

Improving Social Belonging, Meaning, and Mental Health During COVID-19: A Self-Affirmation Approach

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The topics of social belonging, meaning and purpose in life, and mental health have enduring significance, and our objective was to assess the efficacy of two values-affirmation (VA)-based interventions in forestalling critical psychological costs of the COVID-19 pandemic. Both were based on self-affirmation theory (Steele, 1988) and sought to help people stay connected with their core values during this stressful time. One intervention was a one-time VA activity in which participants wrote about important values and were reminded of the value of focusing on core values during uncertain times. A second, elaborated version further guided participants to incorporate brief, values-aligned daily activities. A longitudinal randomized controlled experiment conducted in the United States and Italy revealed an upward trend in social belonging and mental health among participants in the VA conditions—a surprising and positive outcome during a time of looming fear. The trajectories of social belonging and meaning were altered in the intervention conditions, yielding immediate benefits, while long-term benefits (4 weeks postintervention) on social belonging and mental health were confined to men, who experienced poorer psychological outcomes as the pandemic progressed. Additionally, socioeconomic status moderated intervention effects on social belonging, primarily benefitting participants of lower socioeconomic status. Surprisingly, culture and other risk factors (e.g., financial impact of COVID-19; living alone) did not moderate intervention effects. Discussion centers on how tailored VAs can interrupt a recursive cycle triggered by threats to self-integrity, and the potential of social psychologically informed interventions for enhancing belonging, meaning and mental health in face of acute stressors.

Keywords: social belonging, mental health, meaning and purpose, self-affirmation, well-being

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Prolonged adverse circumstances such as the global pandemic can have cumulative costs for health and well-being. Results from Phase 1 of the Household Pulse Survey conducted by the U.S. Census Bureau between April 23, 2020, and July 21, 2020—the period in which the COVID-19 pandemic began in the United States—estimated that 37% of American adults showed symptoms of anxiety disorder, depressive disorder, or both (Centers for Disease Control and Prevention, 2020), three times more than in 2019 (Twenge & Joiner, 2020). Another study found that in April 2020, 14% of American adults reported symptoms of “serious psychological distress” compared with 4% in 2018 (McGinty et al., 2020).

Moreover, neuroimaging studies (e.g., as reviewed by Eisenberger & Lieberman, 2004) indicate an overlap between physical and social pain in their shared neural circuitry and mechanisms, suggesting that a “neural alarm system” could be set off by the elevated social isolation and distress instigated by the COVID-19 pandemic, further worsening well-being.

There is no shortage of reasons that the global pandemic may be distressing. Here, we focused on the notion, grounded in self-affirmation theory, that prolonged exposure to adversity can constitute a threat to self-integrity, one’s global self-image as competent, moral, and able to control important outcomes (Steele, 1988). The pandemic can threaten self-integrity for many reasons: by weakening social bonds, an important source of self-worth (Leary, 2012); by threatening people’s sense of control (Steele, 1988; Seligman, 1972, 1975); by raising awareness of the mortality of oneself and one’s loved ones (Greenberg et al., 1997); by depriving people of the ability to fulfill important social roles such as “provider” due to unemployment (Artazcoz et al., 2004; Edin et al., 2019; Khan et al., 2020).

But scientists have long noted that the effects of a threatening or traumatic event can vary (Bonanno et al., 2006; Galatzer-Levy & Bryant, 2013; Galatzer-Levy et al., 2018; Tedeschi & Calhoun, 2004; Wortman & Silver, 2001). While they are almost always distressing, the distress can be worse for some individuals than for others, and in some cases, can enhance thriving in the long run (e.g., Caplan, 1964; Caplan & Caplan, 2000; Frankl, 1963; Maslow, 1954; Seligman & Csikszentmihalyi, 2000; Tedeschi & Calhoun, 2004). For example, people might find meaning in unavoidable

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suffering by adopting an attitude of “tragic optimism” (Frankl, 1963), or they may experience “positive psychological change as a result of the struggle with highly challenging life circumstances” (Tedeschi & Calhoun, 2004, p. 1), a phenomenon referred to as post-traumatic growth (Calhoun & Tedeschi, 1999, 2001; Tedeschi & Calhoun, 2004). Post-traumatic growth can lead to “an increased appreciation for life in general, more meaningful interpersonal relationships, an increased sense of personal strength, changed priorities, and a richer existential and spiritual life” (Tedeschi & Calhoun, 2004, p. 1).

The global pandemic has revealed great heterogeneity in response. For example, recent research has shown inequalities in coping during COVID-19 (Thomas et al., 2024). The Census Bureau reported that 23% in the lowest income bracket reported “not being able to control or stop worrying” during the pandemic compared with 6% in the highest income bracket (Centers for Disease Control and Prevention, 2020; Fields et al., in press). Additionally, workers from racial and ethnic minority groups were disproportionately represented and affected in sectors most disrupted by COVID-19 (Kantamneni, 2020), while those with lower education or income bore the economic brunt of COVID-19, as they were more likely to lose their jobs (Mongey et al., 2021).

Besides low-income groups, men also appeared to be at elevated risk. Data reported by the Centers for Disease Control and Prevention indicated that, in the United States, there were over 25,000 more deaths of men from COVID-19 than women at the end of December 2020. This gender disparity continued to grow, reaching a 21.8% higher COVID-19 mortality rate for men from 2020 to 2023 (Centers for Disease Control and Prevention, 2023). While the disproportionate death toll of the virus for men could have been attributed to biological factors, social and cultural factors may have played a role. For example, one study reported that men were less likely to be worried about COVID-19 than women and took fewer behavioral precautions (Galasso et al., 2020). On the topic of mental health, for men in general, their identity as a breadwinner and their weaker social ties outside of work (Artazcoz et al., 2004; Khan et al., 2020) may have made them more susceptible to the psychological costs of social distancing and shelter-in-place policies. Even before the pandemic, traditional masculine norms discouraged emotional disclosure and help-seeking (Cleary, 2012; River, 2014) and were associated with poorer mental health and higher rates of suicidal behavior among men (Pirkis et al., 2017; Rasmussen et al., 2018). The pandemic exacerbated these issues, with rampant social isolation and pandemic-related unemployment likely leading men financially affected by COVID-19 to perceive themselves as failures in their traditional provider roles (Khan et al., 2020; Rasmussen et al., 2018; River, 2014). This sense of failure, combined with social isolation, may have been especially harmful, as research suggests that men are more susceptible to loneliness than women (Barreto et al., 2021). These various factors compounded the psychological burden on men, contributing to poorer mental health and higher susceptibility to suicide during the pandemic (Khan et al., 2020).

While men faced notable challenges, women also encountered significant gender-specific stresses. For example, a Gallup poll found that female small-business owners were found to be more stressed and worried than male small-business owners, even after controlling for political affiliation, business size, and location (Badal & Robison, 2020). Other studies during the pandemic revealed that

women experienced worse anxiety than men in countries such as China (Hou et al., 2020), Spain (García-Fernández et al., 2021), and Canada (Moyser, 2020). Moreover, recent research (Corrigan et al., 2024) identified more pronounced cortical thinning in the post-COVID-19 brain of adolescent females compared to adolescent males. Although this study was conducted postpandemic, it provides valuable insights into the long-term impact of pandemic-related lifestyle changes and lockdowns, showing a more severe effect on female adolescents. Overall, these gender-specific findings underscore the widespread impact of COVID-19 on health and well-being, revealing unique vulnerabilities for both men and women.

While distress in the face of the pandemic might have been understandable for these groups, much research suggests that prolonged distress is detrimental to psychological health and can even increase people's risk of viral infection (Cole et al., 2015; S. Cohen et al., 1991; S. Cohen, 1996). What can be done to protect people from adverse psychological reactions to prolonged adversity? One answer is to help people connect to important values in their day-to-day lives. Two separate lines of research suggest the utility of this approach. First, an area of research suggesting the importance of connecting with important social values during times of threat comes from self-affirmation theory (Steele, 1988; see also G. L. Cohen & Sherman, 2014; Sherman & Cohen, 2006). According to self-affirmation theory, people are motivated to maintain a global self-image of moral and adaptive adequacy, referred to as “self-integrity.” When people experience a threat to their self-integrity, they experience stress and engage in defensive behavior. However, these responses can be ameliorated by allowing people to affirm themselves in altogether different domains. One method for doing so is values-affirmation (VA), where people are asked to select their most important values from a list and then write about why the selected values are important to them. This process, the small act of writing about important values, reminds people of deep and authentic bases of self-integrity that transcend the threatening situation (Crocker et al., 2008). Often, these values relate to higher purposes and help people to feel connected to others (Crocker et al., 2008; Shnabel et al., 2013). Additionally, self-affirmation interventions have been shown to buffer psychological and physiological responses to stressful situations (Creswell et al., 2005; Sherman, Bunyan, et al., 2009) and protect hedonic and eudaimonic well-being (Nelson et al., 2014).

Second, research in health psychology suggests that adversities can have less dire psychological and physiological impacts when people have a strong sense of meaning and purpose in life. These constructs, central to the concept of eudaimonic well-being, have been extensively discussed and validated in the literature (e.g., Hanson & VanderWeele, 2021; Huta & Waterman, 2014; Keyes, 2002; Ryff, 1989, 2017; Ryff & Singer, 2008; Seligman, 2002, 2011; Steger et al., 2006; VanderWeele et al., 2020). In principle, meaning and purpose might be promoted by maintaining a sense of fealty to core values, which could buffer people against the stress of the pandemic. Several studies demonstrate that people who scoring higher on measures of meaning and purpose exhibit lower levels of bodily inflammation, a biological marker of stress (Cole et al., 2015; Fredrickson et al., 2013, 2015, 2016). Moreover, acts of kindness, which can fulfill core social values, have been associated with reductions in genetic expressions of inflammation

(e.g., Nelson-Coffey et al., 2017). In another study, poor urban youth had higher levels of bodily inflammation if they were responsible for more household chores, but this response was mitigated among those who saw themselves as fulfilling valued social roles such as being a good “son” or “daughter” (Fuligni et al., 2009).

We tested two versions of a revised VA intervention tailored to the pandemic context. In the first version (VA), the intervention asked people to write about their important values, as well as highlighted the importance of maintaining fealty to core values during the pandemic and economic shutdown. We also tested a new elaborated version (“elaborated values-affirmation”; EVA) that encouraged participants to stay in touch with their values during this time by thinking of how they might incorporate their values in their daily lives. In the EVA condition, participants were provided with explicit prompts to find ways that could help them live up to core values after they completed the writing activity. In other words, the EVA was a more comprehensive version as we added several elements to the intervention to help participants actively integrate their values in their day-to-day lives. We drew on research from an intervention strategy known as “mental contrasting with implementation intentions” or MCII (Oettingen et al., 2013). First, people imagine a desired future that would result from the fulfillment of a goal they have and contrast that desired future with present reality. Next, they create an “if-then” plan for overcoming a key obstacle that stands in the way of their achieving their goal. The first component of the intervention motivates behavioral change by strengthening associative links between the desired future, obstacles (Kappes & Oettingen, 2014), and the behavior needed to overcome the obstacles (Kappes et al., 2012). The second routinizes a strategy for acting effectively on that motivation. For instance, a person might imagine being healthy and fit, contrast that with a tendency to engage in emotional eating when feeling stressed, and then set a specific action plan such as, “If I feel stressed and want to turn to snacking, then I will do yoga for 15 min.” MCII has been found to be effective at helping people to achieve goals in domains as diverse as health, work, school, and relationships (e.g., Adriaanse et al., 2010; Christiansen et al., 2010; Duckworth et al., 2011, 2013; Fritzsche et al., 2016; Houssais et al., 2013; Oettingen et al., 2015; Stadler et al., 2009, 2010). Interestingly, past research has also shown that the health benefits of a self-affirmation intervention can be amplified when integrated with implementation intentions relevant to promoting health behaviors such as increasing fruit and vegetable consumption (Harris et al., 2014) and reducing college student drinking (Ehret & Sherman, 2018). Other studies demonstrate limited benefits of this approach (Jessop et al., 2014; Norman & Wrona-Clarke, 2016), but Ehret and Sherman (2018) address why. Specifically, Ehret and Sherman explain that the effectiveness of combining self-affirmation with implementation intentions hinges on creating contextually flexible, appropriately challenging, and personally relevant if-then plans. Ineffective outcomes in other studies likely resulted from not meeting these criteria.

In this elaborated intervention, we drew inspiration from the theory and practice of MCII, as we crafted prompts aimed at guiding individuals to set action plans in their day-to-day living that would put participants in touch with their values. This new intervention helps participants bring value-aligned activities into their daily lives,

by guiding them to envision the person they aspire to be, identify obstacles that could impede fulfilling their values, and set specific if-then plans to overcome these obstacles. By encouraging the setting of tailored if-then plans that address individual challenges and values, this approach meets Ehret and Sherman’s criteria, enhancing both participant engagement and the practical applicability of the intervention in daily life.

We tested the effect of the two affirmation interventions on social belonging, meaning, and mental health. Each of these outcomes has been found to have been detrimentally affected by the pandemic, and lower levels on each are associated with poorer health outcomes (Cacioppo et al., 2003; Cole et al., 2015; Fredrickson et al., 2013, 2015, 2016; Haslam et al., 2015; Hawkey & Cacioppo, 2010; Holt-Lunstad et al., 2010; Holt-Lunstad et al., 2015; Kapfhammer, 2011; Ong & Patterson, 2016; O’Súilleabháin et al., 2019; Seeman, 2000; Stordal et al., 2003; Ryff, 2017). Furthermore, as maintaining these outcomes over time requires self-affirmation processes to endure in face of adversity, we also tested the effect of the two interventions on spontaneous self-affirmation as measured qualitatively following a stressor task. The rationale for this is that, like a turning point, a brief self-affirmation-based intervention can have enduring effects when it alters chronic patterns of construal (e.g. G. L. Cohen & Sherman, 2014).

Why we might expect that a shift in construal might have lasting effects occurs in two ways. First, a small shift in happiness may beget greater happiness, in a repeating cycle. Research on social connection and happiness (e.g., Lyubomirsky et al., 2005) suggests such a virtuous cycle can occur—as outgoing or happy people tend to interpret and engage in their social worlds in ways that sustain and even strengthen their new state (Margolis & Lyubomirsky, 2020). Second, affirmed participants might develop more “self-affirmational resources” at hand that help them to reinterpret stressors in a more positive way. In the related “broaden-and-build” theory (Fredrickson, 2001), positive emotions expand people’s momentary thought–action repertoires, enhancing individuals’ capacity to generate adaptive responses. Indeed, meta-analytic evidence of self-affirmation interventions suggest that self-affirmation can act as “a psychological trigger into a positive channel of resources that facilitate behavior change” (Ferrer & Cohen, 2019), by interrupting a negative recursive cycle or sparking a positive one (e.g., G. L. Cohen et al., 2006, 2009; Sherman et al., 2013). Previous work examining spontaneous affirmation also suggest such an adaptive mechanism: A single affirmation at a timely moment of stress can “train” people to mimic the same broadened perspective when faced with subsequent stressors (Brady et al., 2016). This is supported by past research (e.g., Emanuel et al., 2018), which demonstrated that engaging in spontaneous self-affirmation was associated with enhanced happiness, hopefulness, optimism, subjective health, and personal health efficacy, as well as reduced anger and sadness.

Additionally, given the research reviewed earlier, it is plausible that the effects of the intervention might be moderated by gender. Given that affirmation interventions tend to be more beneficial for individuals who feel more threatened, and considering various gender-specific factors that might affect perceived threat and psychological stress, we expected that there would be differential benefits across genders. Thus, we tested the role of gender in moderating the effects

of the intervention on outcome variables, including spontaneous affirmation, on an exploratory basis.

To assess the generality of any intervention effects, we conducted the study in two countries, the United States and Italy. Both countries were hit hard by the pandemic, and at the point of data collection, Italy was the hardest hit, with the Italian population under stringent lockdown; hence we expected that psychological threat would be particularly high there. Moreover, while the two cultures differ along many dimensions, the one most theoretically relevant here is the individualism–collectivism dimension. In particular, past research suggests that cultural background can affect the experience of loneliness and social isolation (e.g., Barreto et al., 2021; Rokach et al., 2001; Uchida et al., 2004); moreover, Italians are more collectivistic than Americans (Burton et al., 2021), which would allow us to assess, on an exploratory basis, whether affirmation effects vary by cultural differences along this dimension.

As foreshadowed earlier, certain demographic indicators could provide insights into the social and economic vulnerability of population subgroups in facing the adverse circumstances of COVID-19. Factors such as socioeconomic status (SES), unemployment or pay cuts, and living alone can significantly affect individual vulnerability. The early lockdowns and social restrictions of the pandemic underscore the potential significance of living alone, with studies linking physical isolation to decreased well-being and increased mortality (Eckermann, 2015; Holt-Lunstad et al., 2015; Naito et al., 2023; Rico-Uribe et al., 2018; Smith & Victor, 2019; Wang et al., 2023). In the context of increased physical isolation in April 2020, which may have led to novel living arrangements, this study further examines living alone status, SES, and financial impacts of COVID-19 as variables of interest.

Method

Participants

During the early months of the COVID-19 pandemic (April 15–30, 2020), a total of 1,032 adult participants were recruited on Prolific, an online survey platform, to participate in a three-part survey. Participants were recruited from the United States ($N = 690$) and Italy ($N = 342$). Excluded from all analyses were participants who failed attention checks ($N = 5$), failed to take the survey seriously as evidenced by typing words such as “corona” repeatedly in open-ended responses ($N = 5$), or who had duplicate entries ($N = 6$). An additional two participants were excluded from the sample from Part 3 (but their data from earlier parts of the survey were retained) due to withdrawal ($N = 1$) and failing to follow instructions ($N = 1$). Of the 1,014 participants who were included in our analyses, 983 participants (96.9%) completed both Parts 1 and 2, and 882 participants (87.0%) completed all three parts. There was no differential attrition by condition, $\chi^2(4, N = 1,014) = 0.28, p > .250$.

The recruited sample size was determined before any data analysis—with a minimum effect size of $d = 0.2$ (determined in a meta-analysis of self-affirmation interventions in the health domain in the presence of threat or a stressor; Ferrer & Cohen, 2019), three points of measurement and three conditions, 244 participants per condition (total $N = 732$) were required to achieve 80% power with an α of .05. With a conservative estimate of 40% attrition rates given the uncertain atmosphere of the pandemic, we aimed to recruit around 1,000 participants at Time 1. Thus, the final sample size of

$N = 983$ participants at Time 3 was more than adequate to test the study’s hypotheses with a set power of 80% and α of .05. We provide the demographics of the participants in Table 1.

Materials

VA Condition

The VA condition was revised slightly from its original form to connect it in a meaningful way to the pandemic. Participants first read a prompt that situated the activity in the context of the global pandemic:

During this time, people sometimes like to reflect on values that matter most to them. It can be hard to do the things we had routinely done before. Nevertheless, we can still make a decision every day about what our values are, and find ways—even small, that we can live out our values every day. Researchers have found that during times of change or uncertainty, it can be beneficial to reconnect with values. In particular, we want you to focus on values that are important to you.

Then, as per standard self-affirmation intervention procedures (e.g., G. L. Cohen et al., 2006), participants selected two or three of their most important values from a list of values (i.e., being good at art, creativity, relationships with family and friends, learning/discovery, athletic ability, belonging to a social group, music, wellness, spiritual or religious values, sense of humor, nature/environment, political pursuits), and wrote about why these values mattered to them. Participants then summarized the top two reasons why these values were most important to them, and on a 6-point scale ranging from *strongly disagree* to *strongly agree*, they affirmed their agreement with the following statements “In general, I try to live up to these values,” “These values are an important part of who I am,” and “I care about these values.”

EVA

Participants in the new intervention first read the same prompt and completed the same VA activity described above. Next, they

Table 1
Participant Demographics

| Demographic group | U.S. participant | Italy participant |
|--------------------------|------------------|-------------------|
| Race/ethnicity | | |
| White | 68.8% | 97.3% |
| African/African American | 12.1% | |
| Asian/Asian American | 9.4% | |
| Latino/Hispanic | 5.7% | |
| Other/mixed races | 4.0% | 2.7% |
| Gender | | |
| Male | 46.2% | 51.0% |
| Female | 52.3% | 48.1% |
| Nonbinary | 1.3% | 0.9% |
| Declined to respond | 0.2% | |
| Age | | |
| $M \pm SD$ | 40.4 ± 15.8 | 26.4 ± 7.3 |
| Range | 18–82 | 18–57 |
| Living alone status | | |
| Lived with others | 52.7% | 94.0% |
| Lived alone | 47.3% | 6.0% |

Note. Sample characteristics by country.

completed another activity. First, participants wrote about the “kind of person [they] are and aspire to be” in terms of being “one who leads a life that is aligned with their most important values.” Then, participants were asked to write about obstacles that stood in the way of becoming their ideal self:

It can be hard for all of us to find ways to fulfill our most important values day-to-day, especially in uncertain times. Are there any obstacles that you encounter in your day-to-day life now that make this difficult for you? Think of an obstacle or two that you might have some control over. *It can be something small or big, but should be something “inside” of you, or something that you can control in your environment.*

Participants then listed two things they might do in the coming week that were “tied to their most important values.” They were then asked to set an “if-then” plan, for instance, responding to the prompt “If (name your obstacle and the situation it arises in), then I will (name the behavior).” Finally, participants were presented a summary of their responses and given an option to edit them if they so choose.

As described, both the VA and EVA were altered from the conventional self-affirmation intervention, with the EVA more substantially modified than the VA. The VA differs from the standard self-affirmation, as past research suggests that informing people in advance of the intervention’s benefits can undermine its benefits (Sherman, Cohen, et al., 2009). However, research indicates that informing participants about an intervention’s benefits can still maintain its effectiveness when participants feel they have a choice in completing it (Silverman et al., 2013). Additionally, we tailored the preface of both VAs to the pandemic context, which aimed to help individuals comprehend the usefulness of this method as a navigational tool for adversity.

Control Condition

In the control condition, participants completed a standard affirmation control activity (see G. L. Cohen & Sherman, 2014), in which they reviewed the same list of values provided in the VA and the EVA conditions but select and write about “two or three values that are LEAST important to you, but that may be important to others.”

Procedure

Our study was approved by the institutional review board at Stanford University. Participants were recruited to fill in a three-part survey online via Prolific in exchange for money.¹ In the recruitment description, we emphasized that the survey contained three parts and that participants would receive a bonus if they completed all three parts (but were free to withdraw at any time, and would be appropriately compensated). The Italian participants received all experimental materials in the Italian language, translated by two native Italian speakers. Key psychological dependent variables were measured at all three time points, and spontaneous affirmation was measured at Time 3. Demographic variables of interest were measured at baseline—at the end of the questionnaire, except for SES, which was collected at Time 3.

Time 1 Baseline Survey

Part 1 contained demographic questions and baseline multiple-choice and open-ended measurements of variables of interest, outlined in the next section.

Time 2 Intervention Activities and Survey

One day later, participants were randomly assigned to one of three conditions—a control condition, the VA condition, or an EVA condition. Participants then responded to the main dependent variable measurements as administered as baseline measures in Part 1.

Intervention Nudge

Another key distinction between our VA interventions and past versions is that we included a nudge or reminder 2 weeks after the initial administration designed to sustain or at least reactivate the affirmation process. All participants were sent an intervention, a short direct message on Prolific reminding them of the writing activity they had completed. For instance, those in the VA condition received a brief text containing the following:

Thank you for your participation in the Social Experience Study. We’re sending you little reminder of what the study was about. Two weeks ago, you wrote about two or three values that are important to you in your life and why they are important to you.

Thank you for your thoughtful responses. We look forward to your participation in Part 3 of the study in about two weeks.

For us to know that you have received our message, could you kindly respond to this message with an “ok”? Thank you!

In the EVA condition, after the first paragraph, participants also read:

You also thought about an obstacle that can stand in the way of living out your values day-to-day, something that most of us experience now during this unusual time. Although there are many obstacles to think about, it’s best to think about one that you have some control over. You then listed one or two small things that you could do to overcome the obstacle. You structured it this way:

IF (obstacle arises), THEN I WILL. (behave in a certain way to overcome it)

As you know, it can be helpful to find ways, even small, to sidestep obstacles and to still live out our values even during this unusual time. If you haven’t already, please remember to do at least one thing related to your values before Part 3, as we’ll be asking you about this then.

In the control condition, participants received a reminder of their writing activity—that they “wrote about two or three values that are *not* important to you and why they might be important to some other people.” All intervention materials are provided in the [Supplemental Material](#).

¹ Participants were paid \$2.20 for Part I (approximately 20 min), \$1.15 for Part II (approximately 10 min), and \$1.65 for Part III (approximately 15 min). Additionally, in order to reduce attrition, we paid participants a bonus of \$4 for completion of all three parts. Participants were free to dropout at any time without penalty.

Time 3 Survey

Two weeks after the nudge (1 month following the Time 2 intervention and survey), participants responded to multiple-choice and open-ended questions pertaining to our variables of interest, most of which were also administered at baseline. Then, to assess the degree to which participants spontaneously expressed affirmation or threat in response to a stressor (a tendency which might be affected by our experimental interventions), we had participants write a brief essay after the stressors related to COVID-19 were made salient to them (Brady et al., 2016). In this task, participants were asked to write about their experiences of the COVID-19 situation:

We are interested in your experience of the coronavirus pandemic. Please list the ways in which your life or the lives of people around you have been impacted by the coronavirus. Please write 1 item per line.

Next, to reinforce the stressful nature of the situation, participants responded to a prompt question, “How stressed do you feel when you think about the coronavirus and public health situations?” (1 = *not at all stressed*–7 = *extremely stressed*). Following this, participants then wrote an open-ended essay about any topic that came to their mind (“Please spend the next few minutes writing a full page or more about anything that is on your mind. Do not worry about spelling and punctuation.”). We coded these essays for the presence of spontaneous affirmation, as modeled after the procedures by Brady et al. (2016). The coding scheme is provided in the Supplemental Materials.

Dependent Measures

We collected a range of psychological measures that measured aspects of well-being, as well as secondary measures of spontaneous affirmation, which was assessed from qualitative coding of an open-ended essay. The measures assessed loneliness and social connectedness (for social belonging), purpose and meaning (for meaning), and life satisfaction, depression, and anxiety (for mental health; see Table 2 for the correlation matrix). Because these items measure different facets of well-being, we categorized them based on their theoretical similarities. We then conducted a principal component analysis (PCA) on these dependent variables as measured at baseline to confirm the reliability of the categorization. The decision to conduct a PCA and create composite measures was not specifically preregistered; however, this decision was taken due to the number of dependent variables which would make analyses highly repetitive and increase the probability of Type I errors.

According to our PCA, our psychological measures fell into three components. Initial eigenvalues of the three components explained 51.97%, 16.84%, and 10.83% of the variance respectively. Based on the scree plot generated during our PCA, a noticeable leveling off after the third component suggests a decrease in the rate at which additional components contribute to explaining the variance. Together, these first three components account for 79.65% of the total variance, effectively capturing the primary structure of our data. We extracted solutions for these three factors using varimax rotation, as shown in Table 3.

Composite scores for social belonging (loneliness and social connectedness; $\alpha = .85$), meaning (purpose and meaning; $\alpha = .70$) and mental health (depression, anxiety, and life satisfaction; $\alpha = .82$) were created by first applying the proportion of maximum scaling method to each relevant item (after reverse-coding where appropriate) and then averaging these transformed scores. The proportion of maximum scaling method (Little, 2013; Moeller, 2015) converts each item to a metric ranging from 0 (*minimum possible*) to 1 (*maximum possible*), calculated using the formula: proportion of maximum scaling = [(observed – minimum)/(maximum – minimum)]. This approach “maintains the proportions of the absolute distances between the observed response options” (Moeller, 2015, p. 3) and facilitates a comparison across different measures. We describe the individual items below.

Social Belonging

Loneliness. To measure loneliness, we averaged responses from a subset of six questions from the University of California, Los Angeles Loneliness Scale (Russell et al., 1980), including questions such as “There is no one I can turn to” and “My social relationships are superficial [1 = *never*–4 = *always*].”

Social Connectedness. To measure social connectedness, we included two questions; specifically, “On most days, I feel a sense of ‘belonging,’ that is, a sense of connection with other important people in my life” and “I feel a strong sense of connection with other people in my community [0 = *not at all true*–6 = *completely true*].”

Meaning

Purpose. To measure purpose, we included three items from Ryff’s (1989) Scales of Psychological Well-Being Purpose in Life Subscale. Purpose items included statements such as “I enjoy making plans for the future and working to make them a reality [1 = *strongly disagree*–7 = *strongly agree*].”

Table 2
Correlation Matrix

| Variable | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|-------------------------|-------|-------|-------|-------|-------|-------|-------|
| 1. Depression | — | .691 | .462 | –.426 | –.434 | –.209 | –.589 |
| 2. Anxiety | .691 | — | .380 | –.315 | –.312 | –.119 | –.529 |
| 3. Loneliness | .462 | .380 | — | –.733 | –.474 | –.350 | –.445 |
| 4. Social connectedness | –.426 | –.315 | –.733 | — | .507 | .385 | .445 |
| 5. Purpose | –.434 | –.312 | –.474 | .507 | — | .539 | .457 |
| 6. Meaning | –.209 | –.119 | –.350 | .385 | .539 | — | .310 |
| 7. Life satisfaction | –.589 | –.529 | –.445 | .445 | .457 | .310 | — |

Note. Correlation coefficients for individual psychological measures at baseline in our principal component analysis.

Table 3
Rotated Component Matrix

| Baseline item | Component | | Meaning |
|----------------------|---------------|------------------|-------------|
| | Mental health | Social belonging | |
| Depression | .847 | -.250 | -.137 |
| Anxiety | .887 | -.141 | -.005 |
| Loneliness | .272 | -.869 | -.190 |
| Social connectedness | -.205 | .870 | .264 |
| Purpose | -.311 | .312 | .730 |
| Meaning | -.030 | .159 | .907 |
| Life satisfaction | -.707 | .233 | .327 |

Note. Values in bold indicate items were grouped into components. Principal component analysis was conducted using Varimax rotation with Kaiser normalization in SPSS.

Meaning. To measure meaning, we included four items from the Meaning in Life Scale (Steger et al., 2006), such as “I understand my life’s meaning” (1 = *absolutely untrue*–7 = *absolutely true*).

Mental Health

Depression. To measure depression, we averaged responses from a seven-item subset of the Center for Epidemiologic Studies Depression Scale (Radloff, 1977), which included items such as “I was bothered by things that usually don’t bother me” and “I felt hopeful about the future (reverse-scored)” (1 = *rarely or none of the time*–4 = *most or all of the time*).

Anxiety. To measure anxiety, we averaged responses from the six-item short form of the state anxiety scale of the Spielberger State-Trait Anxiety Inventory (Martean & Bekker, 1992; Tluczek et al., 2009), which included items such as “I am tense” and “I feel worried [1 = *not at all*–4 = *very much so*].”

Life Satisfaction. To measure life satisfaction, we simply asked, “All things considered, how satisfied are you with your life as a whole these days?” (1 = *completely dissatisfied*–10 = *completely satisfied*; Bjørnskov, 2010).

Assessment of Open-Ended Essays

Spontaneous Affirmation. We modeled our assessment of open-ended essays after past research by Brady et al. (2016). Four coders blind to condition and the demographic background of participants evaluated participants’ essays based on a coding manual, which provided an operational definition, scale, and example of each construct. Prior to the essay coding, coders were trained on a small random subset of the essays (approximately 10% of the total number of essays). Two independent coders evaluated a random 100 essays chosen from the sample. The interrater agreement for the affirmation and threat categories were 86% and 87% respectively. For the remaining 14% and 13% of essays on which raters disagreed, an agreement was reached through discussion between the two raters. Based on these discussions, the coding manual was refined, and, for the remaining essays, one of the two coders evaluated the relevant content.

As operationalized in past research (Brady et al., 2016), coders rated the extent to which the open-ended essay highlighted affirming themes relative to threatening ones. Specifically, coders rated each essay’s “degree of focus on positive sources of worth and meaning,

in particular, on self-defining values and life domains, relationships, and personal traits and activities” on a 0- to 4-point scale (0 = *none*–4 = *a lot*; Brady et al., 2016). For example, an essay that scored highly on spontaneous affirmation stated,

I enjoy having my son home with me. He has saved me in a way. ... He flew home March 28th and has me working out again on his exercise equipment, eating healthier and just providing some companionship. ... I really feel healthier and better than I’ve felt in a couple of years both mentally and physically.

Additionally, coders examined the essay’s focus on threat (0 = *none*–3 = *a lot*), which refers to “sources of worry, stress, and fear tied to events that could threaten the self’s integrity” (Brady et al., 2016). An essay that scored high on the threat dimension stated, “I just want this pandemic to be over. Millions of people have been affected. Many have died. There has been too much suffering.”

Just as individuals can experience both positive and negative emotions simultaneously, the essays could have high degrees of both affirmation and threat. Following Brady et al.’s (2016) methodology, we aimed to assess the balance between affirmation and threat content, treating our composite as an “affirmation–threat index.” By reverse-coding threat scores and standardizing both dimensions, we obtained a measure of *spontaneous affirmation* composite ($M = 1.26$, $SD = 0.92$) that captures the interplay between them. We note that the two raw codes were correlated, $r = 0.70$, $p = .001$. Additionally, from a psychological perspective, “threat” and “affirmation” are essentially two sides of the same coin. This measure evaluates how much the self is affirmed rather than threatened in face of a stressor. This approach aims to acknowledge the nuanced nature of the construct and provides insights into participants’ responses amid the adverse circumstance of the COVID-19 pandemic.

Domains of Affirmation Versus Threat. Also following Brady et al. (2016), we created a supplementary dependent variable in which coders counted the number of affirming domains and the number of threatening domains. While Brady et al. (2016) identified domains pertinent to the experiences of college students (e.g., exams, vacations, relationships), we identified four domains relevant to our sample—health, finances, relationships, and daily life. If the participant wrote about the domain in both an affirming and threatening way, then it was counted in both affirmation and threat domain counts. A composite was created by subtracting the number of threatening domains from the number of affirming domains. The grand mean of the composite score was -1.20 ($SD = 1.79$), indicating that on average, participants identified more threatening domains than affirming domains. This was expected given the stressor salience task and the general context of the COVID-19 pandemic.

Demographic Variables of Interest

SES

As part of a demographic questionnaire administered at the last section of the survey at Time 3, we asked participants for their total annual household income (“Right now, what is your total household income annually in U.S. dollars before taxes?” [1 = *less than \$10,000*–9 = *over \$150,000*]) and household size (“How many members are there in your household?”). We then calculated effective income as the total household income divided by the square

root of household size, as defined in past research (Buhmann et al., 1988; Mani et al., 2013). The same questions were administered to the Italian participants, in the Italian language, with the currency changed to Euros. Based on median income statistics for a one-person household from the United States Census Bureau (2020) and the National Institute of Statistics of Italy database (Istituto Nazionale di Statistica, 2020), we originally trichotomized our effective income variable into low, middle, and high-income groups, with high-income defined as income that is falls above 1.5 times of the median income, and low-income defined as income that falls below half of the median income (What is Middle-Class Income?, 2020). However, because there were relatively few participants categorized as high income ($N = 57$; 6.6% of respondents) and they would be insufficient to form an income group on its own, we divided participants into two groups—relatively lower SES ($N = 428$; 49.7%) and relatively higher SES ($N = 434$; 50.3%), the latter group consisting of participants originally assigned to both middle- and high-income groups. This process was nearly identical to conducting a median split on our sample.

Living Alone Status

To assess whether participants lived alone at the time of our survey, we simply asked, “Do you live alone? We refer to living with another human being, not a pet” (+1 = *yes*, -1 = *no*).

Financial Impact of COVID-19

To assess whether participants were affected financially by the pandemic at the time of our survey, we asked, “Have you lost a job or taken a pay cut as a result of COVID-19?” (+1 = *lost job or kept job, but got a pay cut*, -1 = *no*).

Transparency and Openness

We report how we determined our sample size, all data exclusions, manipulations, and measures in the study. Materials, data and code for the experiment are available in an online repository (<https://osf.io/nqgh3/>; Tay, 2024). Additionally, this study’s variables, hypotheses and analyses were preregistered on the Open Science Framework (https://aspredicted.org/817_B5P). The preregistration was completed after the data presented in this study were collected, it had initially been intended to collect data from participants from other countries to test for generality across cultures. Ultimately, however, we decided to analyze the present sample (which had sufficient power) without expanding sample size to keep the time frame consistent across cultural contexts (the pandemic situational aspects were changing rapidly weekly during the early months), and thus the study’s hypotheses were preregistered during a planned data collection phase, and before any analysis was conducted. The study mostly adhered to the preregistration plan for hypotheses, measures, and methods, and we acknowledge any deviations from the preregistration in the Supplemental Material for transparency.

Results

Data Analytic Strategy

We hypothesized that social belonging, meaning and mental health would vary as a result of experimental condition. Specifically, we predicted that participants who were assigned to either the

VA condition or the EVA condition, compared to participants in the control condition, would demonstrate more positive scores for these psychological outcomes. Furthermore, we hypothesized that benefits would be greater in the EVA intervention than in the VA one.

To test our research questions, we created two orthogonal contrast codes to test the effects of experimental condition. The first (Condition Contrast 1) represented the contrast between the control condition and the two VA interventions combined (control = -2, VA = +1, EVA = +1), and the second (Condition Contrast 2) represented the contrast between the two VA conditions (Control = 0, VA = -1, EVA = +1). The analytic strategy of contrast coding enables lower-order coefficients to be interpreted even when the model includes an interaction term (Judd et al., 2009; Judd & McClelland, 1989). We entered condition contrasts (Condition Contrast 1 and Condition Contrast 2), baseline levels of the outcome of interest, age, SES, gender, culture, and living alone status as covariates into a repeated measures analysis of covariance (ANCOVA), predicting social belonging and mental health at each time point. Age was centered on 0, while gender (female = +1, male = -1), SES (higher SES = +1, lower SES = -1), culture (Italy = +1, the United States = -1), living alone status (living alone = +1, was not living alone = -1), and financial impact of COVID-19 (lost job or received a pay cut = +1, did not lose job or receive a pay cut = -1) were contrast coded in our analyses. While the addition of gender, culture, SES, living alone status and financial impact of COVID-19 has been explained in our background literature section, we added age as an additional covariate as past research provides evidence that age predicts emotional stability and satisfaction (e.g., Carstensen, 2006; Steptoe et al., 2015), which may, in turn, influence the psychological outcomes measured in our study. Furthermore, the benefit of controlling for baseline values of the outcome of interest is that doing so adjusts estimates at each time point for these baseline variables, enabling an intuitive visualization of the precise effect of condition over time.

Last, because gender was of theoretical interest in our study, and emerged as a moderator of condition effects, we included the interaction terms between our condition contrasts and gender (i.e., Contrast 1 \times Gender; Contrast 2 \times Gender) in our model. When we zeroed in on condition effects for men versus women, the sample was split by gender to preserve any baseline differences in psychological outcomes for each gender that would otherwise arise from covariance adjustment. As we did not find consistent moderation effects of other covariates such as culture and living alone, their interactions with condition were not included in our final ANCOVA model to prevent overfitting. In line with the preregistration, all moderation analyses concerning variables of interest are either reported in this article or the Supplemental Material. Similarly, all studies, measures, manipulations, and exclusions of data or participants are reported in this article or the Supplemental Materials.

Analyses of Qualitative Data for Spontaneous Affirmation and Domains of Affirmation Versus Threat

To test for differences in spontaneous affirmation by condition and if gender was a moderator of this relationship, we conducted a simple ANCOVA to test for main effects of condition contrasts (Condition Contrast 1 and Condition Contrast 2), gender (female = +1, male = -1), and their interactions, as well as covariates of culture, financial impact of COVID-19, SES, living alone, and age.

The same analytic strategy was used for the dependent variable of *domains of affirmation versus threat*.

Correlations With Covariates of Interest

First, covariates of interest were correlated with our composite measures (averaged across time points) to examine their predictiveness. We note that although many of the correlation tests emerged significant, the strength of those associations, as indicated by the correlation coefficient (r), was generally low. We provide the correlations in Table 4. We also provide the means and standard errors of outcome variables across time points by condition in Supplemental Tables S3–S5).

Effect of VA on Social Belonging

When examining main effects of condition, a repeated measures ANCOVA revealed a significant main effect of Condition Contrast 1, $F(1, 836) = 4.96$, $\eta^2 = 0.01$, $d = 0.22$, $p = .026$, such that after accounting for baseline belonging scores and covariates, participants in intervention groups reported greater belonging ($M = 0.57$, $SE = 0.00$) than participants in the control group ($M = 0.56$, $SE = 0.00$). When comparing the two interventions, the main effect of Condition Contrast 2 was not significant, $F(1, 836) = 0.33$, $\eta^2 = 0.00$, $d = 0.06$, $p = .566$, suggesting that the two interventions, on the whole, did not significantly differ in their effects on belonging over time.

Next, we sought to examine the effects of condition over time. Tests of within-subjects contrasts demonstrated that while the interaction between Condition Contrast 1 and the linear effect of time was not significant, $F(1, 836) = 0.43$, $\eta^2 = 0.00$, $p = .512$, the interaction between Condition Contrast 1 and the quadratic effect of time was significant, $F(1, 836) = 9.20$, $\eta^2 = 0.01$, $p = .003$. This suggested that experimental condition altered the quadratic trend of belonging over time. As shown in Figure 1, participants in the control condition exhibited lower scores in belonging that remained generally constant across time. In contrast, participants in the VA conditions exhibited a boost in belonging at Time 2, which declined at Time 3, creating an inverted “V” pattern through time. The interaction between Condition Contrast 2 and the linear effect of time, $F(1, 836) = 2.07$, $\eta^2 = 0.00$, $p = .151$, and between Condition Contrast 2 and the quadratic effect of time, $F(1, 836) = 2.44$, $\eta^2 = 0.00$, $p = .119$, were not significant.

We then examined the effects of the intervention by gender. The interaction between Condition Contrast 1 and gender was significant, $F(1, 836) = 12.68$, $\eta^2 = 0.02$, $p < .001$. As shown in Figure 2, men in the VA groups ($M = 0.55$, $SE = 0.00$) reported greater social belonging relative to men in the control group ($M = 0.53$, $SE = 0.01$), $F(1, 402) = 15.75$, $\eta^2 = 0.04$, $p < .001$. By contrast, there was little difference in belonging among women in the two VA groups ($M = 0.58$, $SE = 0.00$), compared to women in the control group ($M = 0.59$, $SE = 0.01$), $F(1, 430) = 0.72$, $\eta^2 = 0.00$, $p = .397$, suggesting that the interventions were more beneficial for men than women. This may arise from men starting with lower levels of social belonging compared to women, $F(1, 999) = 5.01$, $SE = 0.01$, $p = .026$. The interaction between Condition Contrast 2 and gender was not significant, $F(1, 836) = 0.03$, $\eta^2 = 0.00$, $p = .861$, suggesting that these effects did not reliably differ by the type of values affirmation.

Additionally, we found a significant three-way interaction both among Condition Contrast 1, gender, and the linear effect of time, $F(1, 836) = 6.20$, $\eta_p^2 = 0.01$, $p = .013$, and for Condition Contrast 1, gender, and the quadratic effect of time, $F(1, 836) = 4.78$, $\eta_p^2 = 0.01$, $p = .029$. Specifically, the VA interventions altered the linear and quadratic trajectories of social belonging across time differently for each gender. As seen in Figure 2, men in both VA conditions generally demonstrated an increase in belonging across time relative to the control condition. However, these effects were not seen among the women, whose belonging scores were relatively stable across time. Three-way interactions involving Condition Contrast 2, time, and gender were null, Contrast 2 \times Linear Time \times Gender, $F(1, 836) = 0.73$, $\eta_p^2 = 0.00$, $p = .394$; Contrast 2 \times Quadratic Time \times Gender, $F(1, 836) = 1.54$, $\eta_p^2 = 0.00$, $p = .214$.

Effect of VA on Meaning

After accounting for baseline meaning scores and covariates, a repeated measures ANCOVA did not reveal a significant main effect of Condition Contrast 1, $F(1, 836) = 3.47$, $\eta_p^2 = 0.00$, $d = 0.07$, $p = .063$, although results approached significance and trended in the predicted direction. The main effect of Condition Contrast 2 was also not significant, $F(1, 836) = 2.50$, $\eta_p^2 = 0.00$, $d = 0.12$, $p = .114$, suggesting that the two interventions, on the whole, did not significantly differ in their effects on meaning over time.

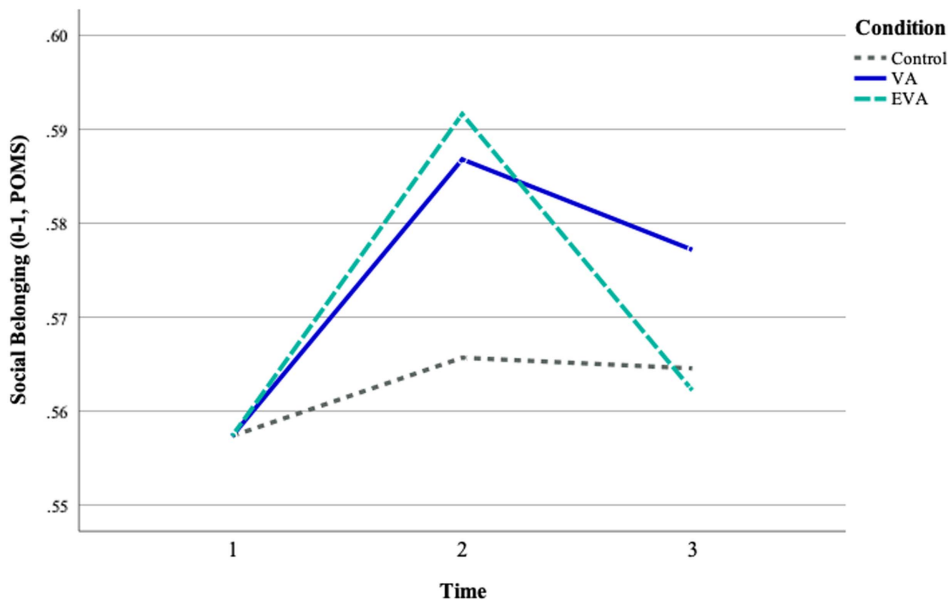
Nevertheless, tests of within-subjects contrasts demonstrated that while the interaction between Condition Contrast 1 and the linear effect of time was not significant, $F(1, 836) = 0.69$, $\eta_p^2 = 0.00$, $p = .406$, the interaction between Condition Contrast 1 and the quadratic

Table 4
Correlation Matrix of Key Psychological Measures and Covariates

| Covariate | <i>n</i> | Correlation | | | | | | | | |
|-----------------------------|----------|------------------|--------------|-----------------|---------------|---------------|-------------|---------------|--------------|-----------------|
| | | Social belonging | | | Meaning | | | Mental health | | |
| | | <i>r</i> | <i>t</i> | <i>p</i> | <i>r</i> | <i>t</i> | <i>p</i> | <i>r</i> | <i>t</i> | <i>p</i> |
| Gender (female) | 1,001 | 0.08 | 2.65 | .008 | 0.043 | 1.348 | .178 | −0.03 | −0.88 | .378 |
| Culture (Italy) | 1,014 | 0.04 | 1.19 | .238 | 0.006 | 0.182 | .855 | −0.066 | −2.11 | .034 |
| Financial impact (lost job) | 1,014 | −0.11 | −3.34 | .001 | −0.036 | −1.134 | .257 | −0.20 | −6.40 | <.001 |
| Living alone | 1,014 | −0.18 | 5.66 | <.001 | −0.080 | −2.564 | .010 | 0.03 | 0.85 | .393 |
| SES | 862 | 0.11 | 3.27 | .001 | 0.108 | 3.179 | .002 | 0.05 | 1.52 | .128 |
| Age | 1,012 | 0.02 | 0.77 | .444 | 0.024 | 0.764 | .445 | 0.15 | 4.90 | <.001 |

Note. Values in bold indicate significant correlations. Correlations between covariates of interest and composite measures of social belonging, meaning, and mental health. SES = socioeconomic status.

Figure 1
Social Belonging Across Time

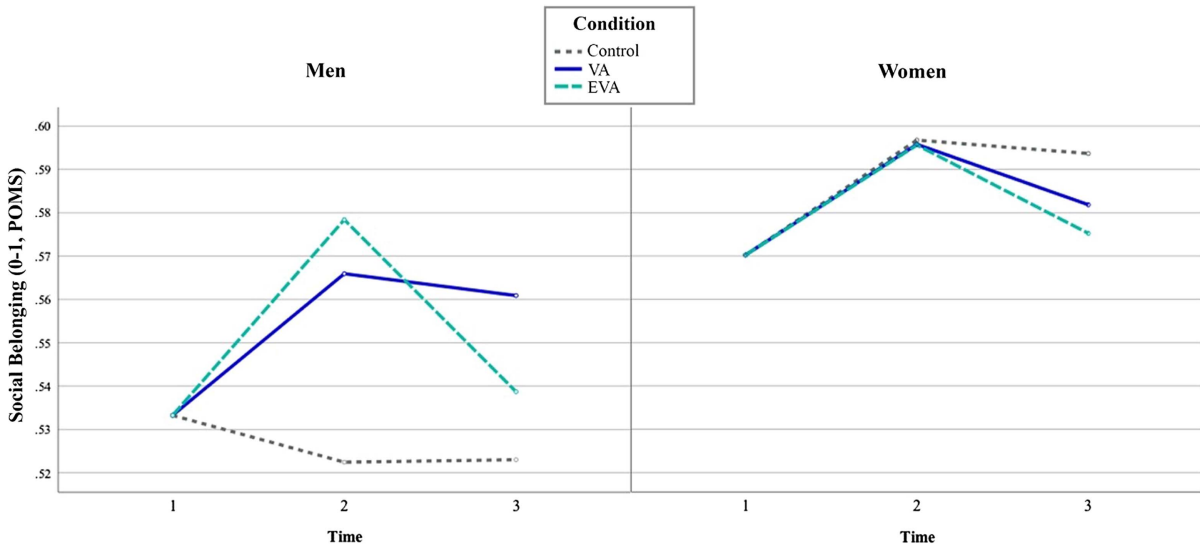


Note. Social belonging across time for participants in the control, VA, and EVA conditions, scaled using the Proportion of Maximum Scale (0–1 point). POMS = proportion of maximum scaling; VA = values-affirmation; EVA = elaborated values-affirmation. See the online article for the color version of this figure.

effect of time was significant, $F(1, 836) = 4.56$, $\eta_p^2 = 0.01$, $p = .033$, suggesting that experimental condition altered the quadratic trend of meaning over time. As shown in Figure 3, participants in the control condition remained fairly consistent over time, with a slight decline by Time 3. In contrast, just as with social belonging, participants in

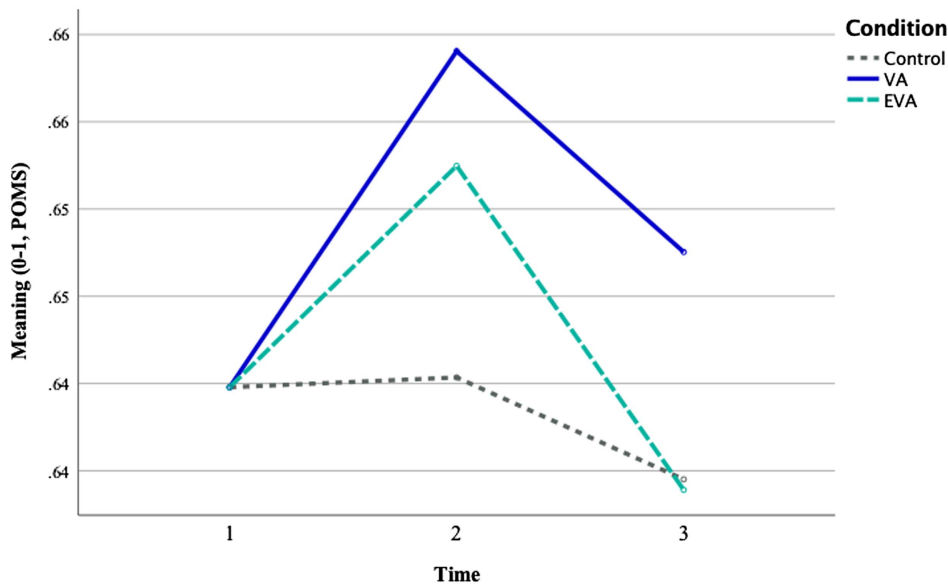
both VA conditions exhibited an inverted “V” pattern in meaning from Time 1 to Time 3, indicating that participants in the VA conditions experienced a boost in meaning at Time 2, though effects were not sustained at Time 3. Interactions between Condition Contrast 2 and the linear effect of time, $F(1, 836) = 2.57$, $\eta_p^2 = 0.00$, $p = .110$,

Figure 2
Social Belonging Across Time by Gender and Condition



Note. Figure depicts the relationship among social belonging, gender, and experimental condition across time. POMS = proportion of maximum scaling; VA = values-affirmation; EVA = elaborated values-affirmation. See the online article for the color version of this figure.

Figure 3
Meaning Across Time



Note. Meaning across time for participants in the control, VA, and EVA conditions. POMS = proportion of maximum scaling; VA = values-affirmation; EVA = elaborated values-affirmation. See the online article for the color version of this figure.

as well as that between Condition Contrast 2 and the quadratic effect of time, $F(1, 836) = 0.00$, $\eta_p^2 = 0.00$, $p = .957$, were not significant.

Then, we sought to examine if gender moderated the effects of experimental condition on meaning. However, results did not support this hypothesis, as evidenced by the nonsignificant interaction between Condition Contrast 1 and gender, $F(1, 836) = 0.17$, $\eta_p^2 = 0.00$, $p = .683$, as well as between Condition Contrast 2 and gender, $F(1, 836) = 2.55$, $\eta_p^2 = 0.00$, $p = .111$. Three-way interactions among condition, gender and time largely did not reach significance, Contrast 1 \times Linear Time \times Gender, $F(1, 836) = 0.02$, $\eta_p^2 = 0.00$, $p = .885$; Contrast 1 \times Quadratic Time \times Gender, $F(1, 836) = 0.30$, $\eta_p^2 = 0.00$, $p = .587$; Contrast 2 \times Linear Time \times Gender, $F(1, 836) = 0.32$, $\eta_p^2 = 0.00$, $p = .571$. There was, however, a significant three-way interaction among Condition Contrast 2, the quadratic effect of time and gender, $F(1, 836) = 4.47$, $\eta_p^2 = 0.01$, $p = .035$. As depicted in Figure 4, the type of intervention altered the quadratic trajectory of meaning over time differently for each gender. In the short-run, the VA appeared more beneficial to men, and the EVA more beneficial to women.

Effect of VA on Mental Health

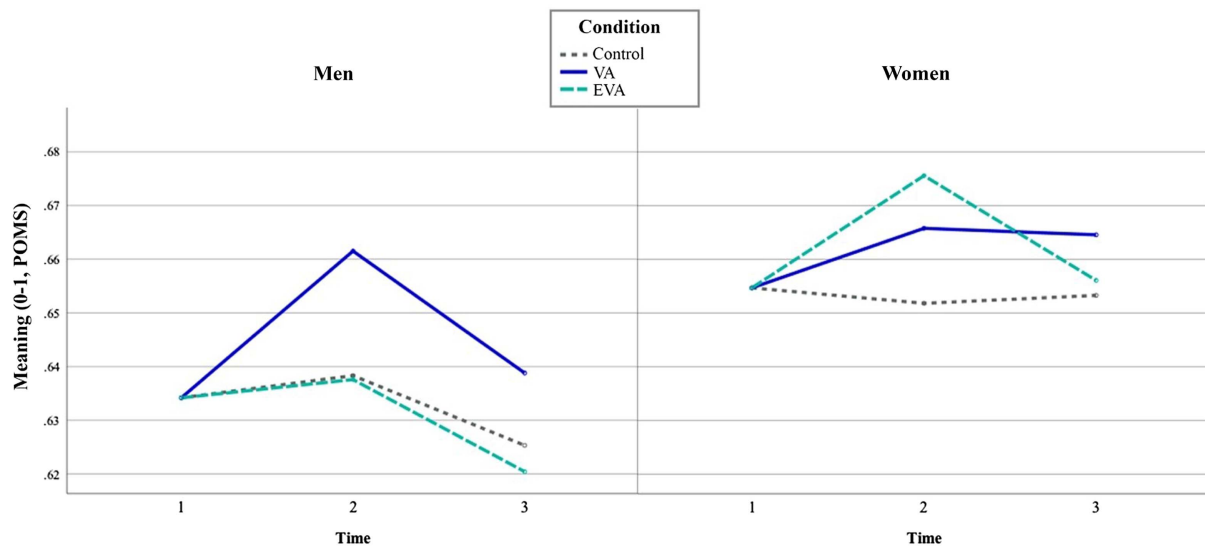
A repeated measures ANCOVA did not yield significant main effects of condition Contrast 1, $F(1, 836) = 1.75$, $\eta_p^2 = 0.00$, $d = 0.13$, $p = .186$, nor of Contrast 2, $F(1, 836) = 2.12$, $\eta_p^2 = 0.00$, $d = 0.03$, $p = .146$. The interactions between Condition Contrasts and the linear and quadratic effects of time were also null, Contrast 1 \times Linear Time, $F(1, 836) = 0.63$, $\eta_p^2 = 0.00$, $p = .428$; Contrast 1 \times Quadratic Time, $F(1, 836) = 0.98$, $\eta_p^2 = 0.00$, $p = .322$; Contrast 2 \times Linear Time, $F(1, 836) = 1.59$, $\eta_p^2 = 0.00$, $p = .208$; Contrast 2 \times Quadratic Time, $F(1, 836) = 0.11$, $\eta_p^2 = 0.00$, $p = .743$.

However, there was a significant interaction between gender and Condition Contrast 1, $F(1, 836) = 8.32$, $\eta_p^2 = 0.01$, $p = .004$, such that the VA conditions appeared to have improved mental health outcomes for the men but not women. Specifically, men, on average, reported significantly higher mental health scores in the VA conditions ($M = 0.59$, $SE = 0.00$) than men in the control condition ($M = 0.57$, $SE = 0.01$), $F(1, 402) = 8.35$, $\eta_p^2 = 0.02$, $p = .004$. Meanwhile, the difference in mental health scores of women in the VA conditions ($M = 0.58$, $SE = 0.00$) did not significantly differ from that of the women in the control condition ($M = 0.58$, $SE = 0.01$), $F(1, 430) = 0.92$, $\eta_p^2 = 0.00$, $p = .337$.

In addition, the interaction between gender and Condition Contrast 2 was also significant, $F(1, 836) = 4.38$, $\eta_p^2 = 0.01$, $p = .037$, suggesting a difference in effect of VA on mental health based on the type of intervention. In particular, the type of VA intervention affected mental health scores differently for the men, $F(1, 401) = 7.37$, $\eta_p^2 = 0.04$, $p < .001$, but not the women, $F(1, 429) = 0.58$, $\eta_p^2 = 0.00$, $p = .559$, with men in the VA condition exhibiting more improvement in mental health over time relative to men in the EVA condition.

Furthermore, tests of within-subject contrasts showed a significant three-way interaction among Condition Contrast 1, gender and the linear trend of time in predicting mental health, $F(1, 836) = 9.46$, $\eta_p^2 = 0.01$, $p = .002$, suggesting that the effect of VA interventions in altering the linear trend of mental health scores over time was different for each gender. As seen in Figure 5, while the mental health scores of men in the control condition remained stagnant from Time 1 to Time 3, the mental health scores of men in the VA conditions exhibited an increase—and this increase was particularly pronounced in the VA condition. In comparison, the mental health scores of women in all three conditions demonstrated a similar upward trend from Time 1 to Time 3, suggesting again, that the VA

Figure 4
Meaning Across Time by Gender and Condition



Note. Figure depicts the relationship among meaning, gender, and experimental condition across time. POMS = proportion of maximum scaling; VA = values-affirmation; EVA = elaborated values-affirmation. See the online article for the color version of this figure.

interventions appeared beneficial to the mental health scores of the men but not women in this study.

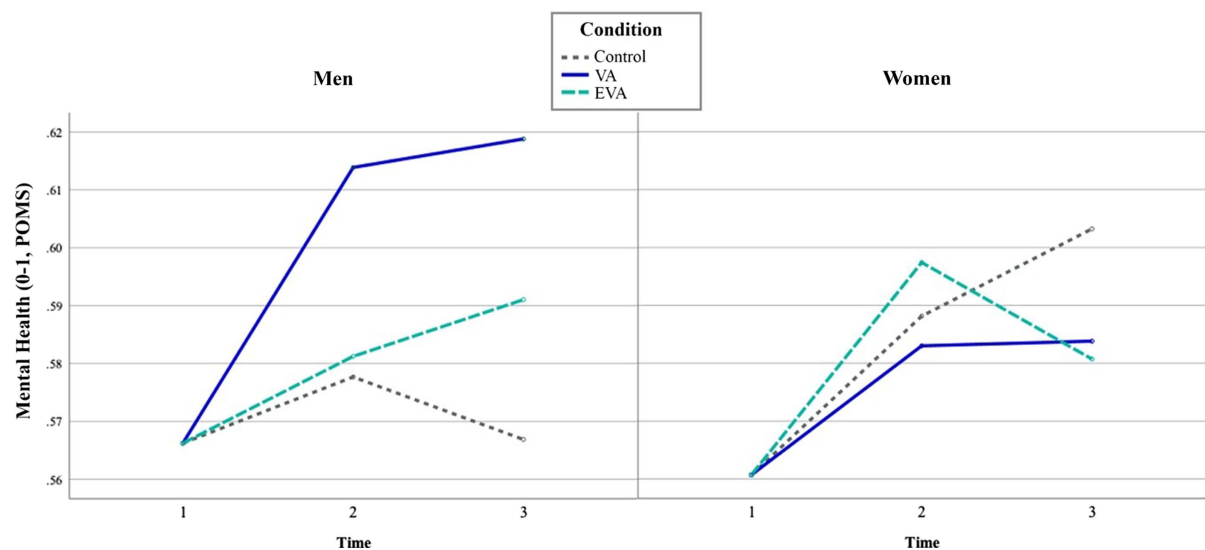
Three-way interactions among Condition Contrast 1 \times Gender \times Quadratic Effect of Time, $F(1, 836) = 0.24$, $\eta_p^2 = 0.00$, $p = .627$; Condition Contrast 2 \times Gender \times Linear Effect of Time, $F(1, 836) = 1.26$, $\eta_p^2 = 0.00$, $p = .262$; and Condition Contrast 2 \times Gender \times Quadratic Effect of Time, $F(1, 836) = 3.32$, $\eta_p^2 = 0.00$, $p = .069$, were not statistically significant.

Analyses of Qualitative Data

Spontaneous Affirmation

For the final section of analyses, we assessed whether participants differed in spontaneous affirmation, as coded in their essays written at Time 3, and whether this difference was moderated by gender. We found that men had higher spontaneous affirmation scores ($M = 1.32$, $SE = 0.05$) than women ($M = 1.20$, $SE = 0.05$),

Figure 5
Mental Health Across Time by Gender and Condition



Note. Figure depicts the relationship among mental health, gender, and experimental condition across time. POMS = proportion of maximum scaling; VA = values-affirmation; EVA = elaborated values-affirmation. See the online article for the color version of this figure.

$F(1, 808) = 7.10$, $\eta_p^2 = 0.01$, $p = .008$. Neither Condition Contrast 1, $F(1, 808) = 0.59$, $\eta_p^2 = 0.00$, $p = .445$, nor Condition Contrast 2, $F(1, 808) = 0.33$, $\eta_p^2 = 0.00$, $p = .567$, yielded significant main effects.

However, there was a significant interaction between gender and Condition Contrast 1, $F(1, 808) = 4.56$, $\eta_p^2 = 0.01$, $p = .033$, as shown in Figure 6. Simple effects tests showed that while men in the VA groups ($M = 1.42$, $SE = 0.06$) scored higher in spontaneous affirmation compared to those in the control ($M = 1.23$, $SE = 0.08$), $F(1, 388) = 3.89$, $\eta_p^2 = 0.01$, $p = .050$, this effect was not observed between women in the VA ($M = 1.15$, $SE = 0.06$) versus the control groups ($M = 1.25$, $SE = 0.08$), $F(1, 420) = 1.04$, $\eta_p^2 = 0.00$, $p = .310$. The interaction between Contrast 2 and gender was not significant, $F(1, 808) = .44$, $\eta_p^2 = 0.00$, $p = .507$, suggesting that the effect of intervention type on spontaneous affirmation was not moderated by gender.

Domains of Affirmation Versus Threat

Recall that we also assessed the number of domains participants wrote about as affirming versus threatening in their essays, with a difference score above 0 indicating more affirming domains generated. There was a significant main effect of gender in predicting domains of affirmation versus threat, whereby men ($M = -1.02$, $SE = 0.10$), on average, wrote about fewer threatening versus affirming domains than women ($M = -1.40$, $SE = 0.09$), $F(1, 808) = 13.23$, $\eta_p^2 = 0.02$, $p < .001$. Neither Condition Contrast 1, $F(1, 808) = 0.37$, $\eta_p^2 = 0.00$, $p = .542$, nor Condition Contrast 2, $F(1, 808) = 0.00$, $\eta_p^2 = 0.00$, $p = .998$, yielded significant main effects. Interactions between gender and Condition Contrast 1, $F(1, 808) = 2.99$, $\eta_p^2 = 0.00$, $p = .084$, and between gender and Condition Contrast 2, $F(1, 808) = 0.33$, $\eta_p^2 = 0.00$, $p = .569$, were not significant.²

Secondary Analyses: Moderating Effects of Additional Risk Factors

As part of secondary analyses, we tested whether the VA interventions had beneficial effects on psychological outcomes as a function of certain risk factors. As mentioned, certain demographic variables—financial impact of COVID-19, SES, and living alone status—could provide measurements of particular social and economic vulnerability that could exacerbate threat levels, thus moderating the effect of the VA interventions on targeted psychological outcomes.

We ran moderation analyses by including each risk factor as a main effect and examining its interaction with the two condition contrasts in the repeated measures ANCOVA. Contrary to our expectations, we generally did not find significant moderation effects of these risk factors on social belonging, meaning, or mental health. However, a noteworthy interaction effect emerged between Condition Contrast 1 and SES in predicting social belonging, $F(1, 836) = 4.45$, $\eta_p^2 = 0.01$, $p = .035$. As shown in Figure 7, among participants of higher SES, those in the VA conditions ($M = 0.57$, $SE = 0.00$) did not differ in social belonging compared to participants in the control condition ($M = 0.57$, $SE = 0.01$), $F(1, 420) = 0.00$, $\eta_p^2 = 0.00$, $p = .971$. In contrast, among participants of lower SES, those in the VA conditions ($M = 0.57$, $SE = 0.00$) reported significantly higher social belonging than participants in the control condition ($M = 0.55$, $SE = 0.01$), $F(1, 412) = 8.43$, $\eta_p^2 = 0.02$, $p = .004$. This effect, albeit exploratory, suggests that the VA interventions are especially helpful in improving social belonging

for individuals of low SES. The remaining interaction effects were not significant, except for one indicating that the EVA was more beneficial for participants experiencing greater financial impact of COVID-19.³ Other risk factors suggested that the benefits of the VA interventions were consistent across these demographic subgroups. Detailed statistics for the remaining moderation analyses are provided in Supplemental Table S8.

General Discussion

In this study, we examined whether a VA intervention could provide a viable means for coping with the psychological threat of the COVID-19 pandemic. We evaluated the effectiveness of various structured activities designed to help individuals reflect on and align with their core values during this challenging period, with consistent results in both the United States and Italy. In addition to a standard VA approach focused on writing and reflection, we tested a more elaborate version of the intervention, inspired by research on goal pursuit and self-regulation, aimed at encouraging behaviors aligned with one's values. A novel aspect of our approach to both interventions was reminding participants of the benefits of affirming their values during times of threat and reinforcing this practice 2 weeks after the initial intervention. We evaluated the outcomes of social belonging, meaning, and mental health both immediately after the commencement of the intervention and 4 weeks later.

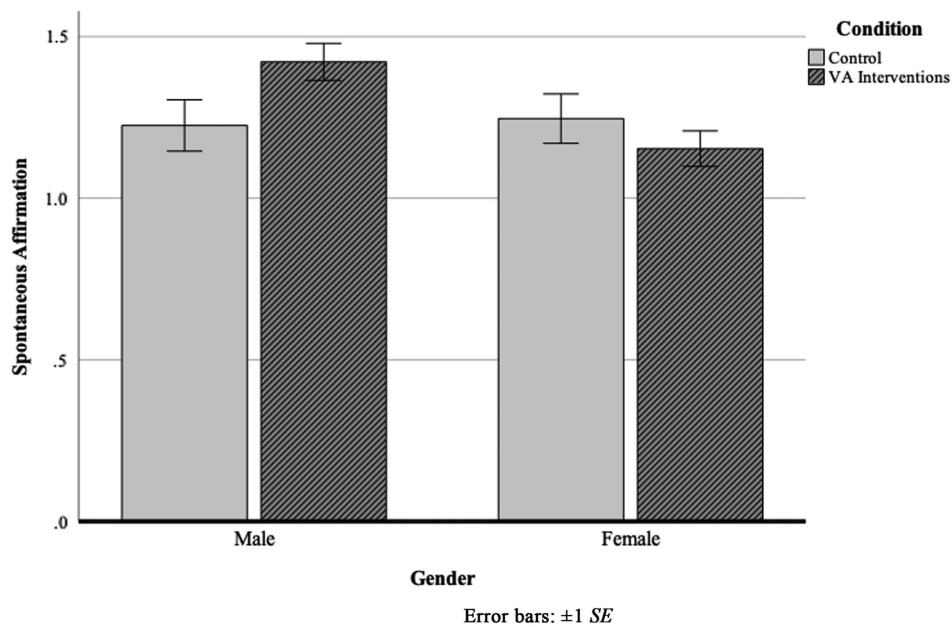
As a whole, our findings suggest that men benefited more from the interventions, especially for social belonging and mental health. For men, the interventions improved the trajectory of all three psychological outcomes—social belonging, meaning, and mental health—over the 1-month period. The role of gender was again highlighted in the analysis of qualitative data, where only the men (and not women) in the intervention groups were more likely to spontaneously self-affirm compared to men in the control group.

One potential explanation is that men may have started the study with lower levels of social belonging compared to women, which

² As part of our stressor salience task at Time 3, we asked participants to rate how stressed they felt when they thought about the coronavirus and public health situations. Our statistical analysis showed that neither Condition Contrast 1— $F(1, 848) = 0.57$, $\eta^2 = 0.00$, $p = .453$ —nor Condition Contrast 2— $F(1, 848) = 0.01$, $\eta^2 = 0.00$, $p = .942$ —predicted stress. However, when examining covariates, higher stress levels were found among participants who experienced a negative financial impact of COVID-19, $F(1, 848) = 22.45$, $\eta^2 = 0.03$, $p < .001$. Higher stress levels were also reported by women in comparison to men— $F(1, 848) = 6.98$, $\eta^2 = 0.01$, $p = .008$ —as well as participants from the United States compared to Italy, $F(1, 848) = 7.17$, $\eta^2 = 0.01$, $p = .008$. Other covariates such as living alone— $F(1, 848) = 0.62$, $\eta^2 = 0.00$, $p = .432$ —SES, $F(1, 848) = 0.12$, $\eta^2 = 0.00$, $p = .732$ —and age were not significant, $F(1, 848) = 0.00$, $\eta^2 = 0.00$, $p = .966$.

³ While there was no significant interaction between Condition Contrast 1 and financial impact of COVID-19— $F(1, 836) = 0.62$, $\eta_p^2 = 0.00$, $p = .432$ —there was a significant interaction between Condition Contrast 2 and financial impact of COVID-19 in predicting social belonging, $F(1, 836) = 4.39$, $\eta_p^2 = 0.01$, $p = .036$. This suggested that financial impact was, to an extent, a risk factor in moderating the relationship between the type of intervention and social belonging. Participants in the control condition had the lowest scores compared to the VA groups—regardless of whether they did or did not lose their jobs or receive a pay cut, $F(1, 836) = 5.52$, $\eta_p^2 = 0.01$, $p = .023$. Descriptively, among participants who lost their jobs or received a pay cut, EVA participants reported higher social belonging scores than VA participants; in contrast, among those who did not lose their jobs, VA participants reported higher belonging scores than EVA participants. While interesting, given that these analyses are exploratory and arise from multiple tests, they should be interpreted cautiously.

Figure 6
Spontaneous Affirmation as a Function of Experimental Condition

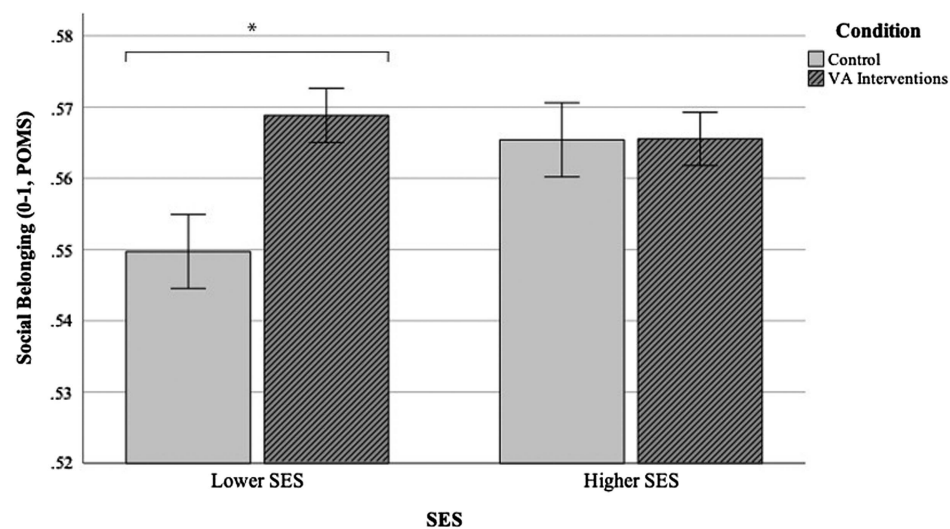


Note. Spontaneous affirmation scores by gender and condition. Error bars represent \pm standard errors. VA = values-affirmation; SE = standard error.

could have made them more responsive to the intervention. This aligns with existing research suggesting that due to traditional masculine gender norms, men tend to develop an identity as the “breadwinner,” are less socialized to develop and actively engage in a larger social network than women (Artazcoz et al., 2004;

Khan et al., 2020), and have a lower tendency to disclose their emotional burdens (Cleary, 2012; River, 2014). Since the majority of men in our sample came from lower- to middle-income backgrounds, the economic damage wrought by the pandemic may have intensified this threat to their provider status, making them

Figure 7
Social Belonging as a Function of Experimental Condition and Socioeconomic Status



Note. Figure depicts the moderation effect of SES on the relationship between social belonging and Condition Contrast 1. Participants from lower SES in the VA conditions reported significantly higher levels of social belonging compared to those in the control condition. Error bars represent \pm standard errors. POMS = proportion of maximum scaling; VA = values-affirmation; SES = socioeconomic status.

* $p = .004$.

more likely to benefit from VA interventions. While women faced significant burdens, such as increased workloads both at home and in the workplace (Thibaut & van Wijngaarden-Cremers, 2020), these were not measured in our study. Thus, the observed gender differences may partly reflect the unique social and economic pressures faced by men during this time. However, further research is needed to better understand these dynamics and to explore the extent to which traditional gender roles and economic pressures shaped the intervention's impact.

Another important finding emerged from the moderation analyses of risk factors. Among participants of lower SES, those who received the VA interventions reported higher social belonging compared to those in the control group. In contrast, there was no observable difference in social belonging between participants of higher SES in treatment versus control conditions. Figure 7 illustrates how the VA interventions closed the SES gap in social belonging.

Contrary to our hypotheses, several risk factors did not moderate the effects of the interventions, even though we expected they might. For instance, living alone and having experienced a negative financial impact of COVID-19—did not moderate intervention effects on psychological outcomes. Instead, after controlling for baseline psychological outcomes, only financial impact of COVID-19 emerged as a significant predictor of worse mental health. (It is important to note that our measure of “financial impact of COVID-19” is binary, indicating whether participants had lost their jobs or received a pay cut due to COVID-19. This measure may not reflect the complexity or extent of economic damage caused by the pandemic. Future studies could show financial security threats as a risk factor in more detail).

Moreover, it is intriguing that neither SES nor the financial impact of COVID-19 emerged as moderators of intervention effects on mental health and meaning. The unique circumstances of the pandemic's early months may have overshadowed the anticipated influence of financial risk factors on these aspects of well-being. This period was characterized by a global crisis that led people to collectively confront heightened uncertainty and anxiety. Perhaps these shared experiences lessened the impact of individual socioeconomic differences—at least within the scope of this study. Moreover, traditional social hierarchies and structures may have experienced temporary disruptions. People were navigating a novel situation that affected everyone, regardless of their SES, and while financial disparities were evidently present, it is plausible that these disparities became more pronounced later when the pandemic persisted.

Furthermore, it was surprising that there were no significant interactions between culture and condition contrasts (which were dropped from the final analyses). While past research has shown that Italians are generally more collectivistic than Americans (Burton et al., 2021) and thus may be less susceptible to loneliness due to greater communal support, after controlling for age, gender, and living alone status, the Americans versus Italians in our sample did not differ in collectivism⁴, $t(994) = 1.04$, $SE = 0.03$, $p > .250$. Instead, age was associated with higher collectivism, $t(994) = -2.63$, $SE = 0.002$, $p < .010$; living alone was associated with lower collectivism, $t(994) = 4.75$, $SE = 0.03$, $p < .001$; and being female associated with marginally higher collectivism, $t(994) = -1.82$, $SE = 0.03$, $p = .070$, in our sample. It was also possible that living alone might have been a proxy for collectivism. Additionally, the unexpected pandemic circumstance, including the shared

experience of “stay-at-home” restrictions, could have made the U.S. participants more collectivistic, or led to a reduction in the traditional cross-cultural disparities typically seen between collectivism and individualism. Future studies might investigate this suggestion where feasible.

Taken together, the absence of moderation effects of most identified risk factors suggested that the effects of the VA interventions were generally statistically consistent across the two cultures. Particularly for men in the VA condition, it is possible that the intervention tapped into fundamental human needs for belonging and self-integrity that transcend these risk factors, leading to the positive effects described in this study. Furthermore, as mentioned previously, the associations among living alone, social isolation, loneliness and mental health yield mixed results in various studies depending on variables such as cultural context and relationship status (Eckermann, 2015; Smith & Victor, 2019). Further studies in which living alone is of particular interest could further disentangle living alone from associated characteristics (e.g., relationship status, the amount of virtual and physical social interactions, duration of living alone, and culture).

Overall, reflecting on one's important values could be beneficial in boosting aspects of well-being; both kinds of VA improved the trajectory of social belonging and meaning (but not mental health), providing evidence for improvements in these psychological outcomes, especially in the short term. Additionally, the interventions benefited men more than women, especially for social belonging and mental health.

When examining these psychological outcomes on the whole, we observed an overall upward trajectory in social belonging and mental health, a trend that was magnified in the intervention conditions. For meaning, the upward trend was specifically observed in the VA condition but not in the EVA condition, leading to a more flattened trajectory by Time 3 when averaging across both interventions. These findings were particularly interesting, as past studies (e.g., G. L. Cohen et al., 2006, 2009; G. L. Cohen & Sherman, 2014; Sherman et al., 2013) have shown that self-affirmation interventions can buffer threat responses. They do this by broadening construal and insulating individuals from experiencing daily adversity as an identity threat, thus slowing down or halting downward trends in outcomes like belonging. In contrast, we observed an unexpected upward trend in the VA condition, particularly during the early months of the pandemic—a period in which a decline in psychological outcomes across all conditions would be expected, given the heightened levels of fear and uncertainty. We inferred that the VA interventions in this study, both altered and tailored to the pandemic context, had interrupted a recursive cycle of threats to self-integrity compounded by the pandemic, offering a reservoir of deeper sources of self-integrity that transcended the threatening situation.

Specifically, when we examined the trajectory of social belonging over time, we found that experimental condition (Condition Contrast 1) altered the quadratic slope of social belonging over time; participants in the control condition showed generally lower scores in belonging that remained constant across time. In contrast,

⁴ We administered a 12-question short form of a Collectivism Scale (Triandis & Gelfand, 1998) and averaged responses to form a collectivism composite measure, including items such as “I'd rather depend on myself than others” and “Competition is the law of nature” (9 = *definitely no*–1 = *definitely yes*).

participants in the VA conditions experienced a boost in belonging scores, particularly at Time 2. While both VA interventions were beneficial in the short term, the VA showed greater long-term benefits compared to the EVA.

Contrary to our hypotheses, we did not find statistically significant main effects of experimental condition on meaning or mental health over time, although results trended in our expected direction. However, the interaction between Condition Contrast 1 and the quadratic effect of time in predicting meaning was significant. While participants in the control condition reported a more linear decline in meaning as the pandemic progressed, participants in the VA conditions demonstrated an inverted “V”-shaped pattern in meaning—a boost in meaning immediately following the intervention. The subsequent decline in meaning was then buffered in the VA condition but not EVA, 1 month after the intervention.

Limitations and Future Directions

A limitation of our study is the sampling procedure. We chose the online platform of Prolific to recruit participants online, as that was the most feasible option given the pressing timeline and physical constraints of the COVID-19 context. Based on participant feedback, it seemed that many participants, particularly those from Italy, spent several hours a day completing online surveys, with study participation becoming a full-time activity during the lockdown. It was thus possible that the high number of surveys these participants complete may have interfered in the participants’ capacity to remember the writing activity after 1 month. There may also have been sampling biases with recruitment on Prolific, which we hoped had been limited via investing in a more representative sample on Prolific (we opted for representative sampling on Prolific based on U.S. Census Bureau population statistics on gender, age and race distributions for the U.S. sample). We also acknowledge the demographic differences between the Italian and U.S. samples. While we controlled for gender, age and living alone status, we did not include race or ethnicity. Race and ethnicity can be complex variables that can vary across cultural contexts, making them important considerations for further exploration in future studies.

Furthermore, past research has shown that interventions can play out differently in various cultural contexts (Markus & Kitayama, 1991). Although culture did not significantly moderate intervention effects in our study, our cultural assessment was limited to an online sample from the United States and Italy. Therefore, future studies may benefit from exploring how modified forms of values-affirmation interventions could impact differently in diverse cultural contexts.

Finally, the finding that the EVA did not show greater benefit than the VA suggested that the EVA can be further refined. Perhaps in the context of the earlier months of COVID-19, the longer writing activity of the EVA might have felt more strenuous for participants. Or perhaps, the external environment may have restricted the contextual flexibility and personal relevance of the values-aligned plans that are integral to the intervention’s success (Ehret & Sherman, 2018). The EVA included prompts encouraging participants to “think of one or two things that [they] could do this week that are tied to [their] most important values.” This instruction is neither a direct request for action nor does it specify the frequency of the activities. Future research could consider making the request for behavioral change more explicit, under

appropriate circumstances, to enhance the positive effects of values-affirmation interventions. Moreover, although measuring the frequency of activities planned by participants in the EVA condition was not prioritized in this study, it could be an important indicator of engagement in the intervention. Tracking this frequency, particularly if behavioral outcomes are a focus, could provide interesting insights. To enable more robust comparisons of intervention effects, future versions of the VA and control conditions could include “placebo-like” activities to standardize behavioral engagement across conditions. In future studies, we also aim to revise the intervention materials to encourage more consistent reflection on core values—such as by teaching participants strategies to reflect independently on their important values—which could be especially vital during times of uncertainty, change, or distress.

Constraints on Generality

In this study, our sample consisted of U.S. and Italian adults recruited online through the Prolific platform during the early months of the COVID-19 pandemic. The detailed demographic breakdown of our participants can be found in the “Participants” section. It is important to acknowledge the constraints on the generalizability of our findings. As with online samples, our participants may not fully represent the entire population of U.S. and Italian adults. Online samples often tend to skew toward a more Internet-engaged demographic, and those who may participate in research studies online as a supplement to their income, potentially limiting the applicability of our results to those who are not as active online. Furthermore, the context of the early pandemic period was characterized by unique and unprecedented circumstances, including lockdowns, health concerns, and rapidly evolving information. This context may have influenced participants’ responses and behaviors, and as such, our findings should be interpreted within the specific context of the pandemic. While our study provides valuable insights into this specific population and time frame, caution should be exercised when extrapolating our results to other contexts or different periods.

Conclusion

In conclusion, the findings of this study suggest that a brief VA writing activity could boost social belonging, meaning, and mental health in the short term, particularly during the early months of the COVID-19 pandemic. The effectiveness of these interventions, tailored to the pandemic context, seemed to interrupt a recursive cycle of threats to self-integrity compounded by the pandemic. As self-affirmation theory posits, by engaging with deeper sources of self-integrity, participants would be able to transcend the immediate threats posed by the situation. Notably, men in our sample experienced worse social belonging, meaning, and mental health as the pandemic progressed, but benefitted more from the VA interventions than women. This underscores the important role gender plays in shaping responses to psychological threats. Furthermore, as the topics of mental health, meaning, and social belonging have come increasingly into the forefront of conversations, we encourage further research on developing simple, accessible, and cost-effective strategies to enhance different facets of well-being. Such social psychologically informed interventions have the potential not only to provide immediate relief,

but also to build resilience against ongoing and future stressors, making them valuable strategies in our psychological toolkit.

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