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Development of a Brief State Self-Transcendent Emotion Scale

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Abstract: Self-transcendent emotions (STEs) are often caused by experiences of moral beauty, natural beauty, or artistic beauty. STEs directly predict both individual and collective flourishing and are linked to spirituality. As such, interventions aiming to increase STEs are expected to promote positive outcomes, yet no state measure of self-transcendent emotions exists that could evaluate such interventions. In Study 1, a broad spectrum measure of state STEs—the State Self-Transcendent Emotion Scale (SSTES; https://osf.io/y3c62/)—was constructed, with three viable subscales: a) a nine-item Social STE subscale consisting of gratitude, love, elevation, and compassion items; a five-item Epistemic STE subscale consisting of awe, wonder, and curiosity items; and a three-item Forgiveness of Others subscale. Study 2 confirmed the goodness-of-fit and established convergent and discriminant concurrent validity, revealing positive correlations with established measures of awe, curiosity, gratitude, elevation and forgiveness; and negative, and no, correlation with measures of anger and narcissism respectively.

Keywords: Self-transcendent emotions; Measure; Epistemic; Social; Forgiveness; Spirituality

1. Development of a Brief State Self-Transcendent Emotion Scale

The relationship between religion and well-being is well-established, with studies demonstrating a correlation between self-reported religious belief and well-being (Colón-Bacó, 2010; Joshi et al., 2008). The same is true for religious involvement (Ellison, 1991; Green & Elliott, 2010; Newman & Graham, 2018). Several factors contribute to the relationship between religion and well-being. Self-transcendent emotions (STEs), in particular, have been found to mediate this relationship (Sharma &

Singh, 2019; Van Cappellen et al., 2016). STEs are a class of positive emotions in which one experiences a diminished sense of self (Yaden et al., 2017) and a shift away from one's immediate concerns and towards those of others (Shiota et al., 2014; Stellar et al., 2017). As such, they evoke prosocial actions and thus bind individuals together (Stellar et al., 2017), thereby boosting both individual and collective flourishing. STEs have been thought of as "religious emotions" (Emmons & Kneezel, 2005; Van Cappellen, 2017) since they often arise in response to religious activities and stimuli (e.g., Hood & Chen, 2005; Joye & Verpooten, 2013; Penman & Becker, 2009).

STEs not only explain the relationship between religion and well-being, but they also directly increase spirituality by fostering meaning in life and perceived benevolence of others and the world (Van Cappellen & Rimé, 2013). Their relationship with spirituality applies in both religions and nonreligious populations, pointing to STEs as a common experience across these populations (Hyland et al., 2010). A bidirectional relationship between spirituality and self-transcendent emotions has been proposed, whereby spirituality leads to self-transcendent emotions and vice versa (Van Cappellen & Rimé, 2013). Likewise, STEs have been framed as moral emotions (Haidt, 2003). They increase prosocial behavior (Stellar et al., 2017) as well as wise reasoning and willingness to address interpersonal conflict (Kim et al., 2023). Various self-transcendent emotions, such as awe (Keltner & Haidt, 2003), gratitude (Emmons & McCullough, 2004), and elevation (Haidt, 2003), have been investigated—but mostly in isolation. Brief intervention studies, for example, have demonstrated effects on distinct STEs. For example, nature evokes awe (Ballew & Omoto, 2018), art evokes wonder (Fingerhut & Prinz, 2018), and moral beauty evokes elevation (Pohling & Diessner, 2016). One study found that frequency of prayer predicted gratitude (Lambert et al., 2009). Others have found that religious stimuli and involvement affects cognitions and behaviors related to STEs (Fredrickson et al., 2008; Van Cappellen, 2017), but evidence of direct effects of religious and spiritual stimuli and engagement on the broad spectrum of STEs remains limited.

If STEs are characterized by joy, a diminished sense of self, and increased prosocial tendencies, they may share common cognitive and motivational elements, and bodily sensations. As such, it's plausible that stimuli may evoke multiple STEs simultaneously and thus, a single measure should assess the broad spectrum of STEs. Further, a measurement of state STEs is essential given their relationship to spirituality, well-being, and other positive outcomes. It would be helpful to know, for example, whether viewing beautiful religious architecture evokes solely awe, or awe, compassion, love, and curiosity. Further, although STEs have typically been explored in isolation, a recent study examining a variety of STEs along with other positive emotions classified STEs into two families: social and epistemic (Abatista & Cova, 2023). Social STEs included compassion and love, while epistemic included wonder and curiosity. Such provides evidence that STEs are related to one another, with potential subgroups or classifications amongst them.

2. Problem: No relatively comprehensive measure of STEs

Despite STEs being such important emotions, there is no comprehensive measure of exclusively STEs; and in particular, no such measure of *state* STEs that could be useful for examining the immediate results of interventions to increase STEs. For example the *Dispositional Positive Emotion Scales* (DPES; Shiota et al., 2006) measure joy, contentment, pride, love, compassion, amusement, and awe; only three of those are STEs (love, compassion, and awe). Further, the Aesthetic Emotions Scale (AESTHEMOS, Schindler et al., 2017) measures the effects of beautiful stimuli, including its activating and calming effects, as well as negative effects of aesthetic displeasure. While some of the effects of aesthetic experiences overlap with the STEs measured in our study, many of them do not. The Aesthetic Emotions Scale encompasses a broad range of effects that extend well-beyond STEs, with the authors noting this as a limitation that may threaten face validity. It captures the effects of "the feeling of beauty" and other emotions such as humor, boredom, and confusion. As such, a more precise measure of explicitly STEs was needed.

A measure of state STEs is important for intervention studies but could also have implications for therapy and positive psychology as well... Such a measure would further support research exploring the relationship

across variables such as religion, spirituality, and well-being. To address this gap, in Studies 1 and 2, we develop and validate a measure of state STEs–the State Self-Transcendent Emotions Scale (SSTES).

3. Aims of Our Studies

Study 1 develops a relatively brief but comprehensive measure of *state* STEs.

Study 2 confirms the fit of the factors and demonstrates convergent and divergent validity.

Study 1: Construction of the SSTES

Because STEs are so important for individual and collective flourishing, and because there is no validated, relatively brief, measure of a wide range of STEs, we aimed to develop one. We selected 10 representative STEs based on the existing literature. Yaden et al. (2017) pointed to elevation, compassion, admiration, gratitude, love, and awe as positive self-transcendent emotions. Algoe and Haidt (2009), further characterized elevation, gratitude, and admiration as "other-praising" emotions and differentiated them from more general positive emotions, such as joy; and Haidt (2003) further characterized awe as an "other-praising" emotion. We ultimately dropped admiration given that admiration of virtue is thought to overlap with elevation, while admiration for a skill can be classified as more of a social emotion (Haidt & Morris, 2009). In addition to these *social* STEs, we measured *epistemic* STEs, given that STEs can be classified into these two dimensions (Abatista & Cova, 2023). As such, based on this work, wonder, curiosity, and adoration were added. Forgiveness (Powers et al., 2007) and reverence (Ai et al., 2017) were further added based on their relationship with self-transcendence (Powers et al., 2007).

Upon identifying these ten self-transcendent emotions of interest, we searched for validated measures of each of them. We identified measures for *gratitude* (McCullough et al., 2002; Watkins et al., 2003), *elevation* (McGuire et al., 2022), *awe* (Keltner & Haidt, 2003; Yaden et al., 2019), *compassion* (Hwang et al., 2008), *love* (Campos et al., 2002; McFarland et al., 2019; Sprecher & Fehr, 2005), *wonder* (Fingerhut & Prinz, 2018; Schindler et al., 2017), *curiosity* (Goldberg et al., 2006; Kashdan et al., 2018; Litman & Spielberger, 2003; Schindler et al., 2017), *adoration* (Schindler, 2014), *forgiveness of others* (Amanze & Carson, 2019; Goldberg et al., 2006; Thompson et al., 2005), and *reverence* (Ai et al., 2017). Items measuring wonder and curiosity were adapted from Schindler et al. (2017)'s state measure of aesthetic emotions. We selected, modified, and/or created four items of each of the 10 STEs mentioned above, based on research cited above; with a focus on designing and modifying items such that they measured *state* STEs. For each item we used a 5-point Likert scale, 1 (*does not describe me at all*) to 5 (*describes me extremely well*). Our initial 40 items can be found at https://osf.io/dzjpc/

Hypotheses

We posted our hypotheses at OSF (https://osf.io/9g6u2/) prior to data collection.

1. The overall measure will have moderate internal consistency.
2. We expect the EFA to reveal 10 factors.
3. We expect each of the 10 factors/subscales to have relatively high internal consistency.

Method

Participants

The N = 213 participants were recruited from Prolific (each was paid $1.35, approx. $13.17 per hour) and ranged in age from 19 – 73 years; M = 30.8 ($S.D.$ 9.6). Three did not indicate age. Participants were prescreened to ensure English was their primary language. Women comprised 51.6% of the sample, men 45.5%, transgender 0.5%, and nonbinary/nonconforming 2.3%. Three participants failed the attention check and thus were excluded. Before data collection, the IRB of Felician University approved the study (No. 24-X-108).

Costello and Osborne (2019) surveyed two years' worth of PsycINFO EFA articles, finding over 40% of them had participants to item ratios below 5:1; our sample size of 213 and 40 items is a ratio of 5.3, indicating it is likely an acceptable sample size.

Procedure

After providing informed consent, the following instructions were displayed: "You will see a video with 10 images presented on the screen. Please contemplate each one for 3 seconds. When you see the video, click on the play button to begin." Participants were then presented with a video of beautiful architecture slides (OSF | Architecture Video - Final.mp4), thereby providing participants with a stimulus to react to, as done in previous studies (e.g., Schindler et al., 2017)

and thus generating an authentic state emotional response. After the video, the 40 items, as described above, were administered to the participants.

Results

To identify the underlying factor structure for the responses to the 40 items, we conducted an exploratory factor analysis using maximum likelihood estimation, promax rotation, and imputing missing values with the mean. Missing data (0.27%) were replaced with the column mean. No column had more than 2 missing responses. Bartlett's Test of Sphericity demonstrated that the variables were significantly correlated, $\chi^2(780) = 6071.26$, $p < 0.0001$, thus indicating suitability for factor analysis. The Kaiser-Meyer-Olkin (KMO) also revealed that the data was well-suited for EFA, overall MSA = 0.95, individual MSAs all > 0.90, except for one elevation item which was > 0.80. Inter-factor correlations ranged from 0.03 to 0.72, demonstrating that some factors overlapped, while others were independent, thereby supporting the use of promax rotation.

The EFA revealed three factors with Eigenvalues of 18.4, 2.8, and 1.6. These factors explained 45.9%, 6.9%, and 4.1% of the variance. The 17 items with loadings greater than 0.63 were selected for the CFA.

As predicted, internal consistency for the measure and for the subscales was high, with an α of 0.93. The 9-item SSTES-Social (a subscale of those 17 items), α= .94, consisted of four gratitude items, one elevation item, one compassion item, and three love items. The 5-item SSTES-Epistemic subscale had α = .81, and was made up of one awe item, three wonder items, and one curiosity item. The 3-item SSTES Forgiveness subscale had α = .79.

Assessment of the model fit using the "efa" function from the lavaan library in R (Rosseel, 2012) revealed an adequate fit, $\chi^2(213) = 726.19$, $p < .0001$. The Tucker Lewis Index (TLI) was 0.954 and the Root Mean Square Error of Approximation (RMSEA) was 0.038, 90% CI [0.03, 0.046], both indicated a good fit and the Comparative Fit Index (CFI) of 0.97 shows an excellent fit. Although our chi-square goodness of fit analysis was significant, a more sensitive and accurate way to examine how well the factor model fits the observed data is to divide the chi-square by the degrees of freedom (χ^2/df); a ratio of 2 or less indicates a good fit (Cole, 1987; Wheaton et al., 1977). In our case that would be 718.2 divided by 555 df, and thus a ratio of 1.28. See **Table 1** for the loadings of the pattern matrix.

Table 1. Loadings on Pattern Matrix

Item	Factor 1 (Social)	Factor 2 (Epistemic)	Factor 3 (Forgiveness)
grat1	0.867		-0.126
grat2	0.868		
grat3	0.805		0.156
grat4	0.675	0.135	
elevation1	0.488	0.281	
elevation2	0.706	-0.105	
elevation3	0.156	-0.135	0.202
elevation4			-0.106
awe1		0.695	
awe2		0.542	
awe3			-0.136
awe4	0.217	0.309	
compassion1	0.636		0.191
compassion2	0.312	-0.109	0.153
compassion3	0.314		0.128
compassion4	0.454	-0.154	0.175
love1	0.784	0.126	
love2	0.882	-0.263	
love3	0.448	0.372	
love4	0.650	0.13	
wonder1	-0.255	0.873	0.129
wonder2	0.471	0.698	-0.103
wonder3	-0.136	0.706	
wonder4		0.603	
curious1	-0.242	0.391	0.156
curious2		0.674	
curious3	0.211	0.282	
curious4	0.34		
adoration1	0.289	0.507	
adoration2		-0.177	
adoration3		-0.1	
adoration4	0.59		0.15
forgiving1	0.438	-0.166	0.650
forgiving2	0.103		0.646
forgiving3	0.136		0.694
forgiving4		0.218	0.454
reverence1	0.254	0.397	
reverence2	0.396	0.269	
reverence3	0.176	0.385	
reverence4		0.467	

Note. Selected items, where loadings > 0.63, are in red.

Discussion

Three factors, rather than the expected ten, emerged

from the EFA. They are conceptually related to Social, Epistemic, and Forgiveness STEs. This three-factor solution partially replicated findings from Abatista and Cova (2023), in that they determined there were two families of STEs—social and epistemic. Our factor #1, which we named the SSTES-Social Subscale, was similar to their social classification; and our factor #2, the SSTES-Epistemic Subscale, was similar to their epistemic classification. Although forgiveness of *others* is not commonly referred to as an STE, it fulfills the definition of an STE as it increases empathy and strengthens relationship closeness; in other words, to some degree it takes the focus off self and puts it on others and their well-being (Cao et al., 2021; McCullough et al., 1998). The emergence of three, rather than ten, factors suggests that STEs are more closely related to each other than expected.

Limitations

Since beauty has been shown to evoke a variety of STEs (e.g., Bethelmy & Corraliza, 2019; Fingerhut & Prinz, 2018; Pohling & Diessner, 2016), we designed a video portraying beautiful architecture, with beautiful instrumental music in the background. We used a single stimulus to evoke STEs; but future research could thus test whether the SSTES factor structure replicates when the stimuli differs. A similar limitation was noted in the development of the AESTHEMOS (Schindler et al., 2017), which relied on music to evoke the effects of beautiful stimuli.

Future Research

While Study 1 provides an initial, much-needed measure of state STEs, future research could expand items to include those related to cognitions and physiological sensations, thereby potentially differentiating amongst STEs. Moreover, similar categories of emotions such as aesthetic emotions (Menninghaus et al., 2019) which are evoked from aesthetic stimuli, and eudaimonic emotions which involve perception of meaning and purpose (Vittersø, 2016), could be assessed jointly with STEs. Further, ancillary emotions such as the feeling of being moved, and other bittersweet emotions such as nostalgia and tenderness, may or may not load onto epistemic, social, and forgiveness factors. As such, a future EFA might be conducted on a range of STE-like emotions, including eudaimonic, aesthetic, prosocial, and tender emotions, with an exploratory factor analysis potentially yielding insight into the extent to which these classes of emotions overlap or are distinct. As such, possibilities exist for expanding the spectrum of emotions measured by the SSTES.

Study 2: Evaluation of the SSTES

In Study 2, we sought to confirm the factor structure of the SSTES and demonstrate its convergent and divergent validity. First, we expected to confirm the three factor fit—Social, Epistemic, and Forgiveness—of the SSTES. Next, we expected to demonstrate convergent validity using existing measures of STEs. Since no current comprehensive state measure of STEs exists, we chose measures of specific STEs to assess convergent validity. Specifically, we expected the SSTES to correlate positively with established measures of gratitude, compassion, elevation (social STEs); as well as awe and curiosity (epistemic STEs); and forgiveness. We ensured that none of the items in the SSTES overlapped with those in the measures used for the validity analysis.

We also expected to demonstrate divergent validity. Since STEs are positive emotions, we selected a negative emotion—anger—to assess divergent validity. While STEs are linked to prosocial behavior (Stellar et al., 2017), anger is linked to opposing behaviors such as aggression, opposition, and punishment (for review (see Van Doorn et al., 2014)). Further, while STEs arise from witnessing acts of moral beauty (Diessner et al., 2013), anger often arises from witnessing the moral ugliness of acts of injustice (Van Doorn et al., 2014). Overall, while STEs seem to arise in response to positive stimuli, involve positive feelings, and produce positive consequences; anger seems to arise in response to negative stimuli, involve negative feelings, and produce negative consequences (although not exclusively; Van Doorn et al., 2014). As such, we expected anger to negatively correlate with STEs.

Narcissism is another construct seemingly in contradiction with STEs. While STEs involve an exiting from oneself and orientation away from one's own interests, narcissistic traits involve increased esteem for oneself and one's needs over others (Glover et al., 2012). Further, while STEs correspond to prosocial behavior, narcissistic traits correspond to hostility and self-seeking behavior (Glover et al., 2012). For example, altruism, tender-mindedness, and feelings of

empathy negatively correlated with narcissism (Glover et al., 2012; Samuel & Widiger, 2008; Urbonaviciute & Hepper, 2020). Thus, we expected the SSTES to negatively, or not correlate, with narcissism.

Hypotheses as follows were posted at OSF prior to data collection (https://osf.io/9g6u2/):

1. We anticipate the CFA to confirm the Social, Epistemic, and Forgiveness factors (subscales) identified in the EFA in Study 1.

2. We expect our STE measure to have medium size correlations with other measures of STEs.

3. We expect our STE measure to not, or negatively, correlate with narcissism and anger scales.

Method

Participants

Participants were recruited via social media, primarily through Rainn Wilson posting it on X. Of the $N = 458$ who completed the SSTES, passed the attention check, and completed the measures in less than an hour, 53.1% were women, 33.6% men, 0.2% transgender, 0.9% nonbinary/nonconforming, 0.2% chose "Prefer not to respond," and 12% did not indicate gender. Age ranged from 19 – 80; M_{age} = 46.2 (*S.D.* 12.4); 12.4% did not indicate age.

We had a second attention check among the concurrent validation measures and deleted the 37 participants that failed or skipped it. This dropped the total *N* to 419 for the concurrent validity studies; but not all of those 419 completed all measures, thus the *N*s varied from 388 to 419 for each concurrent validity scale.

Before data collection, the IRB of [blanked for peer review] approved the study (No. 24-X-136). Most statisticians recommend at least 200 participants in a CFA, or a minimum of 10 participants per variable (Mundfrom et al., 2005); which in our case would be 17 items x 10 = 170 participants.

Procedure

After viewing a (beautiful) architecture video, also used in Study 1, all participants completed the SSTES, then completed the manipulation check. They were asked to respond to, "How beautiful did you find the video?" on a scale from 1 ("Not at all beautiful") to 5 ("Very beautiful." They then completed the convergent and divergent measures in randomized order (to prevent sequencing effects), and then completed the demographic questions, followed by a question about how much they valued spirituality. As noted above, we had two attention checks, one in the middle of the SSTES items, and another in the middle of the concurrent validity measures.

Measures

The **State Self-Transcendent Emotions Scale** (SSTES; see study 1). This is a 17-item measure and includes items addressing gratitude, elevation, compassion, love, awe, wonder, curiosity and forgiveness. Each item is rated on a 5-point Likert scale, 1 (*does not describe me at all*) to 5 (*describes me extremely well*); thus, total score ranges from 17 to 85, with higher scores indicating higher levels of STEs. In this study the total score had an α = .93; SSTES-Social subscale α = .92; SSTES-Epistemic subscale α = .84; and SSTES-Forgiveness α = .78. All 17 items may be found at https://osf.io/9g6u2/.

The **Five-Dimensional Curiosity Scale** (5DC) (Kashdan et al., 2018) is a psychological assessment tool that measures curiosity through five specific dimensions: Joyous Exploration, Deprivation Sensitivity, Stress Tolerance, Social Curiosity, and Thrill-Seeking. We used the Joyous Exploration and Social Curiosity subscales in this current study. The 5DC uses a 7-point Likert-type scale ranging from 1 (*does not describe me at all*) to 7 (*completely describes me*) concerning questions such as "I view challenging situations as an opportunity to grow and learn". The Joyous Exploration subscale refers to enjoyment and motivation individuals feel when they engage with new experiences. High scores in this subscale show a strong desire to seek out new information and a positive emotional response to exploration. The Social Curiosity subscale measures the individuals' interest in understanding the feelings, thoughts, and behaviors of others. Individuals who score high in Social Curiosity actively seek to understand other people's thoughts and behaviors. The Joyous Exploration subscale and Social Curiosity Subscale scores can each range from 5-35. In the present study, the alphas for the scales were: Social Curiosity (5 items, α = .87) and Joyous Exploration (5 items, α = .85).

The **Gratitude Questionnaire-Six Item Form** (GQ-6 (McCullough et al., 2002)) is a measurement tool designed to assess individuals' disposition toward gratitude. The GQ-6 uses a 7-point Likert scale ranging from 1 (*strongly disagree*) to 7 (*strongly agree*) in responding to items such as "I have so much in life to

be thankful for." The GQ-6 evaluates how often and intensely individuals feel grateful in their daily lives. Higher scores reflect a stronger disposition toward gratitude and suggest more intense and frequent experiences of grateful emotions. The GQ-6 scores can range from 6-42. In this current study, the alpha for this 6-item scale was.82.

The **Santa Clara Brief Compassion Scale** (SCBCS; Hwang et al., 2008) is a measure designed to evaluate individuals' compassion toward non-intimate others such as strangers by responding to statements like, "One of the activities that provide me with the most meaning to my life, is helping others in the world when they need help," on a 7-point Likert scale, from 1 (*not at all true of me*) to 7 (*very true of me*). Higher scores show a stronger level of compassion that reflects more feelings of care and concern for others; scores can range from 5 - 35. In our study the alpha for this 5-item scale was α = .82.

The **Dispositional Positive Emotion Scales (DPES)** (Shiota et al., 2006) is a questionnaire of 38-items, divided across seven subscales: Joy, Contentment, Pride, Love, Compassion, Amusement, and Awe. In our study we used the Awe subscale that specifically measures the disposition to experience awe, a positive emotion experienced when individuals face something vast and beyond their current understanding. The Awe subscale includes 6 items, such as "I often feel awe" and "I seek out experiences that challenge my understanding of the world". Participants are asked to rate statements on a 7-point Likert scale from 1 (*strongly disagree*) to 7 (*strongly agree*); scores can range from 6 – 42. Higher scores indicate a greater tendency to experience awe. In our study the alpha was .85.

The **State Moral Elevation Scale (SMES)** measures levels of state moral elevation (McGuire et al., 2022). On this 9-item SMES participants respond to items such as "Motivated to live in a nobler or virtuous way" on a 5-point Likert scale, ranging from 0 (*Not at all*) to 4 (*Extremely*). The SMES scores can range from 0-36. Higher scores on this scale indicate a greater tendency to be emotionally affected by moral beauty. In our study the alpha was .93.

The **Heartland Forgiveness Scale (HFS)** (Thompson et al., 2005) assesses dispositional forgiveness in the three dimensions of self, others, and situations. We used the Forgiveness of Others subscale, which is a 6-item scale, and participants responded to statements such as "Although others hurt me in the past, I have eventually been able to see them as good people." on a 7-point Likert scale, ranging from 1 (*almost always false of me*) to 7 (*almost always true of me*). The HFS scores can range from 6-42. Higher scores show a greater tendency to forgive others. In our study the alpha was .82.

The **Dimensions of Anger Reactions-5** (DAR-5) (Forbes et al., 2014) is a 5-item measure designed to evaluate anger frequency, intensity, and impact. Participants rate items such as "When I got angry, I got really mad." on a 5-point Likert scale, from 1 (*none or almost none of the time*) to 5 (*All or almost all of the time*); scores can range from 5-25. Higher scores indicate greater frequency and severity of anger reactions. In our study the alpha was α = .72.

The **Narcissistic Admiration and Rivalry Questionnaire Short Scale (NARQ-S)** (Leckelt et al., 2018) is a 6-item scale assessing two main dimensions of narcissism, admiration and rivalry, by asking participants to rate their agreement on a 6-point Likert scale from 1 (*not agree at all*) to 6 (*agree completely*) on statements such as "I want my rivals to fail." NARQ-S scores range from 6-36. Higher scores on the admiration subscale indicate a greater tendency to gain social admiration, while higher scores on the rivalry subscale reflect a tendency to competitive behavior. In our study the alpha was α = .71.

Results

The results of our study suggest that participants did, indeed, perceive the architecture video as beautiful, M = 4.16, SD = 0.977.

A confirmatory factor analysis was conducted in R using the "cfa" function in the lavaan library (Rosseel, 2012), with the dataset of all participants who completed the SSTES in Study 2 (N = 458). This CFA did confirm the three factors (Social, Epistemic, Forgiveness), with a CFI = 0.91, indicating an acceptable fit (Matsunaga, 2010). Although the TLI we found of 0.89 is just below 0.90, according to Matsunaga (2010), since CFI and TLI are both incremental fit indices, having one or the other above 0.90 confirms an acceptable fit. The SRMR of 0.06, in combination with a CFI of .91 also indicates good fit (Matsunaga, 2010). Our RMSEA of 0.089 is close to the acceptable fit of 0.08. Our chi-square goodness of fit analysis, based on the ratio χ^2/df, was 3.43. Although this does not show a good fit, it is close enough to indicate an acceptable fit (Cole, 1987; Wheaton et

al., 1977). See Figure 1 for the pattern of coefficients among the various SSTES items and subscales.

Our item-rest correlations (IRC; the correlation between the score on an individual item and the total score on the test, excluding the item in question) for 16 of our 17 items ranged from .50 to .80, which is considered the ideal range for retention of items (Netemeyer et al., 2003). However, one item from the Forgiveness factor had an IRC of .43, which is less than ideal, but acceptable.

We also completed IRCs with each subscale (Social, Epistemic, Forgiveness). We correlated each item with its corrected subscale total and also correlated each item with the total subscale scores of the other two subscales. Sixteen of the 17 SSTES items correlated more highly with its own corrected subscale total than with either of the other two subscale totals; and all within the ideal .50–.80 range, except for one Forgiveness item, which correlated higher with the Social STE subscale.

Total scores on the SSTES significantly, positively correlated with measures of gratitude, $r = 0.60$; compassion, $r = 0.42$; elevation, $r = 0.52$; awe, $r = 0.61$; curiosity, $r = 0.26$; and forgiveness, $r = 0.34$, all $p < 0.001$. Scores significantly, negatively correlated with anger, $r = -0.19$, $p < 0.001$. Finally, scores on the SSTES did not correlate with narcissism (see **Table 2** for correlations).

Table 2. Concurrent Convergent and Divergent Correlational Validity of the SSTES

	SSTES Total Score	SSTES Social	SSTES Epistemic	SSTES Forgiveness
Compassion (Hwang et al., 2008)	.42***	.42***	.33***	.23***
Elevation (McGuire et al., 2022)	.52***	.43***	.56***	.29***
Gratitude (McCullough et al., 2002)	.60***	.59***	.50***	.29***
Awe (Shiota et al., 2006)	.61***	.54***	.62***	.31***
Social Curiosity (Kashdan et al., 2018)	.26***	.28***	.21***	.12*
Joyous Exploration Curiosity (Kashdan et al., 2018)	.44***	.39***	.42***	.26***
Forgiveness (Thompson et al., 2005)	.34***	.26***	.22***	.51***
Anger (Forbes et al., 2014)	-.19***	-.14**	-.14**	-.28***
Narcissism (Leckelt et al., 2018)	-0.05	**-0.05**	0.04	-.16**

Note. *** = $p < .001$; ** = $p < .01$; * = $p < .05$; due to the many correlations in this Table, perhaps it's prudent to only consider the *** as significant

The SSTES subscales also correlated with established measures, all $p < 0.001$ except for SSTES Forgiveness Subscale and Social Curiosity, which was significant at $p < 0.01$ (see **Table 2**).

Discussion

The confirmatory factor analysis resulted in support for Hypothesis #1, confirming the 3-factor structure of the SSTES.

Hypothesis #2 appears supported as well, with a variety of measures indicating the concurrent and convergent validity of the SSTES. The correlation between the SSTES and measures of elevation, gratitude, and awe were large; and between the SSTES and measures of compassion, and forgiveness, medium (Cohen, 2013). The correlation between the SSTES and the measure of curiosity was small to medium ($r = 0.26$). Interestingly, the Social Curiosity measure assessed overt social curiosity, with items assessing the degree to which respondents seek information from social counterparts (Kashdan et al., 2018); as such, it seems reasonable that the correlation between a measure of the self-transcendent emotion, curiosity, correlated relatively less strongly with this measure of overt social curiosity.

The subscales also show convergent validity. One would expect measures of awe and curiosity to correlate the highest with the Epistemic factor, which they do; and social STEs like compassion and gratitude correlate highest with the Social factor of the SSTES; and a measure of forgiveness correlates highest with our Forgiveness factor. Likewise, Hypothesis #3 is supported, as divergent validity was established, with anger having negative correlations with the SSTES, and narcissism being unrelated to it. As described previously, it is reasonable to expect anger to negatively correlate with the SSTES, given opposing

action tendencies and correlates (Van Doorn et al., 2014). At the same time, this finding opens the door for future research to investigate whether interventions fostering SSTES might reduce anger.

Limitations

We used Prolific to collect data in Study 1; and research shows Prolific is one of the most reliable and valid crowdworking platforms to collect social science data (Douglas et al., 2023). However, there are a variety of concerns about such sites wherein one "hires" participants. For example, one concern is whether the responses of semi-professional survey takers, having a monetary motivation, generalize well to the average citizen. Perhaps not (Palan & Schitter, 2018). Therefore, we asked actor Rainn Wilson to post our request on his "X" social media site, as we knew he has a personal interest in spirituality and STEs (Wilson, 2023). As Wilson's major fame comes from his role as Dwight Schrute on *The Office*, and that show was *widely* popular, it seems reasonable to assume our sample may widely represent the American public. *The Office*, in reruns, was still the most watched show on Netflix in 2018. And in 2025, on Peacock, *The Office* was receiving 500,000 views a day (NBC, 2025). On the other hand, there could be a bias in Rainn Wilson's followers; do people who follow a popular comedian generalize to the American public better than Prolific employees? Not knowing this is a limitation to this study.

Future Research

Additional measures could be used in a future validity analysis to extend our findings. For example, measures of related states and traits that are expected to correlate with the experience of state STEs, such as empathy, might support the validity of our measure, while yielding insight into correlates of state STEs. Further, while we established a negative relationship between state STEs and anger, additional states and traits that are expected to negatively correlate with state STEs could be tested. One such trait might be antisocial behavior–which would be expected to negatively correlate with state STEs—given that such behavior involves lack of concern for others (Catalano & Hawkins, 1996).

Future research could also aim to replicate the negative correlation between self-transcendent emotions and anger. If this finding is consistent, consideration might be given to SSTES for use in anger-management interventions. Moreover, future research might confirm that narcissistic traits are unrelated to the experience of self-transcendent emotions, as this finding could yield insights into the affective underpinnings of narcissism and point to STEs as a potentially effective tool for addressing narcissistic traits. Finally, the SSTES could be used in brief intervention studies. Experimental manipulations might include the use of beautiful stimuli, spiritual experiences, or positive interpersonal interactions—all of which would be expected to increase STEs. In particular, given that STEs explain the relationship between religion and well-being (Van Cappellen et al., 2016) interventions might aim to boost STEs amongst the religious and nonreligious, with our measure potentially used to in pre and post tests. Interventions might, for example, aim to increase spirituality even in the absence of belief. For example, does envisioning a united humanity increase epistemic, social, and forgiveness STEs? Our measure can also be used in studies further exploring causal pathways between religious belief and involvement and well-being; and for studies aiming to explore the relationship between spirituality and other positive outcomes.

Conclusion

Here we developed a relatively brief, broad spectrum, *state* measure of self-transcendent emotions–the 17-item State Self-Transcendent Emotions Scale (SSTES). We demonstrated a range of validity (face/content, concurrent, construct, and predictive) as well as internal consistency reliability. This measure may be useful in testing the effectiveness of brief interventions in inducing STEs.

Ethical Approval (if applicable)

This study was approved by the Felician University Institutional Review Board, reference numbers No 24-X-108 (Study 1) and No 24-X-136 (Study 2).

Informed consent from participants (if applicable)

Participants provided informed consent electronically before participating in the study.

Data availability statement for Basic Data Sharing Policy

The data from Study 1 and Study 2 are openly available in Open Science Framework at https://osf.io/9g6u2/, DOI 10.17605/OSF.IO/9G6U2.

Clinical trial registration

n/a

Consent to publish statement / form

n/a

Competing interests

The authors declare no competing interests.

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Authors Contributions: SRM, SZ, & RD conceived and designed the study. SRM primarily, and RD secondarily, performed the data analysis. SRM & RD interpreted the results and SRM, SZ, & RD drafted the manuscript. All authors approved the final version of the article.

Thrix (2018; https://www.thrix.ai) was used to check and correct references. Authors subsequently checked references and made further revisions in response to errors pointed out by Thrix.

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