliness. *Journal of Personality Assessment*, *51*(1), 69–81. https://doi.org/10.1207/s15327752jpa5101_6

Heubeck, B. G., & Wilkinson, R. (2019). Is all fit that glitters gold? Comparisons of two, three and bi-factor models for Watson, Clark & Tellegen's 20-item state and trait PANAS. *Personality and Individual Differences*, *144*, 132–140. https://doi.org/10.1016/j.paid.2019.03.002

Horikawa, T., Cowen, A. S., Keltner, D., & Kamitani, Y. (2020). The Neural Representation of Visually Evoked Emotion Is High-Dimensional, Categorical, and Distributed across Transmodal Brain Regions. *iScience*, *23*(5), 101060. https://doi.org/10.1016/j.isci.2020.101060

Houben, M., Van Den Noortgate, W., & Kuppens, P. (2015). The relation between short-term emotion dynamics and psychological well-being: A meta-analysis. *Psychological Bulletin*, *141*(4), 901–930. https://doi.org/10.1037/a0038822

Impett, E., & Muise, A. (2019). Relationships and sexuality: You reap what you sow in the bedroom. In D. Schoebi & B. Campos (Eds.), *New Directions in the Psychology of Close Relationships*. Routledge.

Izard, C. E. (1977). Differential Emotions Theory. In C. E. Izard (Ed.), *Human Emotions* (pp. 43–66). Springer US. https://doi.org/10.1007/978-1-4899-2209-0_3

Izard, C. E. (2010). The Many Meanings/Aspects of Emotion: Definitions, Functions, Activation, and Regulation. *Emotion Review*, *2*(4), 363–370. https://doi.org/10.1177/1754073910374661

John, O. P., & Srivastava, S. (1999). The Big Five Trait taxonomy: History, measurement, and theoretical perspectives. In *Handbook of personality: Theory and research, 2nd ed* (pp. 102–138). Guilford Press.

Joiner, R. J., Bergeman, C. S., & Wang, L. (2018). Affective experience across the adult lifespan: An accelerated longitudinal design. *Psychology and Aging*, *33*(3), 399–412. https://doi.org/10.1037/pag0000257

Jovanović, V. (2015). Beyond the PANAS: Incremental validity of the Scale of Positive and Negative Experience (SPANE) in relation to well-being. *Personality and Individual Differences*, *86*, 487–491. https://doi.org/10.1016/j.paid.2015.07.015

Keltner, D., Brooks, J. A., & Cowen, A. S. (2023). Semantic Space Theory: Data-Driven Insights Into Basic Emotions. *Current Directions in Psychological Science*, *32*(3), 242–249. https://doi.org/10.1177/09637214221150511

Keltner, D., Sauter, D., Tracy, J., & Cowen, A. S. (2019). Emotional Expression: Advances in Basic Emotion Theory. *Journal of Nonverbal Behavior*, *43*(2), 133–160. https://doi.org/10.1007/s10919-019-00293-3

Keltner, D., Sauter, D., Tracy, J. L., Wetchler, E., & Cowen, A. (2022). How emotions, relationships, and culture constitute each other: Advances in social functionalist theory. *Cognition and Emotion*, *36*(3), 388–401. https://doi.org/10.1080/02699931.2022.2047009

Keltner, D., & Shiota, M. N. (2021). Emotion and personality: A social functionalist approach. In *Handbook of personality: Theory and research, 4th ed* (pp. 447–486). The Guilford Press.

Keltner, D., Tracy, J. L., Sauter, D., & Cowen, A. S. (2019). What Basic Emotion Theory Really Says for the Twenty-First Century Study of Emotion. *Journal of Nonverbal Behavior*, *43*(2), 195–201. https://doi.org/10.1007/s10919-019-00298-y

Kitayama, S., & Park, H. (2007). Cultural Shaping of Self, Emotion, and Well-Being: How Does It Work? *Social and Personality Psychology Compass*, *1*(1), 202–222. https://doi.org/10.1111/j.1751-9004.2007.00016.x

Kitayama, S., & Salvador, C. E. (2024). Cultural Psychology: Beyond East and West. *Annual Review of Psychology*, *75*(Volume 75, 2024), 495–526. https://doi.org/10.1146/annurev-psych-021723-063333

Kitayama, S., Salvador, C. E., Nanakdewa, K., Rossmaier, A., San Martin, A., & Savani, K. (2022). Varieties of interdependence and the emergence of the Modern West: Toward the globalizing of psychology. *American Psychologist*, *77*(9), 991–1006. https://doi.org/10.1037/amp0001073

Kleinginna, P. R., & Kleinginna, A. M. (1981). A categorized list of emotion definitions, with suggestions for a consensual definition. *Motivation and Emotion*, *5*(4), 345–379. https://doi.org/10.1007/BF00992553

Kring, A. M., & Bachorowski, J.-A. (1999). Emotions and Psychopathology. *Cognition and Emotion*, *13*(5), 575–599. https://doi.org/10.1080/026999399379195

Kuppens, P., & Verduyn, P. (2017). Emotion dynamics. *Current Opinion in Psychology*, *17*, 22–26. https://doi.org/10.1016/j.copsyc.2017.06.004

LeDoux, J. E., & Hofmann, S. G. (2018). The subjective experience of emotion: A fearful view. *Current Opinion in Behavioral Sciences*, *19*, 67–72. https://doi.org/10.1016/j.cobeha.2017.09.011

LeDoux, J. E., Phelps, E. A., & Alberini, C. (2016). What We Talk About When We Talk About Emotions. *Cell*, *167*(6), 1443–1445. https://doi.org/10.1016/j.cell.2016.11.029

Lench, H. C., Flores, S. A., & Bench, S. W. (2011). Discrete emotions predict changes in cognition, judgment, experience, behavior, and physiology: A meta-analysis of experimental emotion elicitations. *Psychological Bulletin*, *137*(5), 834–855. https://doi.org/10.1037/a0024244

Lerner, J., & Keltner, D. (2001). Fear, Anger, and Risk. *Journal of Personality and Social Psychology*, *81*(1), 146–159.

Levenson, R. W. (1999). The intrapersonal functions of emotion. *Cognition and Emotion*, *13*(5), 481–504. https://doi.org/10.1080/026999399379159

Lindquist, K. A., Satpute, A. B., Wager, T. D., Weber, J., & Barrett, L. F. (2016). The Brain Basis of Positive and Negative Affect: Evidence from a Meta-Analysis of the Human Neuroimaging Literature. *Cerebral Cortex*, *26*(5), 1910–1922. https://doi.org/10.1093/cercor/bhv001

Lindsay, B. A. N. and D. S. (2018). Preregistration Becoming the Norm in Psychological Science. *APS Observer*, *31*. https://www.psychologicalscience.org/observer/preregistration-becoming-the-norm-in-psychological-science

Lipson, S. K., Zhou, S., Abelson, S., Heinze, J., Jirsa, M., Morigney, J., Patterson, A., Singh, M., & Eisenberg, D. (2022). Trends in college student mental health and help-seeking by race/ethnicity: Findings from the national healthy minds study, 2013–2021. *Journal of Affective Disorders*, *306*, 138–147. https://doi.org/10.1016/j.jad.2022.03.038

Littman, A. J., White, E., Satia, J. A., Bowen, D. J., & Kristal, A. R. (2006). Reliability and Validity of 2 Single-Item Measures of Psychosocial Stress. *Epidemiology*, *17*(4), 398. https://doi.org/10.1097/01.ede.0000219721.89552.51

Lyubomirsky, S., King, L., & Diener, E. (2005). The benefits of frequent positive affect: Does happiness lead to success? *Psychological Bulletin*, *131*(6), 803–855. https://doi.org/10.1037/0033-2909.131.6.803

Margolis, S., Schwitzgebel, E., Ozer, D. J., & Lyubomirsky, S. (2019). A New Measure of Life Satisfaction: The Riverside Life Satisfaction Scale. *Journal of Personality Assessment*, *101*(6), 621–630. https://doi.org/10.1080/00223891.2018.1464457

Marsh, H. W., Guo, J., Dicke, T., Parker, P. D., & Craven, R. G. (2020). Confirmatory Factor Analysis (CFA), Exploratory Structural Equation Modeling (ESEM), and Set-ESEM: Optimal Balance Between Goodness of Fit and Parsimony. *Multivariate Behavioral Research*, *55*(1), 102–119. https://doi.org/10.1080/00273171.2019.1602503

Marsh, H. W., Hau, K.-T., Balla, J. R., & Grayson, D. (1998). Is More Ever Too Much? The Number of Indicators per Factor in Confirmatory Factor Analysis. *Multivariate Behavioral Research*, *33*(2), 181–220. https://doi.org/10.1207/s15327906mbr3302_1

Marsh, H. W., Muthén, B., Asparouhov, T., Lüdtke, O., Robitzsch, A., Morin, A. J. S., & Trautwein, U. (2009). Exploratory Structural Equation Modeling, Integrating CFA and EFA: Application to Students' Evaluations of University Teaching. *Structural Equation Modeling: A Multidisciplinary Journal*, *16*(3), 439–476. https://doi.org/10.1080/10705510903008220

Matsumoto, D. (1992). More evidence for the universality of a contempt expression. *Motivation and Emotion*, *16*(4), 363–368. https://doi.org/10.1007/BF00992972

Matsumoto, D. (2001). Culture and Emotion. In *The handbook of culture and psychology* (pp. 171–194). Oxford University Press.

Mauss, I. B., & Robinson, M. D. (2009). Measures of emotion: A review. *Cognition and Emotion*, *23*(2), 209–237. https://doi.org/10.1080/02699930802204677

McManus, M. D., Siegel, J. T., & Nakamura, J. (2019). The predictive power of low-arousal positive affect. *Motivation and Emotion*, *43*(1), 130–144. https://doi.org/10.1007/s11031-018-9719-x

McNeish, D. M. (2015). Using Lasso for Predictor Selection and to Assuage Overfitting: A Method Long Overlooked in Behavioral Sciences. *Multivariate Behavioral Research*, *50*(5), 471–484. https://doi.org/10.1080/00273171.2015.1036965

Merz, E. L., Malcarne, V. L., Roesch, S. C., Ko, C. M., Emerson, M., Roma, V. G., & Sadler, G. R. (2013). Psychometric properties of Positive and Negative Affect Schedule (PANAS) original and short forms in an African American community sample. *Journal of Affective Disorders*, *151*(3), 942–949. http://dx.doi.org.libproxy.berkeley.edu/10.1016/j.jad.2013.08.011

Merz, E. L., & Roesch, S. C. (2011). Modeling trait and state variation using multilevel factor analysis with PANAS daily diary data. *Journal of Research in Personality*, *45*(1), 2–9. http://dx.doi.org.libproxy.berkeley.edu/10.1016/j.jrp.2010.11.003

Mesquita, B., Boiger, M., & De Leersnyder, J. (2016). The cultural construction of emotions. *Current Opinion in Psychology*, *8*, 31–36. https://doi.org/10.1016/j.copsyc.2015.09.015

Metler, S. J., & Busseri, M. A. (2017). Further Evaluation of the Tripartite Structure of Subjective Well-Being: Evidence From Longitudinal and Experimental Studies. *Journal of Personality*, *85*(2), 192–206. https://doi.org/10.1111/jopy.12233

Monroy, M., Cowen, A. S., & Keltner, D. (2022). Intersectionality in emotion signaling and recognition: The influence of gender, ethnicity, and social class. *Emotion*, *22*(8), 1980–1988. https://doi.org/10.1037/emo0001082

Mulligan, K., & Scherer, K. R. (2012). Toward a Working Definition of Emotion. *Emotion Review*, *4*(4), 345–357. https://doi.org/10.1177/1754073912445818

Nosek, B. A., Ebersole, C. R., DeHaven, A. C., & Mellor, D. T. (2018). The preregistration revolution. *Proceedings of the National Academy of Sciences*, *115*(11), 2600–2606. https://doi.org/10.1073/pnas.1708274114

Ong, A. D., Benson, L., Zautra, A. J., & Ram, N. (2018). Emodiversity and biomarkers of inflammation. *Emotion*, *18*(1), 3–14. http://dx.doi.org.libproxy.berkeley.edu/10.1037/emo0000343

Pekrun, R., Daniels, L. M., Goetz, T., Stupnisky, R. H., & Perry, R. P. (2010). Boredom in Achievement Settings: Exploring Control--Value Antecedents and Performance Outcomes of a Neglected Emotion: Journal of Educational Psychology. *Journal of Educational Psychology*, *102*(3), 531–549. https://doi.org/10.1037/a0019243

Quoidbach, J., Gruber, J., Mikolajczak, M., Kogan, A., Kotsou, I., & Norton, M. I. (2014). Emodiversity and the emotional ecosystem. *Journal of Experimental Psychology: General*, *143*(6), 2057–2066. http://dx.doi.org.libproxy.berkeley.edu/10.1037/a0038025

Robins, R. W., Hendin, H. M., & Trzesniewski, K. H. (2001). Measuring Global Self-Esteem: Construct Validation of a Single-Item Measure and the Rosenberg Self-Esteem Scale. *Personality and Social Psychology Bulletin*, *27*(2), 151–161. https://doi.org/10.1177/0146167201272002

Robinson, M. D., & Clore, G. L. (2002). Belief and feeling: Evidence for an accessibility model of emotional self-report. *Psychological Bulletin*, *128*(6), 934–960. https://doi.org/10.1037/0033-2909.128.6.934

Russell, J. A. (1980). A circumplex model of affect. *Journal of Personality and Social Psychology*, *39*(6), 1161–1178. https://doi.org/10.1037/h0077714

Russell, J. A. (1994). Is there universal recognition of emotion from facial expression? A review of the cross-cultural studies. *Psychological Bulletin*, *115*(1), 102–141. https://doi.org/10.1037/0033-2909.115.1.102

Russell, J. A. (2003). Core affect and the psychological construction of emotion. *Psychological Review*, *110*(1), 145–172. https://doi.org/10.1037/0033-295X.110.1.145

Ryff, C. D. (1989). Happiness is everything, or is it? Explorations on the meaning of psychological well-being. *Journal of Personality and Social Psychology*, *57*(6), 1069–1081. https://doi.org/10.1037/0022-3514.57.6.1069

Ryff, C. D. (2013). Psychological Well-Being Revisited: Advances in the Science and Practice of Eudaimonia. *Psychotherapy and Psychosomatics*, *83*(1), 10–28. https://doi.org/10.1159/000353263

Sauter, D. A. (2017). The Nonverbal Communication of Positive Emotions: An Emotion Family Approach. *Emotion Review*, *9*(3), 222–234. https://doi.org/10.1177/1754073916667236

Scherer, K. R. (2005). What are emotions? And how can they be measured? *Social Science Information*, *44*(4), 695–729. https://doi.org/10.1177/0539018405058216

Seib-Pfeifer, L.-E., Pugnaghi, G., Beauducel, A., & Leue, A. (2017). On the replication of factor structures of the Positive and Negative Affect Schedule (PANAS). *Personality and Individual Differences*, *107*, 201–207. https://doi.org/10.1016/j.paid.2016.11.053

Senft, N., Campos, B., Shiota, M. N., & Chentsova-Dutton, Y. E. (2020). Who emphasizes positivity? An exploration of emotion values in people of Latino, Asian, and European heritage living in the United States. *Emotion*, No Pagination Specified-No Pagination Specified. https://doi.org/10.1037/emo0000737

Shao, K., Elahi Shirvan, M., & Alamer, A. (2022). How Accurate Is Your Correlation? Different Methods Derive Different Results and Different Interpretations. *Frontiers in Psychology*, *13*. https://doi.org/10.3389/fpsyg.2022.901412

Shields, S. A. (2013). Gender and Emotion: What We Think We Know, What We Need to Know, and Why It Matters. *Psychology of Women Quarterly*, *37*(4), 423–435. https://doi.org/10.1177/0361684313502312

Shiota, M. N., Campos, B., Oveis, C., Hertenstein, M. J., Simon-Thomas, E., & Keltner, D. (2017). Beyond happiness: Building a science of discrete positive emotions. *American Psychologist*, *72*(7), 617–643. https://doi.org/10.1037/a0040456

Shiota, M. N., Keltner, D., & John, O. P. (2006). Positive emotion dispositions differentially associated with Big Five personality and attachment style. *The Journal of Positive Psychology*, *1*(2), 61–71. https://doi.org/10.1080/17439760500510833

Siegel, E. H., Sands, M. K., Van den Noortgate, W., Condon, P., Chang, Y., Dy, J., Quigley, K. S., & Barrett, L. F. (2018). Emotion Fingerprints or Emotion Populations? A Meta-Analytic Investigation of Autonomic Features of Emotion Categories. *Psychological Bulletin*, *144*(4), 343–393. https://doi.org/10.1037/bul0000128

Smidt, K. E., & Suvak, M. K. (2015). A brief, but nuanced, review of emotional granularity and emotion differentiation research. *Current Opinion in Psychology*, *3*, 48–51. https://doi.org/10.1016/j.copsyc.2015.02.007

Soto, C. J., & John, O. P. (2017). The next Big Five Inventory (BFI-2): Developing and assessing a hierarchical model with 15 facets to enhance bandwidth, fidelity, and predictive power. *Journal of Personality and Social Psychology*, *113*(1), 117–143. https://doi.org/10.1037/pspp0000096

Stellar, J. E., Gordon, A. M., Piff, P. K., Cordaro, D., Anderson, C. L., Bai, Y., Maruskin, L. A., & Keltner, D. (2017). Self-Transcendent Emotions and Their Social Functions: Compassion, Gratitude, and Awe Bind Us to Others Through Prosociality. *Emotion Review*, *9*(3), 200–207. https://doi.org/10.1177/1754073916684557

Tamir, M., Schwartz, S. H., Cieciuch, J., Riediger, M., Torres, C., Scollon, C., Dzokoto, V., Zhou, X., & Vishkin, A. (2016). Desired emotions across cultures: A value-based account. *Journal of Personality and Social Psychology*, *111*(1), 67–82. http://dx.doi.org.libproxy.berkeley.edu/10.1037/pspp0000072

Tibshirani, R. (2011). Regression shrinkage and selection via the lasso: A retrospective. *Journal of the Royal Statistical Society: Series B (Statistical Methodology)*, *73*(3), 273–282. https://doi.org/10.1111/j.1467-9868.2011.00771.x

Tracy, J. L., & Matsumoto, D. (2008). The spontaneous expression of pride and shame: Evidence for biologically innate nonverbal displays. *Proceedings of the National Academy of Sciences*, *105*(33), 11655–11660. https://doi.org/10.1073/pnas.0802686105

Tracy, J. L., & Robins, R. W. (2004a). Putting the Self Into Self-Conscious Emotions: A Theoretical Model. *Psychological Inquiry*, *15*(2), 103–125. https://doi.org/10.1207/s15327965pli1502_01

Tracy, J. L., & Robins, R. W. (2004b). Show Your Pride: Evidence for a Discrete Emotion Expression. *Psychological Science*, *15*(3), 194–197. https://doi.org/10.1111/j.0956-7976.2004.01503008.x

Tracy, J. L., & Robins, R. W. (2008). The nonverbal expression of pride: Evidence for cross-cultural recognition. *Journal of Personality and Social Psychology*, *94*(3), 516–530. https://doi.org/10.1037/0022-3514.94.3.516

Tsai, J. L. (2007). Ideal Affect: Cultural Causes and Behavioral Consequences. *Perspectives on Psychological Science*, *2*(3), 242–259. https://doi.org/10.1111/j.1745-6916.2007.00043.x

Tsai, J. L. (2017). Ideal affect in daily life: Implications for affective experience, health, and social behavior. *Current Opinion in Psychology*, *17*, 118–128. https://doi.org/10.1016/j.copsyc.2017.07.004

Van Cappellen, P. (2017). Rethinking self-transcendent positive emotions and religion: Insights from psychological and biblical research. *Psychology of Religion and Spirituality*, *9*(3), 254–263. https://doi.org/10.1037/rel0000101

Vishkin, A., Kitayama, S., Berg, M. K., Diener, E., Gross-Manos, D., Ben-Arieh, A., & Tamir, M. (2023). Adherence to emotion norms is greater in individualist cultures than in collectivist cultures. *Journal of Personality and Social Psychology*, *124*(6), 1256–1276. https://doi.org/10.1037/pspi0000409

Vuong, Q. H. (1989). Likelihood Ratio Tests for Model Selection and Non-Nested Hypotheses. *Econometrica*, *57*(2), 307–333. https://doi.org/10.2307/1912557

Wagenmakers, E.-J., Wetzels, R., Borsboom, D., van der Maas, H. L. J., & Kievit, R. A. (2012). An Agenda for Purely Confirmatory Research. *Perspectives on Psychological Science*, *7*(6), 632–638. https://doi.org/10.1177/1745691612463078

Wang, L. (Peggy), & Maxwell, S. E. (2015). On disaggregating between-person and within-person effects with longitudinal data using multilevel models. *Psychological Methods*, *20*(1), 63–83. https://doi.org/10.1037/met0000030

Watson, D., Anna, L., & Tellegen, A. (1988). Development and Validation of Brief Measures of Positive and Negative Affect: The PANAS Scales. *Journal of Personality and Social Psychology*, *54*(6).

Watson, D., & Clark, L. A. (1984). Negative affectivity: The disposition to experience aversive emotional states. *Psychological Bulletin*, *96*(3), 465–490. https://doi.org/10.1037/0033-2909.96.3.465

Watson, D., & Clark, L. A. (1992). On Traits and Temperament: General and Specific Factors of Emotional Experience and Their Relation to the Five-Factor Model. *Journal of Personality*, *60*(2), 441–476. https://doi.org/10.1111/j.1467-6494.1992.tb00980.x

Watson, D., & Clark, L. A. (1994). *The PANAS-X: Manual for the Positive and Negative Affect Schedule - Expanded Form* [dataset]. University of Iowa. https://doi.org/10.17077/48vt-m4t2

Watson, D., & Tellegen, A. (1985). Toward a consensual structure of mood. *Psychological Bulletin*, *98*(2), 219–235. https://doi.org/10.1037/0033-2909.98.2.219

Watson, D., Wiese, D., Vaidya, J., & Tellegen, A. (1999). The two general activation systems of affect: Structural findings, evolutionary considerations, and psychobiological evidence. *Journal of Personality and Social Psychology*, *76*(5), 820–838. https://doi.org/10.1037/0022-3514.76.5.820

Weidman, A. C., Steckler, C. M., & Tracy, J. L. (2017). The jingle and jangle of emotion assessment: Imprecise measurement, casual scale usage, and conceptual fuzziness in emotion research. *Emotion*, *17*(2), 267–295. https://doi.org/10.1037/emo0000226

Weidman, A. C., & Tracy, J. L. (2020). Picking up good vibrations: Uncovering the content of distinct positive emotion subjective experience. *Emotion*, *20*(8), 1311–1331. https://doi.org/10.1037/emo0000677

Wu, D. C., Kim, H. S., & Collins, N. L. (2021). Perceived responsiveness across cultures: The role of cultural fit in social support use. *Social and Personality Psychology Compass*, *15*(9), e12634. https://doi.org/10.1111/spc3.12634

Yik, M. S. M., Russell, J. A., & Barrett, L. F. (1999). Structure of self-reported current affect: Integration and beyond. *Journal of Personality and Social Psychology*, *77*(3), 600–619. https://doi.org/10.1037/0022-3514.77.3.600

Appendix

Table 1

Emotion items in Sample 1b

Active	Calm	Elated	Joyful	Serenity
Admiration	Cheerful	Embarrassed	Lonely	Shameful
Affectionate	Closeness	Energetic	Love	Shy
Afraid	Compassionate	Enthusiastic	Lustful	Silly
Alert	Concerned (for another)	Envious	Negative	Strong
Amazement	Concerned (for self)	Excited	Nervous	Superior
Amused	Confident	Exuberant	Nostalgic	Surprise
Angry	Confused	Frustrated	Pain	Sympathetic
Annoyed	Contempt	Good	Peaceful	Tense
Anxious	Contented	Grateful	Perplexed	Terrified
Appreciative	Curiosity	Guilty	Pleasant	Thankful
Ashamed	Desire	Happy	Positive	Threatened
Attentive	Determined	Hostile	Proud	Triumphant
Awe	Devotion	Humorous	Relaxed	Unhappy
Bad	Disappointed	Hurt	Relieved	Unpleasant
Bitter	Disgusted	Inspired	Repulsed	Upset
Blissful	Distressed	Interested	Sadness	Victorious
Blue	Down	Irritable	Scared	Wonder
Blushed	Dumbfounded	Jealous	Self-condemning	Worried
Bored	Ecstasy	Jittery	Self-critical	---

Figure 1

Visual representation of the 99 x 99 residual correlation matrix ordered using hierarchical agglomerative clustering in Study 1a.

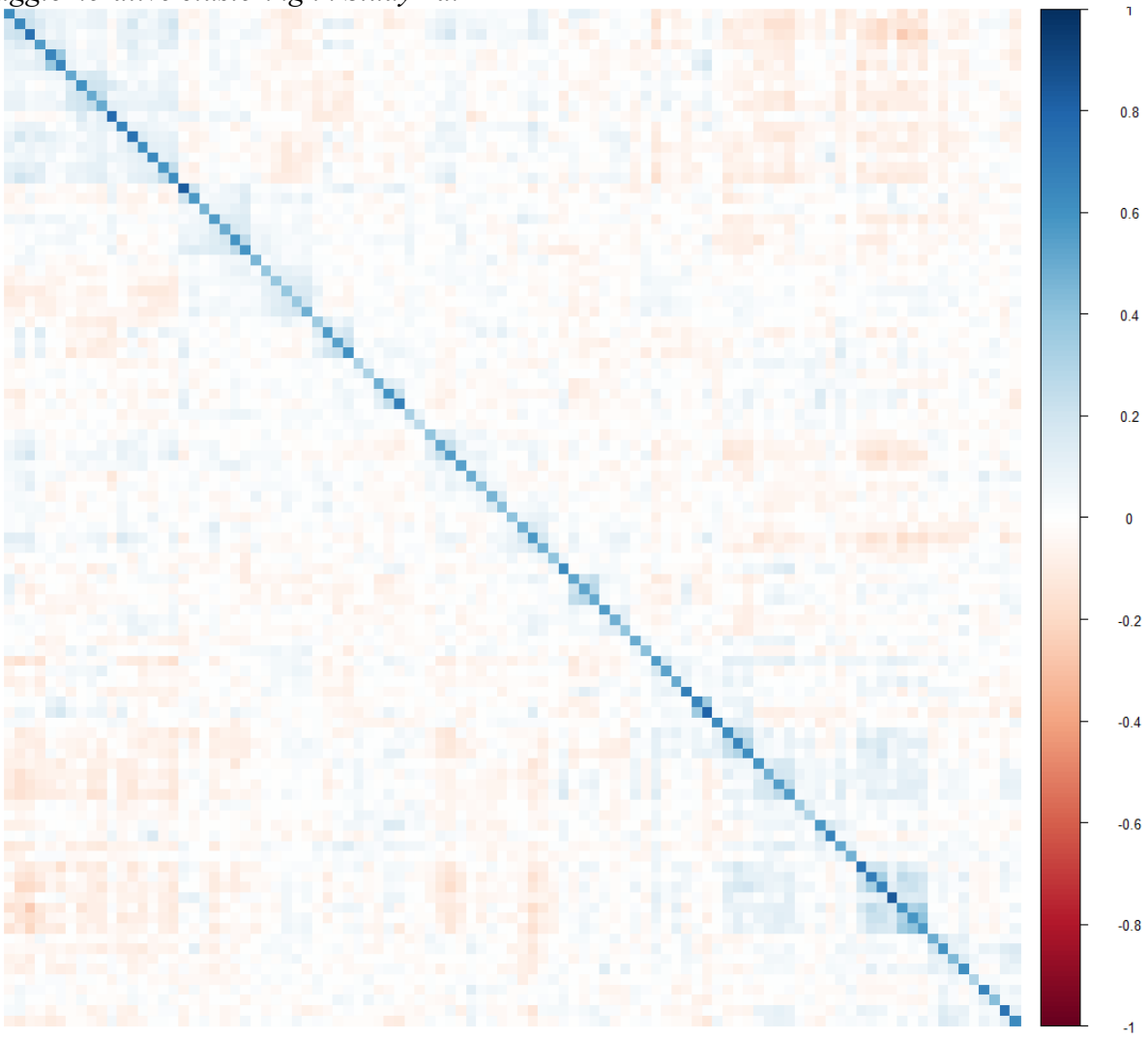


Table 2

Model 1 factor loadings in freely correlated SEEQ (version 1)

Factor	Item	Std. Loading	Factor	Item	Std Loading
Interested	Interested	.81	Anger	Angry	.70
	Curiosity	.68		Frustrated	.74
	Attentive	.66		Irritable	.73
Awe	Awe	.76	Fear	Afraid	.81
	Amazement	.83		Terrified	.82
	Wonder	.71		Threatened	.61
Love	Love	.75	Sad	Sadness	.86
	Affectionate	.79		Down	.87
	Devotion	.59		Blue	.80
Desire	Desire	.87	Disgust	Disgusted	.77
	Lustful	.66		Repulsed	.79
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Compassion	Compassionate	.78	Shame	Ashamed	.71
	Sympathetic	.77		Self-critical	.69
	Concerned (for another)	.52		Self-condemning	.72
Amusement	Amused	.78	Embarrassed	Embarrassed	.75
	Humorous	.74		Blushed	.40
	Silly	.64		Shy	.56
Content	Contented	.77	Confused	Confused	.74
	Serenity	.73		Dumbfounded	.62
	Calm	.69		Perplexed	.66
Pride	Proud	.80	Pain	Pain	.77
	Confident	.78		Distressed	.69
	Strong	.74		Hurt	.79
Triumph	Triumphant	.78	Anxiety	Anxious	.78
	Victorious	.82		Worried	.79
	Superior	.61		Tense	.72
Joy	Elated	.77			
	Joyful	.83			
	Exuberant	.73			
Gratitude	Grateful	.86			
	Thankful	.89			
	Appreciative	.82			

Table 3

Mean Differences on Emotion Items by Cultural Group in Sample 1a

Scale	Emotion	Latinx	Asian	White
Both	Interested	M = 3.00 SD = 1.30	M = 3.24 SD = 1.37	M = 3.31 SD = 1.30
SEEQ	Awe	M = 2.24 SD = 1.46	M = 2.35 SD = 1.47	M = 2.3 SD = 1.26
SEEQ	Love	M = 3.19 SD = 1.61	M = 3.56 SD = 1.57	M = 3.99 SD = 1.43
SEEQ	Amused	M = 2.56 SD = 1.22	M = 3.1 SD = 1.44	M = 3.21 SD = 1.43
SEEQ	Contented	M = 2.82 SD = 1.38	M = 2.98 SD = 1.38	M = 2.83 SD = 1.39
Both	Proud	M = 2.57 SD = 1.56	M = 2.67 SD = 1.38	M = 2.93 SD = 1.41
SEEQ	Elated	M = 1.99 SD = 1.3	M = 2.49 SD = 1.5	M = 2.41 SD = 1.4
SEEQ	Grateful	M = 3.92 SD = 1.57	M = 3.88 SD = 1.42	M = 4.06 SD = 1.26
SEEQ	Compassionate	M = 3.76 SD = 1.52	M = 3.56 SD = 1.35	M = 4.05 SD = 1.26
SEEQ	Desire	M = 2.74 SD = 1.64	M = 3.09 SD = 1.49	M = 3.21 SD = 1.6
SEEQ	Sadness	M = 3.56 SD = 1.5	M = 3.06 SD = 1.55	M = 3.44 SD = 1.49
Both	Ashamed	M = 2.13 SD = 1.85	M = 1.82 SD = 1.45	M = 1.95 SD = 1.59
SEEQ	Disgusted	M = 2.00 SD = 1.54	M = 1.65 SD = 1.35	M = 1.71 SD = 1.36
Both	Afraid	M = 2.74 SD = 1.64	M = 2.44 SD = 1.52	M = 2.6 SD = 1.48
SEEQ	Angry	M = 2.74 SD = 1.58	M = 2.15 SD = 1.37	M = 2.47 SD = 1.38
SEEQ	Anxious	M = 4.00 SD = 1.55	M = 3.75 SD = 1.5	M = 4.38 SD = 1.35
SEEQ	Confused	M = 3.61 SD = 1.50	M = 3.03 SD = 1.53	M = 2.92 SD = 1.54
SEEQ	Pain	M = 2.71 SD = 1.72	M = 2.18 SD = 1.59	M = 2.51 SD = 1.42
SEEQ	Jealous	M = 1.93 SD = 1.60	M = 2.07 SD = 1.47	M = 2.16 SD = 1.6
SEEQ	Self-critical	M = 4.28 SD = 1.42	M = 3.84 SD = 1.43	M = 4.24 SD = 1.46
PANAS	Excited	M = 2.68 SD = 1.33	M = 3.04 SD = 1.39	M = 3.2 SD = 1.3
PANAS	Strong	M = 2.41 SD = 1.27	M = 2.67 SD = 1.37	M = 3.09 SD = 1.50
PANAS	Enthusiastic	M = 2.63 SD = 1.23	M = 2.99 SD = 1.51	M = 2.94 SD = 1.47
PANAS	Alert	M = 3.11 SD = 1.55	M = 2.72 SD = 1.37	M = 3.16 SD = 1.35
PANAS	Inspired	M = 2.51 SD = 1.44	M = 3.04 SD = 1.41	M = 3.01 SD = 1.4
PANAS	Determined	M = 2.94 SD = 1.56	M = 3.17 SD = 1.42	M = 3.48 SD = 1.51

		M = 2.72	M = 3.04	M = 3.11
PANAS	Attentive	SD = 1.18	SD = 1.32	SD = 1.45
		M = 2.61	M = 2.64	M = 3.08
PANAS	Active	SD = 1.49	SD = 1.49	SD = 1.62
		M = 3.39	M = 3.03	M = 3.3
PANAS	Distressed	SD = 1.52	SD = 1.56	SD = 1.56
		M = 3.21	M = 2.85	M = 3.13
PANAS	Upset	SD = 1.4	SD = 1.45	SD = 1.35
		M = 2.33	M = 2.09	M = 2.32
PANAS	Guilty	SD = 1.64	SD = 1.53	SD = 1.63
		M = 2.6	M = 2.34	M = 2.69
PANAS	Scared	SD = 1.73	SD = 1.58	SD = 1.55
		M = 1.68	M = 1.44	M = 1.67
PANAS	Hostile	SD = 1.56	SD = 1.33	SD = 1.41
		M = 3.35	M = 2.83	M = 3.22
PANAS	Irritable	SD = 1.43	SD = 1.37	SD = 1.39
		M = 3.94	M = 3.52	M = 3.82
PANAS	Nervous	SD = 1.45	SD = 1.5	SD = 1.5
		M = 2.81	M = 2.61	M = 3.04
PANAS	Jittery	SD = 1.73	SD = 1.63	SD = 1.61

Table 4

Mean Differences on Emotion Items by Cultural Group in Sample 1b

Scale	Emotion	Latinx	Asian	White
Both	Interested	M = 2.19 SD = 1.06	M = 2.19 SD = 1.02	M = 2.32 SD = 0.81
SEEQ	Awe	M = 1.43 SD = 1.12	M = 1.55 SD = 1.02	M = 1.52 SD = 1.07
SEEQ	Love	M = 2.36 SD = 1.36	M = 2.08 SD = 1.24	M = 2.03 SD = 1.28
SEEQ	Amused	M = 1.60 SD = 1.10	M = 1.88 SD = 0.95	M = 2.00 SD = 0.99
SEEQ	Contented	M = 1.6 SD = 1.15	M = 1.88 SD = 1.03	M = 1.95 SD = 0.93
Both	Proud	M = 1.72 SD = 1.19	M = 1.67 SD = 1.03	M = 1.93 SD = 0.97
SEEQ	Elated	M = 1.47 SD = 1.08	M = 1.46 SD = 1.01	M = 1.68 SD = 0.97
SEEQ	Grateful	M = 2.36 SD = 1.21	M = 2.47 SD = 1.02	M = 2.50 SD = 1.05
SEEQ	Compassionate	M = 2.49 SD = 1.18	M = 2.27 SD = 1.01	M = 2.32 SD = 1.03
SEEQ	Desire	M = 2.04 SD = 1.10	M = 1.97 SD = 1.10	M = 1.97 SD = 1.13
SEEQ	Sadness	M = 2.36 SD = 1.29	M = 1.62 SD = 1.14	M = 1.67 SD = 1.07
Both	Ashamed	M = 1.79 SD = 1.28	M = 1.20 SD = 1.10	M = 1.13 SD = 1.11
SEEQ	Disgusted	M = 1.13 SD = 1.26	M = 0.91 SD = 1.09	M = 1.02 SD = 1.07
Both	Afraid	M = 1.68 SD = 1.4	M = 1.30 SD = 1.05	M = 1.33 SD = 1.17
SEEQ	Angry	M = 1.47 SD = 1.21	M = 1.19 SD = 0.98	M = 1.33 SD = 1.07
SEEQ	Anxious	M = 2.64 SD = 1.21	M = 2.03 SD = 1.15	M = 2.42 SD = 1.06
SEEQ	Confused	M = 2.30 SD = 1.08	M = 1.95 SD = 1.07	M = 1.97 SD = 0.92
SEEQ	Pain	M = 1.70 SD = 1.28	M = 1.17 SD = 1.05	M = 1.63 SD = 1.18
SEEQ	Jealous	M = 1.13 SD = 1.13	M = 1.22 SD = 0.89	M = 1.18 SD = 0.89
SEEQ	Self-critical	M = 2.83 SD = 1.19	M = 2.26 SD = 1.20	M = 2.45 SD = 1.19
PANAS	Excited	M = 1.79 SD = 0.95	M = 1.95 SD = 1.04	M = 2.08 SD = 0.89
PANAS	Strong	M = 1.51 SD = 1.12	M = 1.67 SD = 1.03	M = 1.95 SD = 1.02
PANAS	Enthusiastic	M = 1.74 SD = 1.15	M = 1.92 SD = 1.09	M = 2.20 SD = 0.92
PANAS	Alert	M = 1.68 SD = 0.93	M = 1.71 SD = 0.99	M = 1.98 SD = 0.91
PANAS	Inspired	M = 1.81 SD = 1.08	M = 1.96 SD = 1.10	M = 2.08 SD = 1.06
PANAS	Determined	M = 2.11 SD = 1.07	M = 2.19 SD = 1.05	M = 2.60 SD = 0.91

		M = 1.89	M = 1.92	M = 2.28
PANAS	Attentive	SD = 1.01	SD = 0.96	SD = 0.88
		M = 1.51	M = 1.81	M = 2.22
PANAS	Active	SD = 1.18	SD = 1.05	SD = 1.12
		M = 2.23	M = 1.81	M = 1.72
PANAS	Distressed	SD = 1.09	SD = 1.15	SD = 1.19
		M = 2.00	M = 1.54	M = 1.57
PANAS	Upset	SD = 1.06	SD = 1.04	SD = 1.00
		M = 1.77	M = 1.11	M = 1.10
PANAS	Guilty	SD = 1.34	SD = 1.03	SD = 1.10
		M = 1.81	M = 1.38	M = 1.53
PANAS	Scared	SD = 1.21	SD = 1.17	SD = 1.07
		M = 1.04	M = 0.80	M = 0.83
PANAS	Hostile	SD = 1.20	SD = 1.06	SD = 1.08
		M = 1.81	M = 1.44	M = 1.65
PANAS	Irritable	SD = 1.36	SD = 1.06	SD = 1.02
		M = 2.70	M = 2.10	M = 2.28
PANAS	Nervous	SD = 1.20	SD = 1.08	SD = 1.03
		M = 1.57	M = 1.32	M = 1.58
PANAS	Jittery	SD = 1.12	SD = 1.05	SD = 1.14

Figure 2

Visual representation of the residual correlation matrix ordered using hierarchical agglomerative clustering in Study 3.

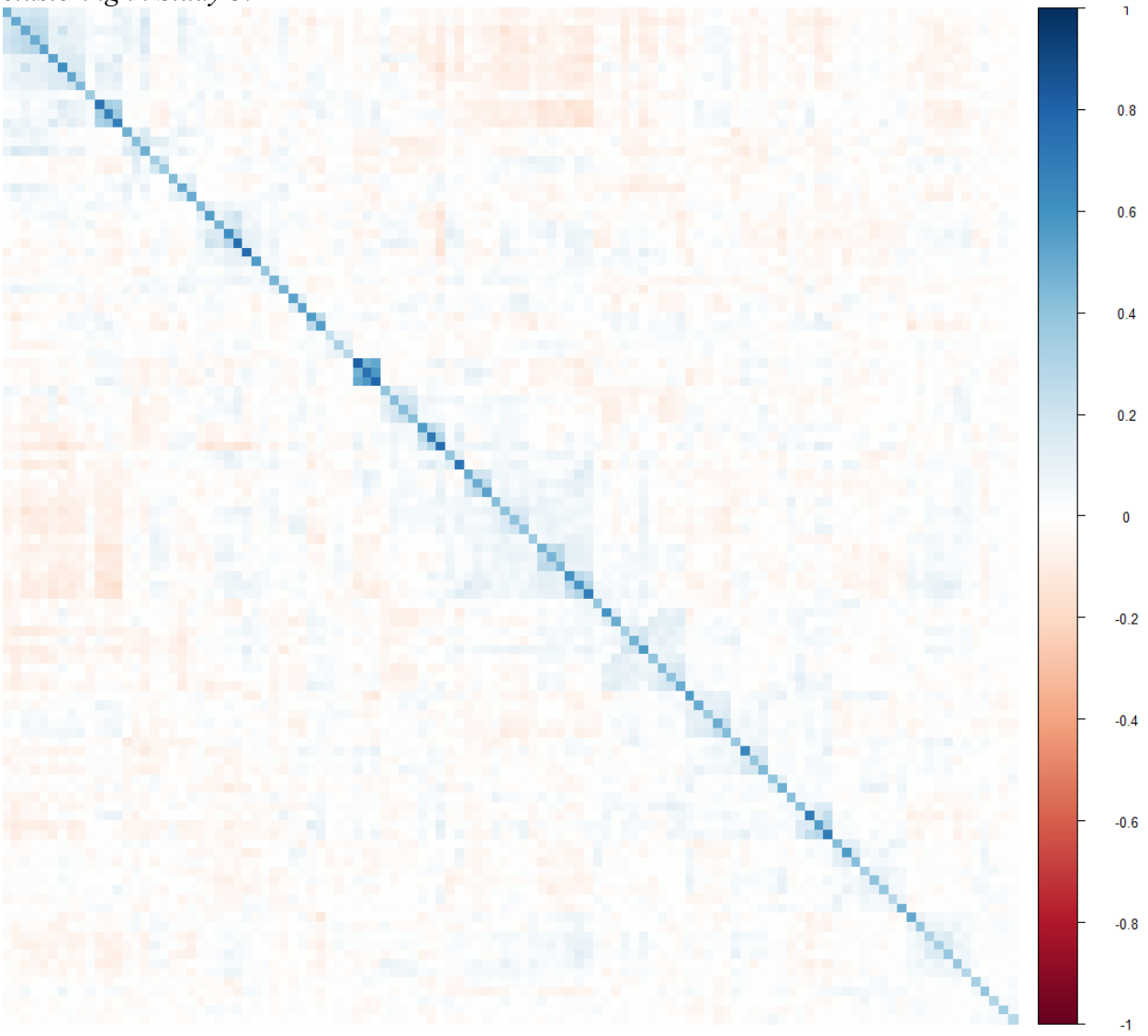

Table 5

Emotion items in Part IV: Study 3

Amused	Strong	Pain	Revolted	Bashful
Humorous	Determined	Distressed	Cocky	Awkward
Silly	Desire	Hurt	Arrogant	Shy
Awe	Lustful	Self-condemning	Egotistical	Apologetic
Amazed	Horny	Self-critical	Uplifted	Regretful
Wonderment	Afraid	Concerned for myself	Elevated	Remorseful
Compassionate	Terrified	Sad	Admiration	Blameworthy
Sympathetic	Scared	Down	Acknowledging	Disappointed with myself
Kind	Angry	Blue	Appalled	Positive
Contented	Annoyed	Upset	Horrified	Negative
Serene	Irritated	Excited	Shocked	
Calm	Anxious	Hostile	Dismayed	
Elated	Worried	Enthusiastic	Hopeful	
Blissful	Nervous	Irritable	Optimistic	
Ecstatic	Ashamed	Alert	Encouraged	
Grateful	Embarrassed	Inspired	Bored	
Thankful	Guilty	Jittery	Disengaged	
Appreciative	Confused	Active	Meaningless	
Interested	Dumbfounded	Hesitant	Uninterested	
Curious	Perplexed	Doubtful	Restless	
Attentive	Disgusted	Wary	Peaceful	
Love	Repulsed	Unsure	Relaxed	
Affectionate	Revulsion	Scornful	Relieved	
Closeness to another	Jealous	Disdainful	Reassured	
Proud of myself	Envious	Contemptuous	Soothed	

Table 6

Empirical correlations between all composite emotion measures in study 3

Var	Emotion	V1	V2	V3	V4	V5	V6	V7	V8	V9	V10	V11	V12	V13	V14	V15	V16	V17	V18	V19	V20	V21	V22	V23	V24	V25	V26	V27
V1	**trepidation**	1	.63	.34	-.16	.68	-.37	.76	-.18	-.02	-.23	.16	-.08	.08	-.39	-.29	-.12	-.24	.75	.76	.76	.58	.74	.71	.80	.81	.61	.70
V2	**contempt**	.63	1	.57	.15	.77	-.05	.55	.00	.26	-.03	.25	.02	.14	-.09	.04	.20	-.09	.63	.65	.53	.82	.61	.67	.62	.47	.61	.53
V3	Hubristic pride	.34	.57	1	.30	.49	.20	.30	.16	.36	.13	.35	.08	.32	.17	.26	.36	.07	.36	.36	.21	.52	.41	.50	.34	.23	.43	.28
V4	**elevated**	-.16	.15	.30	1	.14	.81	-.27	.68	.78	.68	.41	.65	.56	.67	.79	.81	.70	-.16	-.05	-.28	.16	-.07	.15	-.11	-.22	.02	-.06
V5	horror	.68	.77	.49	.14	1	-.07	.54	.04	.25	.01	.23	.11	.21	-.13	.03	.19	-.04	.67	.74	.55	.81	.62	.78	.68	.57	.56	.53
V6	**hope**	-.37	-.05	.20	.81	-.07	1	-.45	.69	.67	.68	.32	.60	.48	.74	.83	.74	.76	-.34	-.25	-.48	-.04	-.25	-.05	-.31	-.40	-.14	-.26
V7	**bored**	.76	.55	.30	-.27	.54	-.45	1	-.35	-.14	-.37	.10	-.18	-.03	-.42	-.40	-.19	-.39	.72	.65	.80	.52	.70	.55	.73	.70	.59	.64
V8	interest	-.18	.00	.16	.68	.04	.69	-.35	1	.61	.60	.27	.62	.50	.62	.72	.60	.67	-.18	-.12	-.29	.01	-.16	.07	-.19	-.20	-.11	-.11
V9	awe	-.02	.26	.36	.78	.25	.67	-.14	.61	1	.58	.36	.53	.54	.56	.65	.77	.56	-.04	.06	-.14	.25	.06	.27	.00	-.09	.11	-.01
V10	love	-.23	-.03	.13	.68	.01	.68	-.37	.60	.58	1	.36	.64	.49	.58	.63	.63	.66	-.21	-.13	-.34	.01	-.18	.03	-.19	-.22	-.06	-.17
V11	desire	.16	.25	.35	.41	.23	.32	.10	.27	.36	.36	1	.22	.35	.21	.31	.38	.24	.12	.15	.06	.25	.21	.26	.12	.07	.23	.16
V12	compassion	-.08	.02	.08	.65	.11	.60	-.18	.62	.53	.64	.22	1	.46	.47	.59	.54	.65	-.11	.01	-.12	.03	-.05	.11	-.01	-.08	.02	.01
V13	amusement	.08	.14	.32	.56	.21	.48	-.03	.50	.54	.49	.35	.46	1	.45	.43	.57	.42	.10	.08	-.08	.18	.14	.31	.07	.06	.14	.03
V14	content	-.39	-.09	.17	.67	-.13	.74	-.42	.62	.56	.58	.21	.47	.45	1	.71	.67	.62	-.36	-.33	-.49	-.08	-.27	-.11	-.39	-.47	-.20	-.30
V15	pride	-.29	.04	.26	.79	.03	**.83**	-.40	.72	.65	.63	.31	.59	.43	.71	1	.71	.69	-.25	-.18	-.41	.06	-.24	.01	-.24	-.32	-.08	-.19
V16	elated	-.12	.20	.36	**.81**	.19	.74	-.19	.60	.77	.63	.38	.54	.57	.67	.71	1	.62	-.09	.01	-.24	.23	-.01	.20	-.07	-.16	.07	-.07
V17	gratitude	-.24	-.09	.07	.70	-.04	.76	-.39	.67	.56	.66	.24	.65	.42	.62	.69	.62	1	-.26	-.13	-.35	-.05	-.16	-.04	-.22	-.24	-.14	-.17
V18	anger	.75	.63	.36	-.16	.67	-.34	.72	-.18	-.04	-.21	.12	-.11	.10	-.36	-.25	-.09	-.26	1	.66	.73	.60	.65	.65	.74	.74	.58	.59
V19	fear	.76	.65	.36	-.05	.74	-.25	.65	-.12	.06	-.13	.15	.01	.08	-.33	-.18	.01	-.13	.66	1	.72	.66	.71	.70	.80	.73	.55	.62
V20	sad	.76	.53	.21	-.28	.55	-.48	**.80**	-.29	-.14	-.34	.06	-.12	-.08	-.49	-.41	-.24	-.35	.73	.72	1	.51	.68	.53	.80	.76	.53	.68
V21	disgust	.58	**.82**	.52	.16	**.81**	-.04	.52	.01	.25	.01	.25	.03	.18	-.08	.06	.23	-.05	.60	.66	.51	1	.57	.70	.61	.46	.54	.47
V22	shame	.74	.61	.41	-.07	.62	-.25	.70	-.16	.06	-.18	.21	-.05	.14	-.27	-.24	-.01	-.16	.65	.71	.68	.57	1	.63	.71	.66	.66	.67
V23	confused	.71	.67	.50	.15	.78	-.05	.55	.07	.27	.03	.26	.11	.31	-.11	.01	.20	-.04	.65	.70	.53	.70	.63	1	.67	.59	.57	.51
V24	pain	**.80**	.62	.34	-.11	.68	-.31	.73	-.19	.00	-.19	.12	-.01	.07	-.39	-.24	-.07	-.22	.74	.80	.80	.61	.71	.67	1	.74	.56	.68
V25	anxiety	**.81**	.47	.23	-.22	.57	-.40	.70	-.20	-.09	-.22	.07	-.08	.06	-.47	-.32	-.16	-.24	.74	.73	.76	.46	.66	.59	.74	1	.53	.67
V26	jealous	.61	.61	.43	.02	.56	-.14	.59	-.11	.11	-.06	.23	.02	.14	-.20	-.08	.07	-.14	.58	.55	.53	.54	.66	.57	.56	.53	1	.55
V27	selfcritical	.70	.53	.28	-.06	.53	-.26	.64	-.11	-.01	-.17	.16	.01	.03	-.30	-.19	-.07	-.17	.59	.62	.68	.47	.67	.51	.68	.67	.55	1