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Self-esteem and immortality: Evidence regarding the terror management hypothesis that high self-esteem is associated with a stronger sense of symbolic immortality

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ABSTRACT

Terror Management Theory (Greenberg, Pyszczynski, & Solomon, 1986) defines self-esteem as the feeling that one is living up to the standards of their internalized cultural worldview and is consequently worthy of the symbolic and/or literal modes of death transcendence offered by that worldview. Although there is ample evidence for the death-anxiety buffering function of self-esteem, no study to date has assessed the hypothesis that high self-esteem is associated with a stronger sense of symbolic immortality. Supporting this hypothesis, in seven samples ($N = 7404$) we found that American students with higher self-esteem more strongly believed that they will be remembered and have an impact after they die. Symbolic immortality was also related to greater ingroup identification and lower levels of loneliness, existential isolation, death-thought accessibility, and depression. Additionally, symbolic immortality partially mediated the effect of self-esteem on death-thought accessibility (Samples 4–7) and on depression (Sample 4), although these relationships were also bi-directional with self-esteem partially explaining the variance between symbolic immortality and these constructs. These findings augment the literature delineating the existential function of self-esteem and highlight the potential importance of perceived symbolic immortality to psychological well-being.

1. Introduction

According to terror management theory (TMT; Greenberg, Pyszczynski, & Solomon, 1986; Solomon, Greenberg, & Pyszczynski, 2015), much of human behavior is directed at minimizing the potentially anxiety-provoking awareness of personal mortality. TMT posits that human beings manage existential terror by immersing themselves in cultural conceptions of reality (cultural worldviews) that afford a sense of meaning, purpose, and hope for death transcendence through literal and/or symbolic immortality. To gain a sense of security and immortality, people must feel that they are living up to the standards of value prescribed by their culture. *Self-esteem*, from this theoretical perspective, is the feeling that one is a person of value in a meaningful universe, and thus worthy of protection and death transcendence.

Numerous studies provide convergent empirical support for the death anxiety buffering function of self-esteem (for reviews see, e.g.,

Greenberg, 2008; Pyszczynski, Greenberg, Solomon, Arndt, & Schimel, 2004; Rothschild, Lifshin, Helm, & Greenberg, 2018). These studies show that: (1) death reminders (*mortality salience*; MS) motivates self-esteem striving in worldview relevant ways (e.g., Greenberg et al., 2010; Jonas, Schimel, Greenberg, & Pyszczynski, 2002; Taubman-Ben-Ari, Florian, & Mikulincer, 1999; Zestcott, Lifshin, Helm, & Greenberg, 2016); (2) high self-esteem reduces anxiety and death-related concerns (e.g., Greenberg et al., 1992; Harmon-Jones et al., 1997); (3) undermining self-esteem increases the accessibility of death-related thoughts (*death thought accessibility*; DTA, e.g., Hayes, Schimel, Faucher, & Williams, 2008); and (4) low self-esteem is associated with deficient terror management mechanisms and consequent death anxiety (e.g., Juhl & Routledge, 2016). However, to date, the TMT-based putative association between high self-esteem and a stronger sense of symbolic immortality has not been directly assessed and explored. That is the purpose of the current research.

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1.1. Terror management theory of self-esteem

Terror management theory (TMT; [Greenberg et al., 1986](#)) was initially formulated to explain the psychological functions of self-esteem and cultural worldviews. Following the works of cultural anthropologist Ernest Becker (e.g., [Becker 1971, 1973](#)), TMT maintains that human beings are motivated to procure self-esteem because it serves as an anxiety buffer that shields them from the potentially terrifying awareness of death.

According to [Becker \(1971\)](#), self-esteem acquires its anxiety-buffering qualities over the course of the socialization process. Newborns are completely helpless at birth and only survive and have their physical and emotional needs met by their primary caretakers (typically the parents). Infants are however equipped with the adaptive ability to experience anxiety and call upon their caregivers in times of need. Parental love and protection thereby provide the original basis of psychological security and the foundation for a socio-psychological anxiety buffering system. But as the parents begin to put conditions on the child based on the culture's rules and values, requiring them to be good and do the "right" things, sustaining that love and protection becomes dependent on living up to these rules and values which the child internalizes. From then on, being a good boy or girl becomes associated with safety and security and being bad becomes associated with insecurity, the potential loss of that love and protection (cf. [Sullivan, 1953](#)). This is how self-esteem, believing oneself to be good and of value, becomes an anxiety-buffer.

Becker and TMT propose that as children become more and more aware of their mortality (see also [Lifton, 1979](#)), they must shift their seeking of security and sense of protection from death via immortality to the larger concepts of their cultural worldviews; e.g., belief in deities, in literal immortality via an immortal soul, in symbolic immortality via a lasting legacy of social, scientific, and artistic achievements and identifications that will extend beyond physical death (see also [Florian & Mikulincer, 1998a](#)). Thus, the problem of death is managed as long as people feel they are of value and therefore qualify for one or more of these bases of death transcendence. Self-esteem therefore provides individuals with a sense that they are presently protected, and may ultimately transcend death.

Considerable evidence supports the anxiety-buffering function of self-esteem in general, and its value in ameliorating concerns about death and death anxiety in particular. Self-esteem boosts reduce anxiety in response to reminders of death and physical threats ([Greenberg et al., 1992](#)). Dispositionally high self-esteem reduces defensiveness and anxiety in response to reminders of mortality ([Harmon-Jones et al., 1997](#); [Juhl & Routledge, 2016](#)). Regarding the specific role of belief in immortality as a defense against mortality concerns, there is evidence that having a greater sense of literal and symbolic immortality is associated with lower levels of death anxiety and defensiveness after MS inductions ([Dechesne et al., 2003](#); [Florian & Mikulincer, 1998](#)). Furthermore, reminding people of their symbolic legacy after death reduces DTA in response to MS ([Wojtkowiak & Rutjens, 2011](#)). However, to our knowledge, no study has provided direct evidence to support for the link between self-esteem and immortality beliefs posited by TMT. According to the theory, higher levels of self-esteem should be associated with a greater belief that one will continue to exist symbolically after death.

1.2. The current research

In the current research, we tested this hypothesis in seven large samples of American undergraduate students, by determining if individuals with higher levels of trait self-esteem also reported greater belief that they will be remembered, or their lives will have impact after they die. Support for this correlational hypothesis would not unequivocally corroborate a TMT explanation. For example, a high level of symbolic immortality may cause an increase in self-esteem;

alternatively, people with high self-esteem may simply perceive themselves more positively in general, including being remembered over time. However, if the predicted correlation between self-esteem and symbolic immortality is not found, this would cast serious doubt on a central hypothesis derived from TMT. It is thus important to determine whether this relationship exists or not.

In addition, we examined if other variables related to self-esteem and to terror management, such as investment in an ingroup identity (e.g., national identity, identification with one's university), the subjective availability of close relationships (attachment orientation, lower loneliness, existential isolation), and perceived meaning in life, would also predict higher levels of symbolic immortality. This would enable us to test the TMT prediction that these variables foster symbolic immortality; if so, this would increase the construct validity of our measure of symbolic immortality and provide further support for TMT. Theoretically, people with a strong ingroup identity should feel that they are a part of something larger than themselves and therefore have a stronger sense of symbolic immortality through the collective continuity (e.g., [Castano, Yzerbyt, Paladino, & Sacchi, 2002](#); [Greenberg et al., 1986](#); [Herrera & Sani, 2013](#); [Sani, Herrera, & Bowe, 2009](#)). Secure attachment (low attachment anxiety and avoidance) should also relate to higher sense of symbolic immortality because forming close relationships provides a route for symbolic immortality via romantic relationships and offspring ([Mikulincer, 2018](#); [Mikulincer, Florian, & Hirschberger, 2003](#); [Wisman & Goldenberg, 2005](#)). For this reason, peoples' sense of belonging or loneliness may also relate to self-esteem and symbolic immortality. Loneliness and impoverished social relationships may therefore be especially detrimental to feelings of symbolic immortality. Existential isolation, the "unbridgeable gulf between oneself and any other being" ([Yalom, 1980](#), p. 355) may also undermine a sense of symbolic immortality. Higher levels of existential isolation should be negatively correlated with one's ability to connect to other people and to the cultural worldview and gain a sense of symbolic immortality (e.g., [Helm et al., 2020](#); [Helm, Lifshin, Chau, & Greenberg, 2019](#)). Finally, perceived meaning in life should also foster effective terror management and increase a sense of symbolic immortality (e.g., [Routledge & Juhl, 2010](#); for a review see [Juhl & Routledge, 2016](#)). As people perceive their lives as more meaningful, and feel a part of something greater they should in turn perceive stronger symbolic immortality. Thus, based on TMT, all these variables should contribute to people's sense of symbolic immortality.

Moreover, and perhaps more critical for our hypothesis, we included these additional variables in this research to determine if the relationship between self-esteem and symbolic immortality would hold when we statistically controlled for all of these other variables. It is particularly important to control for variables related to social relationships such as attachment orientations, loneliness and existential isolation, as theoretically they could account for the relationship between self-esteem and symbolic immortality entirely and provide an alternative explanation for the hypothesized relationship between self-esteem and immortality. If one has a wider and more supportive social network, they may have higher self-esteem and think that their memory would live on symbolically. If self-esteem and symbolic immortality are related beyond these other variables, such third variable explanations for the correlation would be rendered unlikely. We should note however that these variables are also likely to be inherently interconnected at some level, as they operate together in synchrony, whereas in order for one to have a stable sense of self-esteem they may also need to have a sense of attachment security, social identity, meaning in life and social connections. We therefore do expect that these variables will share variance with self-esteem when explaining symbolic immortality. From the TMT perspective, self-esteem is a socio-cultural-psychological structure that depends on social validation of the perception that one is a valuable member of a meaningful universe.

In addition to investigating the relationship between self-esteem and symbolic immortality we also assessed if a greater sense of literal

immortality, the belief that one may continue to exist in some form of afterlife, is also associated with high self-esteem. Here we expected that this relationship would exist only among people who believe that an afterlife exists. For them, higher levels of self-esteem may reflect the feeling that they are living up to the standards of their cultural beliefs, and therefore worthy of immortality (e.g., Vail et al., 2010). Still, because living up to standards of religious beliefs may also correlate with higher levels of humility, at least for some religions, we assumed that this relationship may be more complex than the one between self-esteem and a sense of symbolic immortality. Also in this case, including measures of belief in literal immortality, as well as of religiosity or spirituality, allowed us to further assess the convergent and discriminative validity of our symbolic immortality measure.

In Samples 4–7, we also tested if higher levels of symbolic immortality partially mediate the effect of self-esteem on death-thought accessibility (DTA), as higher levels of self-esteem should be associated with higher beliefs in symbolic immortality, and a higher sense of symbolic immortality should be negatively related to DTA. This would further allow us to test the idea that higher levels of symbolic immortality have a terror management function.

Finally, in Sample 4 we tested if symbolic immortality mediates the relationship between self-esteem and depression, in light of research showing that depression may be caused due to deficient terror management systems and the inability to repress death-related thoughts (Mikulincer, Lifshin, & Shaver, 2020). A compromised death anxiety buffering system can undermine people's capacity to efficiently manage existential concern and therefore increase anxiety and depression and related psychological disorders. If indeed a weaker anxiety buffer (i.e., low self-esteem) increases vulnerability to depression because of problems with *terror management*, then symbolic immortality, which is an indicator of successful terror management, should partially mediate the relationship between self-esteem and depression. We therefore predicted that lower levels of self-esteem would be associated with a lower sense of symbolic immortality, which in turn would relate to higher levels of depression.

2. Method

2.1. Participants

In all seven samples, introductory psychology students completed the study at the beginning of the semester as part of a large survey of undergraduates' attitudes, interests, concerns, and personality traits. The participants completed the questionnaires voluntarily during their class (Samples 1–4) or online (Samples 5–7) and received a credit toward their research requirement for their participation.

Sample 1 was completed by 1713 students. After excluding the results of participants who were not native English speakers or American, or who had missing data on the variables of interest, the results of 1407 participants were analyzed (915 women; $M_{age} = 18.60$, $SD = 1.87$). The participants' religious affiliation was as follows: 887 reported being Christian (63.1%; including all denominations), 196 agnostic (13.9%), 127 atheist (9%), 70 Jewish (5%), 15 Mormon (1.1%), 24 Buddhist (1.7%), 10 Muslim (0.7%), 9 Hindu (0.6%), 67 reported "other" (4.8%) and 2 had missing data (0.1%).

Sample 2 consisted of 1641 students. After excluding non-native English speakers or those who had missing data, the results of 1422 participants were analyzed (937 women, $M_{age} = 18.52$, $SD = 1.59$). Eight-hundred and forty-seven students reported being Christian (including all denominations), 231 agnostic (16.2%), 137 atheist (9.6%), 58 Jewish (4.1%), 24 Mormon (1.7%), 17 Buddhist (1.2%), 17 Muslim (1.2%), 15 Hindu (1.1%), 68 reported "other" (4.8%) and 7 had missing data (0.5%).

Sample 3 consisted of 707 students. After excluding data of non-native English speakers, non-Americans, or those with missing data, the results of 604 participants were analyzed (377 women, $M_{age} = 19.18$,

$SD = 2.20$). Religious affiliation was not measured in Samples 3–5.

Sample 4 consisted of 1477 students. After excluding data of non-native English speakers, non-Americans, or those with missing data, the results of 1264 participants were analyzed (905 women, $M_{age} = 18.84$, $SD = 2.63$).

Sample 5 consisted of 1414 students. After excluding non-native English speakers, non-Americans, or those who had missing data, the results of 1143 participants were analyzed (810 women, $M_{age} = 18.96$, $SD = 2.69$).

Sample 6 consisted of 809 students. After excluding non-native English speakers, non-Americans, or participants with missing data, the results of 643 participants were analyzed (443 women, $M_{age} = 19.36$, $SD = 2.09$). Two-hundred and ninety-eight students reported being Christian (46.3%; including all denominations), 49 agnostic (7.6%), 43 atheist (6.7%), 111 "spiritual but not religious" (17.3%), 32 Jewish (5%), 7 Buddhist (1.1%), 3 Muslim (0.5%), 6 Hindu (0.9%), 77 "other" (12%) and 17 had missing data (2.6%).

Sample 7 consisted of 1103 students. After excluding non-native English speakers, non-Americans, or participants with missing data, the results of 921 participants were analyzed (658 women, $M_{age} = 18.88$, $SD = 2.51$). Five-hundred and twenty-five students reported being Christian (57%), 73 agnostic (7.9%), 61 atheist (6.6%), 147 "spiritual but not religious" (16%), 43 Jewish (4.7%), 8 Buddhist (0.9%), 5 Muslim (0.5%), 7 Hindu (0.8%), 37 "other" (4%) and 15 had missing data (1.6%).

Sensitivity analyses using G*Power (Faul, Erdfelder, Lang, & Buchner, 2007) indicated that each of these samples could detect a very small Pearson correlation at 80% power (Sample 1: $r = .066$; Sample 2: $r = .065$; Sample 3: $r = .101$; Sample 4: $r = .070$; Sample 5: $r = .073$; Sample 6: $r = .098$; Sample 7: $r = .082$). Similarly, sensitivity analyses indicated that each of these samples could detect a very small effect size in a multiple regression analysis with 11 predictors (including the maximum amount of potential covariates) at 80% power (Sample 1: $f^2 = .012$; Sample 2: $f^2 = .012$; Sample 3: $f^2 = .028$; Sample 4: $f^2 = .013$; Sample 5: $f^2 = .015$; Sample 6: $f^2 = .027$; Sample 7: $f^2 = .018$).

2.2. Materials and procedure

In all seven samples, participants first provided demographic information such gender, age and race, and then completed the different measures of identification with America, belief in symbolic immortality, and self-esteem. The specific measures and the order of presentation slightly differed between samples and are described below (M s and SD s of all the variables for each sample are presented in Table 1 and in Tables S1–S7 in the Supplementary file).¹

2.2.1. Ingroup identification

In all the samples, participants completed a measure of identification with America ("How important to you is your identity as an American?") on a scale from 1 (*Not at all*) to 9 (*Very much*). In Samples 1–6 we also included a measure of identification with participants' university using the same scale ("How important to you is your identity as a member of [University name]?"), considering that after the 2016 elections, students' levels of investment in the American identity had declined (e.g., Lifshin, Horner, Helm, Greenberg, & Solomon, 2020; also see Table 1).² In Sample 2, we included a three-item measure of perception that the American worldview is morally superior (Sullivan et al., 2014; e.g., "The American way of life is the most moral way of life in the world"; 1 =

¹ The surveys also included unrelated measures that were included in the departmental mass survey (all other departmental surveys were included after our materials, aside from in Samples 6–7, in which the order of surveys was random). More information of these measures is available from the first author.

² In Samples 5–7, the scale had slightly different wording, ranging from 1 (*Not at all important*) to 9 (*Extremely important*).

Strongly disagree, 9 = *Strongly agree*).

2.2.2. Symbolic immortality

In Samples 1–4, symbolic immortality was measured using a single item which was constructed for the purpose of the study: “Do you think that you will be remembered by other people after you die (e.g., through your accomplishments or legacy)?” (1 = *Certainly not*, 9 = *Certainly yes*). In Samples 5 and 6, we used a different version of this measure: “After I die, my impact on the world will continue and be remembered by others” (1 = *Not at all true*, 9 = *Definitely true*). In Sample 7, we included two items with yet slightly different wordings: “After I die, my impact on the world will continue” and “Some aspect of myself, such as my name or accomplishments, will be remembered long after I die” (1 = *Not at all true*, 9 = *Definitely true*), which were highly correlated ($r = .75, p < .001$) and averaged.

In Samples 1–3, the measure appeared after the questions about importance of ingroup identity and before the measures of self-esteem and social relations (e.g., existential isolation, loneliness). In Sample 4, the measure appeared after all these measures (aside from the measure of DTA). In Sample 5, the measure appeared after the questions about importance of ingroup identity, self-esteem, and attachment orientation, and it was followed by the questions about meaning in life, existential isolation, and DTA. Finally, in Samples 6 and 7, the symbolic immortality measure appeared after these other measures.

The rationale for using these new and more general and direct measures of symbolic immortality was that other existing measures of Lifton’s domains of symbolic immortality (e.g., Mathews & Kling, 1988) or of generativity (McAdams & de St. Aubin, 1992) are usually framed in a manner that assesses the impact of specific life activities and achievements on feelings of symbolic immortality. By contrast, our current measures are more likely to a general belief that one will attain symbolic immortality, which we believe is more suitable to assess the influence of self-esteem on symbolic immortality beyond a person’s given life circumstances. These more direct general measures are also likely more suitable for young adults (university students), who most likely have not yet accomplished the things in life that will secure their sense of symbolic immortality (e.g., children, a career).

2.2.3. Literal immortality

Sample 1 included a measure of belief in literal immortality through an afterlife: “Do you think that you will live again after you die (e.g., in heaven or through reincarnation)?” (1 = *Certainly not*, 9 = *Certainly yes*). In Samples 5–7, we changed this measure: “After I die, my soul will continue to live on” (1 = *Not at all true*, 9 = *Definitely true*). In these samples, we also added a measure of general belief in the afterlife (Lifshin, Greenberg, Weise, & Soenke, 2016; “Do you believe in an afterlife?”; *yes/no/I don’t know*) in order to test for the correlations between self-esteem and belief in ones’ literal immortality among participants who either belief in an afterlife or not separately. This measure appeared before the measure of symbolic immortality in Sample 1, but was placed after the measure of symbolic immortality in Samples 2–7, in order to minimize it influencing the symbolic immortality measure.

2.2.4. Religiosity and spirituality

In Samples 1–3, participants indicated the importance of their religious beliefs (“How important are your religious beliefs to you?”; 1 = *Not at all important*, 9 = *Extremely important*). In Samples 5–7, participants responded to the same question but were also given the option to identify as non-religious (0 = *I am not religious*, 1 = *Not at all important*, 9 = *Extremely important*). In Samples 6–7 we also added a measure asking about importance of spirituality (“If you consider yourself to be spiritual, how important are your spiritual beliefs to you?”; 1 = *Not at all important*, 9 = *Extremely important*). We included a measure of religious affiliation in Samples 1–2 and 6–7 (as detailed in the [Participants](#) section).

2.2.5. Political orientation

In all the samples, participants indicated their political orientation (1 = *Very conservative*, 9 = *Very liberal*).

2.2.6. Self-esteem

In Samples 1, and 3–7, self-esteem was measured using the single item self-esteem scale (Robins, Hendin, & Trzesniewski, 2001; “I have high self-esteem”; 1 = *Not very true of me*, 9 = *Very true of me*).³ This scale has been found to highly correlate with the Rosenberg Self-Esteem Scale with strong convergent validity and similar predictive validity (Robins et al., 2001). In Sample 2, we measured self-esteem using the 10-item Rosenberg Self-Esteem Scale (Rosenberg, 1965; e.g., “On the whole, I am satisfied with myself”, “I feel that I’m a person of worth, at least on an equal plane with others”; 1 = *Strongly Disagree*, 4 = *Strongly Agree*; $\alpha = .87$).

2.2.7. Loneliness

In Samples 1–4, we included the 3-item loneliness scale (Hughes, Waite, Hawkey, & Cacioppo, 2004; e.g., “How often do you feel like you lack companionship?”; 1 = *Never*, 5 = *Always*; α ranged from .71 to .87).

In Sample 4 we also included a social isolation scale (Helm, 2019), which includes questions about subjective social integration (3 items, e.g., “I feel like a part of a group on campus”, “I feel I am able to spend time with others when I want to”; 1 = *Strongly Disagree*, 5 = *Strongly Agree*), frequency of social contact (2 items, e.g., “How often do you socialize with friends?”; 1 = *Almost Never*, 5 = *Almost Always*), and one question about the number of close friends (with whom they believe they could confide in or turn to for help) that they currently have at college (1 = *0 friends*, 5 = *4+ friends*). These items were combined into a social isolation measure ($\alpha = .79$).

2.2.8. Existential isolation

In all the samples, we also included the 6-item Existential Isolation Scale (EIS; Pinel, Long, Murdoch, & Helm, 2017; e.g., “Other people usually do not understand my experiences”; 1 = *Strongly Disagree*, 7 = *Strongly Agree*; α ranged from .80 to .84). Only three of these items were included in Sample 7 ($\alpha = .83$). In Sample 2 we also included another scale focused more on the emotional aspects of existential isolation (Adopted from van Bruggen et al., 2017; 5 items; e.g., “I struggle with the feeling that in the end I am on my own in life”; 1 = *Strongly Disagree*, 7 = *Strongly Agree*; $\alpha = .83$).

2.2.9. Attachment orientation

In Samples 2–5, attachment orientation was measured using the 9-item Experiences in Close Relationships scale short version (ECR-RS; Fraley et al., 2011) with the general instructions (i.e., “with regard to the most important person in your life”) rather than a specific attachment figure. In Sample 5, we had slightly different instructions (i.e., “about close relationships in general”). This scale contains two subscales: Avoidance (6 items; e.g., “I don’t feel comfortable opening up to this person”; 1 = *Strongly Disagree*, 7 = *Strongly Agree*; α ranged from .85 to .87) and Anxiety (3 items; e.g., “I often worry that this person doesn’t really care for me”; 1 = *Strongly Disagree*, 7 = *Strongly Agree*; α ranged from .89 to .90).

2.2.10. Death-thought accessibility

In Samples 4–7, we also included a measure of death-thought accessibility (DTA). Drawing from previous terror management research (Greenberg, Pyszczynski, Solomon, Simon, & Breus, 1994), we included six word-stems that could be completed with either a death-related or non-death-related word (e.g., DE_ _ can be completed with DEAL or DEAD). In Sample 4, the target death-related words were:

³ In Samples 3, 5, 6 and 7, the scale had slightly different wording, using *Strongly Disagree/Strongly Agree* and *Fully disagree/Fully agree*, respectively.

coffin, killed, corpse, grave, skull, and dead. In Samples 5 and 6, the words were: coffin, killed, murder, grave, skull, and dead. We tallied the number of words completed in death-related ways to compute a final DTA score. Although this measure is not the standard measure of death thought accessibility, as it does not include the full list of non-death related words, this measure was previously used successfully in TMT research (e.g., Helm et al., 2019). We removed participants with multiple incomplete words (Z scores > 3). To control for the possibility that this measure might affect ratings of self-esteem and symbolic immortality, in Samples 4 and 5 the measure of DTA appeared after the items about symbolic (and literal) immortality measures. In Samples 6 and 7 the DTA measure appeared before the measure of symbolic (and literal) immortality.

2.2.11. Beck depression inventory

In Sample 4, we also included the Beck Depression Inventory (BDI-II; Beck, Steer, & Brown, 1996).

2.2.12. Meaning in life

In Samples 5–7, we also included a 6-item measure assessing the presence of meaning in life (Steger et al., 2006). Items included “I have a good sense of what makes my life meaningful” and “My life has no clear purpose” (reverse-scored). Participants rated their agreement with each statement on a 7-point Likert-type scale (1 = *Absolutely untrue*, 7 = *Absolutely true*). An overall mean score was computed (α ranged from .88 to .90, after one item was dropped from Samples 5–6 due to low inter-item correlations). In Sample 7 only 4-items were included ($\alpha = .87$).

3. Results

Data and code are available at Open Science Foundation (<https://osf.io/j85em/>). To test our hypothesis, in each Sample, we conducted Pearson correlations between participants' sense of symbolic immortality and self-esteem, as well as importance and superiority of American worldview, importance of university identification, religiousness, literal immortality beliefs, loneliness, and existential isolation. As shown in Table 1, the results provided strong support for the self-esteem and symbolic immortality hypothesis derived from TMT, as participants' sense of symbolic immortality was positively related to self-esteem in all seven samples (correlations ranged from $r = .34$ to $r = .48$, $ps < .001$).

Furthermore, supporting the hypothesized terror management functions of cultural identification and close relationships, in all samples, symbolic immortality was positively related with importance of American identity and superiority of the American worldview (Sample 1), with identification with one's university, religiosity, spirituality, and perceived meaning in life and it was negatively correlated with attachment insecurities, loneliness, existential isolation, DTA and depression (see Table 1). For the full correlations between the variables in each sample, see the Supplementary material file.

Importantly, self-esteem still predicted symbolic immortality in a multiple regression analysis that included all other variables (ingroup identification, loneliness, attachment orientations, existential isolation, meaning in life and, religiosity and spirituality; only statistically significant predictors were kept in each model) in Sample 1, $\beta = .25$, t

(1391) = 9.26, $p < .001$; Sample 2, $\beta = .30$, $t(1402) = 9.81$, $p < .001$; Sample 3, $\beta = .33$, $t(591) = 8.41$, $p < .001$; Sample 4, $\beta = .25$, $t(1255) = 8.70$, $p < .001$; Sample 5, $\beta = .20$, $t(1131) = 6.55$, $p < .001$; Sample 6, $\beta = .26$, $t(637) = 6.94$, $p < .001$; and in Sample 7, $\beta = .23$, $t(906) = 7.47$, $p < .001$.⁴

Literal immortality belief was only weakly related to self-esteem when framed as belief that one would continue in a literal afterlife in Sample 1, $r(1401) = .06$, $p = .019$, but it was more strongly related to self-esteem when framed as the continuation of the soul (which may also imply symbolic immortality beliefs), in Sample 5, $r(1148) = .16$, $p < .001$; Sample 6, $r(641) = .24$, $p < .001$; and in Sample 7, $r(918) = .18$, $p < .001$. Furthermore, in these Samples we also examined the correlation between self-esteem and a sense of literal immortality separately among people who either believe in an afterlife or not (yes = 1, I don't know = 0, no = -1). For each level, we conducted a regression analysis controlling for participant's gender and importance of religiosity in the first step, and entering self-esteem in the second step (we controlled for gender considering previous findings indicating that women invest more in literal immortality than men; e.g., Lifshin, Helm, Greenberg, Soenke, & Pyszczynski, 2019; results remained the same also without including this variable). These analyses indicated that in line with TMT, self-esteem was related to higher literal immortality beliefs for individuals who believe in an afterlife (β s $> .15$, t s > 3.20 , $ps < .002$), but this relationship was inconsistent for those who were unsure (marginally significant in Sample 5, $\beta = .08$, $t(409) = 1.69$, $p = .091$, statistically significant in Sample 6, $\beta = .23$, $t(237) = 3.68$, $p < .001$, and not significant in Sample 7, $\beta = .05$, $t(281) = 0.87$, $p = .385$); and it was consistently not statistically significant among those who do not believe in an afterlife (β s $< .165$, t s < 1.69 , $ps > .095$).

In Samples 4–7, we also conducted a mediational analysis using model 4 in PROCESS V. 3.2 (Hayes, 2012). We entered the participants' self-esteem (mean-centered) as the predictor variable, symbolic immortality (mean-centered) as the mediator variable, and DTA as the final outcome. The indirect effect was obtained using bootstrapping with 5000 resamples. These analyses showed that the indirect effect was small but statistically significant in Sample 4, *indirect effect* = $-.02$, 95% CI $[-.04, -.01]$; in Sample 5, *indirect effect* = $-.02$, $[-.04, -.01]$; it was marginally significant in Sample 6, *indirect effect* = $-.03$, $[-.05, .00]$ (statistically significant with 90% confidence); and significant again in Sample 7, *indirect effect* = $-.02$, $[-.04, -.01]$. We also conducted an analysis after combining the data from the three samples. This analysis ($N = 3860$) yielded a statistically significant indirect effect, *indirect effect* = $-.05$, $[-.05, -.04]$. As shown in Fig. 1, self-esteem predicted symbolic immortality (A path) and DTA (C path); symbolic immortality

⁴ The participants' gender was not related to symbolic immortality in all the samples (r s $< .05$, $p > .052$), aside from in Sample 5 in which women reported slightly lower levels of symbolic immortality ($r = -.10$, $p < .001$). We therefore did not include gender as a covariate in the models predicting symbolic immortality. We also found – in a post hoc analysis – that symbolic immortality was positively related with political conservatism in all the samples (r s ranged from $r = .09$ to $r = .18$, all $ps < .002$). However, considering that controlling for political view did not change the relationship between self-esteem and symbolic immortality, and that this relationship is beyond the scope of our investigation, we did not further expand on this finding in the manuscript.

Table 1

Descriptive statistics of key measures and correlations with sense of symbolic immortality, across samples 1–7.

Sample		Sample 1 (N = 1407)	Sample 2 (N = 1422)	Sample 3 (N = 604)	Sample 4 (N = 1264)	Sample 5 (N = 1143)	Sample 6 (N = 643)	Sample 7 (N = 921)
Measure								
Symbolic immortality ^a	<i>M</i>	6.78	6.42	6.45	6.52	5.12	5.34	4.78
	<i>SD</i>	2.04	2.04	2.08	2.73	2.30	2.24	2.04
Self-esteem	<i>r</i>	.34***	.39***	.42***	.40***	.36***	.48***	.41***
	<i>M</i>	5.91	29.88	5.99	5.80	5.54	5.55	5.39
	<i>SD</i>	1.98	4.75	1.89	1.93	2.04	2.14	2.51
American identity	<i>r</i>	.23***	.23***	.12***	.22***	.20***	.24***	.25***
	<i>M</i>	7.01	6.58	6.57	6.41	6.05	6.08	5.52
	<i>SD</i>	1.88	1.97	1.87	2.03	2.23	2.26	2.51
American superiority	<i>r</i>	.16***	–	–	–	–	–	–
	<i>M</i>	4.57	–	–	–	–	–	–
	<i>SD</i>	1.29	–	–	–	–	–	–
University identity	<i>r</i>	.25***	.28***	.22***	.20***	.19***	.31***	–
	<i>M</i>	7.28	7.05	6.88	6.89	6.37	5.99	–
	<i>SD</i>	1.68	1.75	1.83	1.76	2.12	2.27	–
Loneliness	<i>r</i>	–.26***	–.29***	–.30***	–.34***	–	–	–
	<i>M</i>	2.89	2.89	2.74	2.78	–	–	–
	<i>SD</i>	0.74	0.72	0.79	0.82	–	–	–
Existential isolation	<i>r</i>	–.16***	–.17***	–.13***	–.19***	–.14***	–.18***	–.20***
	<i>M</i>	3.69	3.67	3.78	3.59	3.70	3.75	3.83
	<i>SD</i>	1.00	1.02	1.01	0.96	0.96	1.02	1.20
Religiousness	<i>r</i>	.21***	.18***	.24***	–	.14***	.21***	.24***
	<i>M</i>	5.38	5.20	5.04	–	4.95	5.02	5.06
	<i>SD</i>	2.63	2.70	2.70	–	3.29	3.36	3.44
Spirituality	<i>r</i>	–	–	–	–	–	.24***	.20***
	<i>M</i>	–	–	–	–	–	5.68	5.69
	<i>SD</i>	–	–	–	–	–	3.91	3.12
Literal immortality	<i>r</i>	.25***	–	–	–	.35***	.36***	.39***
	<i>M</i>	6.17	–	–	–	5.97	6.00	6.04
	<i>SD</i>	2.54	–	–	–	2.54	2.45	2.60
Attachment anxiety	<i>r</i>	–	–.14***	–.18***	–.26***	–.24***	–	–
	<i>M</i>	–	2.36	2.47	2.49	4.51	–	–
	<i>SD</i>	–	1.61	1.61	1.62	1.80	–	–
Attachment avoidance	<i>r</i>	–	–.17***	–.15***	–.22***	–.21***	–	–
	<i>M</i>	–	2.15	2.31	2.24	3.58	–	–
	<i>SD</i>	–	1.10	1.10	1.07	1.35	–	–
Social isolation	<i>r</i>	–	–	–	–.35***	–	–	–
	<i>M</i>	–	–	–	2.15	–	–	–
	<i>SD</i>	–	–	–	0.83	–	–	–
Meaning in life	<i>r</i>	–	–	–	–	.43***	.52***	.49***
	<i>M</i>	–	–	–	–	4.67	4.79	4.72
	<i>SD</i>	–	–	–	–	1.26	1.35	1.37
Depression (BDI)	<i>r</i>	–	–	–	–.36***	–	–	–
	<i>M</i>	–	–	–	11.61	–	–	–
	<i>SD</i>	–	–	–	9.56	–	–	–
DTA	<i>r</i>	–	–	–	–.13***	–.11***	–.13***	–.13***
	<i>M</i>	–	–	–	1.34	2.30	2.36	2.32
	<i>SD</i>	–	–	–	1.04	1.20	1.21	1.11

Notes: American identity = importance of American identity; American superiority = belief in the superiority of the American worldview (Sullivan, Landau, Young, & Stewart, 2014); University identity = importance of university identity; Religiousness = importance of religious beliefs; Spirituality = importance of spirituality; Literal immortality = belief in literal afterlife (Sample 1) and everlasting soul (Samples 5–7); BDI = Beck Depression Inventory (BDI-II; Beck, Steer, & Brown, 1996); DTA = death-thought accessibility. In Sample 4, 120 participants did not complete the measure of DTA and 132 did not complete the measure of BDI.

^a In Sample 2, we included an additional measure of emotional existential isolation (van Bruggen et al., 2017; $M = 3.25$, $SD = 1.43$), and this scale was also positively related to symbolic immortality ($r = .22$, $p < .001$).

*** $p < .001$.

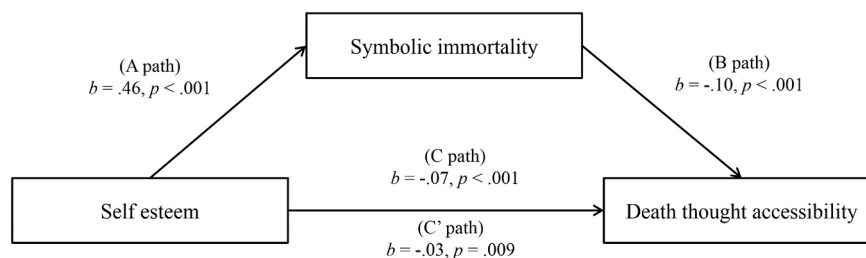


Fig. 1. A mediation model of the relationship between self-esteem, symbolic immortality and death thought accessibility from the combined samples 4–7 ($N = 3860$).

Note. The 95% CI for the indirect effect based on 5000 resamples did not include zero, *indirect effect* = $-.05$, $[-.05, -.04]$.

also predicted DTA (B path); and controlling for symbolic immortality attenuated the relationship between self-esteem and DTA (C' path).⁵

In Sample 4, we also tested if lower levels of symbolic immortality beliefs mediate the relationship between self-esteem and depression (BDI), again using model 4 in *PROCESS*. This analysis yielded a large and statistically significant indirect effect, *indirect effect* = $-.48$, [$-.65$, $-.34$], suggesting that lower levels of symbolic immortality among people with low self-esteem may partially explain their level of depression. As shown in Fig. 2, self-esteem significantly predicted symbolic immortality (A path) and depression (C path); symbolic immortality also predicted depression (B path); and controlling for symbolic immortality attenuated the relationship between self-esteem and depression (C' path). These results also held when controlling for loneliness, social isolation, existential isolation, and attachment anxiety and avoidance, which were all predictive of depression, *indirect effect* = $-.13$, [$-.21$, $-.05$]. Nevertheless, additional analyses suggest that this may not be the only mediational path, as self-esteem also partially mediated the relationship between symbolic immortality and depression.⁶ Thus, both variables shared explanatory variance when predicting depression.

4. Discussion

Although the idea that high self-esteem is associated with an increased sense of symbolic immortality is a central tenet of TMT, previous research has mainly focused on the death-anxiety buffering function of self-esteem (e.g., Greenberg et al., 1992; Harmon-Jones et al., 1997; Hayes et al., 2008; Taubman-Ben-Ari et al., 1999). The present findings offer the first direct evidence showing that higher levels of self-esteem are related to a greater belief that one will continue to exist symbolically after death. The results from seven large surveys provide clear support for the TMT hypothesis that those with a higher sense of self-esteem also have a higher sense of symbolic immortality. The findings were robust and consistent across all samples.

Furthermore, in line with TMT, results indicated that symbolic immortality was consistently correlated with variables that are theorized to play a role in terror management, such as investment in group

identity and in cultural worldviews (e.g., religiosity, spirituality), attachment orientation, loneliness and social isolation, existential isolation and perceived meaning in life. These findings lend further support for the terror management function of cultural worldviews and close relationships in securing a sense of symbolic immortality. In samples 4–7 we also measured the accessibility of death related thoughts to consciousness (DTA) and found that symbolic immortality was consistently negatively correlated with DTA and that it also partially mediated the relationship between self-esteem and DTA (significant indirect effects, although this relationship was also multi directional as noted in footnote 5).

These results are consistent with the idea that, as TMT avows, that self-esteem buffers death anxiety in part because it entails having a greater sense of symbolic immortality. These findings are congruent with previous research demonstrates that higher levels of symbolic immortality can provide a buffer against the terror of death (e.g., Florian & Mikulincer, 1998; Wojtkowiak & Rutjens, 2011). The results also suggest that symbolic immortality may play a significant role in various central aspects of human social behavior.

Importantly, these findings further support the terror management theory of self-esteem. A different view of self-esteem is provided by the sociometer model (Leary & Baumeister, 2000), according to which self-esteem is a reflection of the quality of an individuals' current and potential social relationships, one's level of belonging. Although the strong relationship between self-esteem and loneliness is consistent with this model, the sociometer model does not posit a relationship between self-esteem and symbolic immortality, and would have difficulty explaining why this correlation holds when controlling for indicators of belonging such as loneliness.

Moreover, the current findings show that high self-esteem was associated with reduced death-thought accessibility independently and via higher levels of symbolic immortality. Thus, self-esteem may reduce death-related thoughts both directly (by finding a solution to death, i.e., symbolic immortality) or indirectly (e.g., by simply raising the degree to which people feel protected more generally). Interestingly, the possibility resonates with the debate over the mechanisms by which people reduce cognitive dissonance – whether it is achieved only by directly solving the dissonance or indirectly via self-affirmation (e.g., Steele & Liu, 1983). Of course, the literature suggests that both seem to be correct and dissonance can be reduced directly and indirectly (for a review see e.g., McGrath, 2017).

Considering that self-esteem is central to many psychological phenomena, these findings may enhance our understanding of psychological phenomena related to self-esteem. In Sample 4, in line with the anxiety buffer disruption theory of depression (Mikulincer et al., 2020), a sense of symbolic immortality partially mediated the relationship between self-esteem and depression (but as we note in footnote 6, this relationship was also multi directional). This result suggests that feelings of symbolic immortality (or lack thereof) may have a key role in the experience of depression – at least among a non-clinical sample of American students. It may therefore be useful to take symbolic immortality beliefs (and terror management) into account when designing interventions to prevent or reduce depression. Further research could test this hypothesis more directly, for example, by trying to increase a sense of symbolic immortality among depressed individuals. Additionally, future work could assess whether higher levels of symbolic immortality mediate the effect of self-esteem on various indices of well-being, such as satisfaction with life, subjective vitality, and state anxiety (Routledge et al., 2010). Although we included some interesting and theoretically relevant variables as potential correlates of strength of belief in symbolic immortality, there are certainly others future research should consider. From a TMT perspective, although high faith in one's self-esteem and in one's symbolic immortality are good for the individual's psychological security and well-being, whether strivings for these psychological resources and attaining them are constructive for others and for societies depends on the individual's worldview and the

⁵ We also conducted analyses for the alternative causal models in which the dependent, mediator and outcome variables were switched in the combined sample. When self-esteem was still the predictor, but DTA was the mediator and symbolic immortality the outcome, the model was statistically significant, *indirect effect* = $.02$, [$.01$, $.03$], but this was smaller than the hypothesized path (*indirect effect* = $.05$). The models in which symbolic immortality was the predictor, self-esteem was the mediator and DTA was the outcome, and vice-versa, also yielded a statistically significant indirect effects that were different from zero but smaller than the hypothesized path, *indirect effect* = $-.01$, [$-.02$, $-.00$], and *indirect effect* = $.01$, [$.00$, $.01$], respectively. Unexpectedly however, indirect effects that were larger than the hypothesized path were found in the models in which DTA was the predictor, symbolic immortality was the mediator and self-esteem the outcome, *indirect effect* = $-.13$, [$-.15$, $-.11$] (with DTA negatively related to symbolic immortality, $b = -.38$, $p < .001$), and when self-esteem was the mediator and symbolic immortality was the outcome, *indirect effect* = $-.09$, [$-.11$, $-.06$]. These findings suggest that the hypothesized path might not be the only direction of influence, and that the relationship between these variables may be reciprocal or work in additional ways. Thus, self-esteem and symbolic immortality both share variance in predicting DTA.

⁶ Analyses for the alternative causal paths showed that the mediational effect was also large and statistically significant when symbolic immortality was the predictor and self-esteem was the mediator variable, *indirect effect* = $-.52$, [$-.66$, $-.39$]. The indirect effect was also significant, albeit smaller, when BDI was the mediator and symbolic immortality was the outcome, *indirect effect* = $-.11$, [$.08$, $.15$], or when self-esteem was the outcome, *indirect effect* = $-.03$, [$-.04$, $-.02$], but these were smaller than the hypothesized path. In any case, these results suggest that the relationship between these variables is multi-directional and that they both share variance predicting depression.

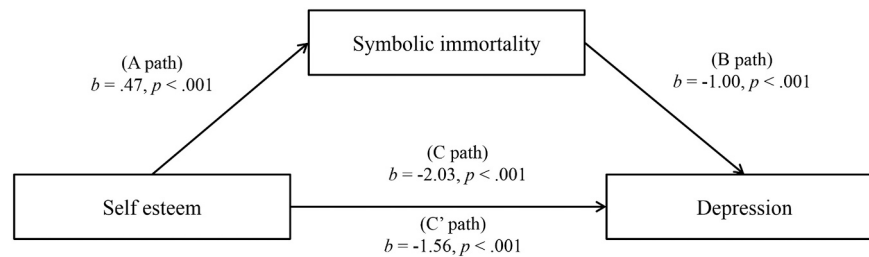


Fig. 2. A mediation model of the relationship between self-esteem, symbolic immortality and depression from sample 4 ($N = 1250$). Note. The 95% CI for the indirect effect based on 5000 resamples did not include zero, *indirect* = $-.47$, $[-.61, -.32]$.

worldview-consistent ways in which such individuals pursue self-worth and symbolic immortality.

This study had some noteworthy limitations because of the samples and methods employed. First, this is all correlational evidence. If the terror management hypothesis is true, we should have obtained these positive correlations, and we clearly did. Furthermore, these effects were not eliminated by controlling for some other potentially relevant variables, and the correlation was found using slightly different measures of the two variables in different samples. So, the TMT idea that self-esteem serves to provide symbolic immortality is viable and has not been disconfirmed in any of these studies. However, as correlations, they do not, and cannot, prove that self-esteem has a causal influence on strength of people's sense of symbolic immortality. It is also possible that optimistic people are prone to positive views of the self and their post-death future, although the fact that the relationship holds when controlling for variables that should also correlate with optimism, like levels of loneliness, social isolation, and depression, renders this less likely. Another possibility is that high self-esteem people view all aspects of self positively including one's post-death prospects. In addition, the causation could run in the other direction, with belief in symbolic immortality increasing self-esteem. Longitudinal research examining if changes in self-esteem over time predict changes in belief in symbolic immortality is needed to provide stronger support for the causal relationship. Such research may also test the downstream effect of this relationship on other outcomes such as DTA or depression and to try and account for the causal relationship between symbolic immortality and these more distal variables.

A second potential limitation is that all of the evidence was based on self-report measures imbedded in mass surveys consisting of about an hour's worth of questionnaires. This introduces a number of possible problems. One is fatigue. However, for all the samples except for samples 6 and 7, these were the first questionnaires the students filled out. Another possible problem is priming of death affecting the self-esteem-symbolic immortality relationship. The symbolic immortality measures inherently raise the concept of death, so there is no clear way around that. However, we did vary from sample to sample whether the DTA measure came before the self-esteem and the symbolic immortality measure and whether the symbolic immortality measure came before or after the self-esteem measure, and the predicted correlation held regardless of the order of the measures, strongly suggesting that one measure priming death before another did not alter the main findings. Another point worth noting is that these self-report measures likely make participants self-aware, so the findings may be influenced by that, but this is an inherent problem whenever self-report measures ask people about themselves. Importantly, the fact that the death anxiety buffering function of both self-esteem and symbolic immortality has previously been supported in other research (e.g., Florian & Mikulincer, 1998; Greenberg et al., 1992) may reduce concern about the shortcomings of the current self-reported measures.

A third limitation is that we used either new single-item measures or, in Sample 7, a two-item measure to assess participants' general belief in symbolic immortality. We do think these measures are face valid; they correlated well with each other in Sample 7, and with self-esteem

regardless of minor variations in wording. In addition, they consistently correlated with variables they should theoretically correlate with symbolic immortality (e.g., self-esteem, loneliness, DTA), supporting its predictive validity. At the same time, they did not correlate too highly with any of our other variables, providing some indication of discriminant validity. In addition, although the current measures do not capture different ways in which people may feel they have or will obtain symbolic immortality, we believe that this was the best strategy when assessing strength of general belief in symbolic immortality in young adults, who have yet to establish the ways in which their memory or their impact may continue beyond their physical deaths. Future research could build on this work by using multi-item measures to assess people across the lifespan with regard to how their self-esteem relates to their beliefs regarding continuing to exist symbolically after death. Lifton (1979) proposed five modes of feeling continuity beyond one's physical death; through offspring and identifications with groups; through religious and spiritual beliefs; through creative actions and achievements; through connections to nature; and through experiential feelings outside of time and self (also see Mathews & Kling, 1988). Studies could examine how self-esteem relates to each of these modes. Similarly, it may be of value to connect these general measures of feelings of symbolic immortality to various measures of generativity (McAdams & de St. Aubin, 1992) and to examine how self-esteem may relate to them. It is likely that higher levels of self-esteem may also lead people to become more successful in life and therefore report higher levels of symbolic immortality on these measures.

Fourth, each sample was comprised of American college-aged adults, and research using more diverse samples from other cultures would help inform the generalizability of these findings. For example, the self-esteem and symbolic immortality link could be more evident in relatively individualistic cultures, and it may manifest differently in more collectivistic cultures. Future research could also extend the present findings by assessing how self-esteem in particular domains is associated with specific perceptions of symbolic immortality (e.g., perceived longevity of one's contributions, expected level of recognition after one's death).

In sum, the present research provides clear correlational evidence consistent with the TMT hypothesis that high self-esteem is associated with a greater sense of symbolic immortality, and some evidence that symbolic immortality may partially mediate the relationship between self-esteem and both death-thought accessibility and depression. These findings help further establish the validity of this basic TMT premise, and also can hopefully spawn future inquiries into the specific mechanism by which self-esteem may achieve terror management functions. By doing so, this research may ultimately advance the scientific understanding of the psychological function of self-esteem and other social-psychological anxiety buffering mechanisms.

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Uri Lifshin: Conceptualization, Methodology, Investigation, Data curation, Formal analysis, Writing – original draft, Writing – review & editing. **Dylan E. Horner:** Methodology, Investigation, Data curation, Formal analysis, Writing – review & editing. **Peter J. Helm:** Methodology, Investigation, Data curation. **Sheldon Solomon:** Writing – review & editing, Supervision. **Jeff Greenberg:** Conceptualization, Methodology, Project administration, Resources, Supervision, Writing – original draft, Writing – review & editing.

Declaration of competing interest

None.

Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.jpaid.2021.110712>.

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