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Feasibility of a culturally adapted positive psychological intervention for Hispanics/Latinos with elevated risk for cardiovascular disease

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ABSTRACT

Although increasing emotional well-being has been proposed as a potential pathway to drive cardiac health, emotional well-being interventions for people with cardiac risk are underdeveloped, particularly among Hispanic/Latino adults. Our objective was to pilot a well-being intervention drawing on positive psychology concepts to determine feasibility and acceptability in Hispanics/Latinos at risk for cardiovascular disease (CVD). We developed a Spanish-language positive psychological intervention, with cultural tailoring informed by formative qualitative work, to promote emotional well-being and its antecedents in Hispanics/Latinos. Hispanic/Latino adults ($n = 19$) self-reporting two or more CVD risk factors were enrolled in our single-arm 8-week pilot trial. The group intervention consisted of 8 weekly 90-min sessions delivered by a bilingual licensed clinical social worker. Mean age was 54.1 years, 68.8% were female, and 50% had ≤eighth-grade education. Eleven of 19 Hispanic/Latino adults completed the 8-week program for a 57.89% retention rate, with a majority of factors leading to dropout unrelated to program content or mode of delivery. Most participants felt satisfied overall with each session (97.1%). Largest increases relative to baseline after receiving the intervention were found in engagement in happiness-inducing behaviors (e.g., meditation), emotional vitality, and subjective happiness using metrics of reliable change and effect sizes. This single-arm trial documented adequate feasibility and acceptability, although strategies to increase retention are warranted. Future studies should test our intervention using a randomized trial design with a larger sample size and inclusion of biomarkers (e.g., C-reactive protein) to document impact of our intervention on cardiac-related health.

Keywords

Positive psychology, Psychological well-being, Hispanics/Latinos, Cardiovascular disease risk factors, Cultural adaptation, Feasibility

For decades now, empirical work has documented the detrimental effects of psychological distress on cardiovascular health and physiological functioning [1]. The American Heart Association (AHA) recently recommended inclusion of depressive symptoms as a major cardiovascular risk factor joining the ranks of traditional markers such as diabetes and hypertension [2]. Although this indicates an increased consideration of psychological health as a determinant

Implications

Practice: Strength-based psychological interventions are an acceptable and feasible strategy for improving overall mental health and emotional well-being in Hispanics/Latinos at risk for cardiovascular disease.

Policy: Policy makers wanting to positively affect mental health in Hispanics/Latinos at risk for cardiovascular disease should explore affordable and sustainable strength-based psychological interventions as a means to increase positive emotions.

Research: Future trials should explore whether, and for whom, benefits in emotional well-being can translate into better cardiovascular health and the types of environments or settings that might influence this relationship.

of physical health, another shift has been the recognition that psychological health is not a bipolar continuum but rather consists of both the presence of emotional well-being (e.g., positive emotions, life satisfaction, meaning and purpose) and the absence of negative psychological states (e.g., negative emotions, depression, anxiety, stress) [3–5]. Research documents a robust cardio-protective influence of emotional well-being above and beyond measures of psychological distress [3, 6, 7]. This evidence is suggestive that interventions targeting increases in emotional well-being could have beneficial impacts on cardiovascular health although none have been tailored to Hispanic/Latino samples.

Design of a positive psychological intervention tailored for Hispanic/Latinos is opportune for several reasons. First, the Hispanic/Latino population is the largest racial/ethnic minority group in the USA consisting of 56.6 million people [8, 9]. Second, the public health burden of cardiovascular disease (CVD) is disproportionately high in Hispanics/

Latinos. According to the largest epidemiologic study ($N = 16,415$) of Hispanic/Latino adults to date (the Hispanic Community Health Study/Study of Latinos [HCHS/SOL]) [10], approximately three-quarters of Hispanics/Latinos have at least one major CVD risk factor [8]. Cardiovascular illness accounts for approximately 30% of mortality in this underserved and understudied group [9, 11, 12]. Unfortunately, the AHA reports that currently available CVD prevention efforts are relatively sparse and ineffectual in minority populations, highlighting the need for new and more effective disease prevention strategies [13, 14]. Positive psychological interventions that align with cultural values and perspectives may be particularly useful for reaching populations who show less service utilization in medical settings [15].

The current pilot study seeks to determine acceptability and feasibility of a culturally adapted psychosocial intervention that directly seeks to cultivate positive psychological assets among Hispanic/Latino adults. Hispanic/Latinos are a vital population to pilot such work due to an overwhelming need for interventions to improve cardiovascular health and evidence that emotional well-being may be a particularly relevant target [6, 16], especially within the context of a cultural group that values building of positive emotional bonds and encourages collectivism [17], and yet, continues to experience widening cardiac-related health disparities [8]. Development of psychosocial interventions has overwhelmingly been informed by theories that draw heavily from Western-centric perspectives [18] especially those directly targeting improvements of psychological assets (i.e., positive psychological interventions) [19, 20]. This neglects culturally bound frameworks. Culture may affect the efficacy of positive psychological interventions in a variety of ways including altering people's interpretation, performance, or benefits from specific intervention strategies [21]. Cultural adaptations in interventions can include efforts to make interventions more accessible, selecting particular modalities on the basis of a group's culture, or using cultural elements to modify traditional treatment elements [22]. Targeted approaches that incorporate social and cultural adaptations are needed as these may result in greater adherence, enjoyment, and superior gains across targeted behaviors.

Previous publications provide an in-depth description of the hypothesized underlying biobehavioral processes through which emotional well-being may protect against incidence and progression of subclinical and clinical heart disease [6, 16], that is directly via stimulation of restorative biological processes and increased engagement in healthy behavior and indirectly through increased psychosocial and coping resources [23]. At the physiologic level, biologic dysregulation is less prevalent among individuals reporting high emotional well-being as measured

via cortisol output, heart rate variability [24], blood pressure [25], and markers of inflammation [6, 26]. These relationships hold true even when controlling for negative affect and psychological distress, which highlights the independent and distinct contributions that psychological assets make toward positive physical health. Favorable emotional well-being is also associated with restorative health behaviors including regular physical activity, smoking abstinence, a more prudent diet, increased medication regimen adherence, and fewer risky behaviors [27, 28]. Lastly, emotional well-being has indirect impacts on physical health through fostering of more adaptive coping strategies (e.g., positive reappraisal), increased social connectedness, and reduced cognitive catastrophizing, among others [29].

Despite mounting observational evidence, however, less extensive efforts have been made to enhance individual-level emotional well-being as a strategy to improve CVD risk factors profiles. Such studies are becoming increasingly feasible given the mounting evidence that emotional well-being can be increased through changes in volitional behaviors [30] and a robust literature showing varied strategies that can reliably boost well-being [31, 32]. Positive psychological interventions directly focus on promoting attributes including gratitude, optimism, emotional vitality, and positive affect, among others, through deployment of activities such as recalling positive events in life, recognizing and using personal strengths, regular practice of mindfulness and meditation, and conceiving and performing acts of kindness [19, 32]. Tested in over 4,000 subjects across 51 randomized studies, positive psychological interventions increase positive affect and emotional well-being and have led to significant reductions in depressive symptoms across heterogeneous samples of mostly healthy adults [33]. Positive psychological elements exist in the Spanish Internet-cognitive behavioral therapy intervention "Smiling is fun" [34]. Positive psychological interventions, however, have not been tested specifically in U.S.-based Hispanics/Latinos; much less, with the added enhancement of cultural tailoring. These may be critical as person-activity fit moderates the relationship between performing a positive psychological intervention and benefitting from it [21] and cultural elements might help shape this fit. This novel psychological strategy to promote emotional well-being and cardiovascular health is not likely to be pursued in at-risk minority populations in the absence of such evidence.

Instead of adapting existing treatment programs with cultural examples, we encourage co-development of novel intervention programs with members of the target community to ensure that cultural values and strengths are followed. Indeed, we conducted formative qualitative work to engage in this co-development and modified empirically

validated positive psychology curriculum to be language and culturally tailored to Hispanics/Latinos [35]. Cultural variation and divergent value systems evident in the Hispanic/Latino population have the potential to distinctly influence conceptions of well-being and happiness and thus suggest the need to tailor intervention approaches. Well-documented cultural values found within Hispanic/Latino traditions, that need be considered, include features such as familismo (centrality of familial units and kin relationships) [36, 37], marianismo (female self-sacrifice and purity), personalismo (value of friendly interpersonal relationships), and simpatía (amiable and polite approach toward others, despite states of hardship or disagreement) [38]. Spirituality is another integral cultural component within the Hispanic/Latino community with 55% reporting religious ties to Catholicism [39]. Our newly designed positive psychological intervention infuses the currently available sterile curricula with cultural traditions that embrace familial bonds and spirituality.

The current study aims to determine feasibility and acceptability of a Spanish-language culturally tailored positive psychological intervention in Hispanic/Latino adults at risk for CVD. Specifically, assessment of feasibility and acceptability will consider rates of refusal, participation and attrition, and subjective ratings of the intervention content and modality of delivery. We also describe the development of the Spanish-language curriculum and the infusion of culturally informed practices and skill-building exercises, for example, fostering of “familismo” by encouraging family members to participate in the last intervention session. An exploratory aim for this feasibility study is to explore effects on both psychological and physical outcomes, investigating aspects of the casual pathway through which we believe positive psychological interventions could improve health specific to CVD including emotional well-being, engagement in physical activity, and blood pressure profiles.

METHODS

Population, study setting, and recruitment

A single-armed pre-post pilot trial was conducted to test the feasibility of an 8-week positive psychological intervention in Hispanic/Latino adults self-reporting presence of two or more major cardiovascular risk factors, that is, obesity/overweight, diabetes, hypercholesterolemia, hypertension, or active smoking status. Hispanic/Latino adults were recruited from a single church institution. Adults were eligible to participate if they met the following inclusion criteria: (a) Hispanic/Latino heritage, (b) aged ≥ 18 years, (c) self-identified as having two or more major cardiovascular risk factors, (d) ability to read and understand Spanish, (e) intent to reside in

the Cicero or Chicago land area for at least 1 year, and (f) ability to identify a family member to attend at least one intervention session. Participants were excluded if they had cognitive impairment denoting dementia (assessed using the Short Portable Status Questionnaire) [40], presented with severely reduced life expectancy (i.e., self-reported diagnosis of metastatic cancer, congestive heart failure, or end-stage kidney disease), were currently enrolled in psychotherapy or reported taking prescribed antidepressants, identified history or current diagnosis of bipolar disorder, dissociative disorder, psychosis, or substance abuse, or if severe depression was evident. A total of 19 participants were enrolled in the study. The pilot trial was approved by the Institutional Review Boards (IRB) at Northwestern University and the University of Illinois at Urbana-Champaign.

Recruitment occurred at a single church institution located in Cicero, IL which is a suburb of Chicago with resident composition consisting of 86.6% of Hispanic/Latino background. During in-person broadcasting of church-related announcements and prior to closing of mass, research staff provided study details to parishioners and invited interested parties to approach program staff at the conclusion of the religious service. Interested parishioners were then contacted by a bilingual research assistant for a phone screening to determine full eligibility. A baseline testing session was scheduled following eligibility screening. Trained bilingual staff proceeded to administer questionnaires and measures after acquisition of written informed consent.

Intervention development and cultural tailoring

The positive psychological intervention was adapted from previously published and empirically validated curricula [41], with additional content informed by formative qualitative work [35] identifying the cultural importance of incorporating religiosity and familialism. The newly developed Spanish-language curriculum was infused with religious content and often involved prayer led by the parish priest before the start of each session and when engaging in mindfulness meditation. For example, the *Serenity Prayer* was read aloud prior to introducing the topic of mindfulness as its message aligns well with said educational module, for example, “God grant me the serenity to accept the things I cannot change; courage to change the things I can; and wisdom to know the difference. Living one day at a time; enjoying one moment at a time...” For one at-home exercise, participants were asked to practice the skill of noticing and remembering positive events through the “Three Daily Blessings from God” activity. During group discussions, participants were also invited to identify how the communicated skillsets could inform interactions with the central family unit in the home setting. At the last study session, participants invited family members to a festive dinner

(potluck-style) and utilized this time to identify the strengths of the family unit, with discussion of strategies to incorporate and continue practicing skillsets acquired as part of the 8-week intervention into their day-to-day activities.

The resulting 8-week curriculum was written in English and was reviewed for content and alignment with evidenced-based practice by two clinical psychologists (S.M.S. and F.P.) and two researchers trained in public health and cardiovascular epidemiology (R.H. and M.C.). This multidisciplinary team has considerable experience in positive psychology and working with Hispanic/Latino populations. Once the curriculum was finalized, a qualified native-Spanish speaker (trained as a physician in Ecuador, >10 years providing translation services) translated the curriculum into the Spanish language. Multiple iterative verifications were performed by bilingual/bicultural research staff (R.H. and L.M.) to ensure accurate cultural and linguistic appropriateness of the Spanish-language translation.

Culturally tailored positive psychological intervention

The 8-week intervention was a multicomponent [31] program drawing from several evidence-based practices to increase well-being. Each week consisted of one 90-min session delivered by a bilingual licensed clinical social worker in a group setting and a homework assignment intended to incorporate skills learned during the session into their day-to-day activities. Groups were stratified by gender to reduce inhibition during study sessions as women may feel uneasy in sharing personal details on emotions, stressors, and medical health information in the presence of men, and vice versa. Table 1 summarizes the skills imparted at each week. Briefly, during the first week, participants identified their unique personal strengths by specifying the skills and talents they possessed; this included specification of five attributes such as bravery, humor,

or curiosity from an available pool of twenty-four. Weeks 2–3 were used to define and boost positive emotion using exercises that required participants to recall three good things that happened in their day-to-day activities and craft letters of gratitude to a friend or family member. Weeks 5–7 were devoted to development of intrapersonal coping strategies including mindfulness meditation and positive reappraisal of stressful events. For the last session (Week 8), participants invited at least one family member and proceeded to identify the signature strengths, as in Week 1, of individual family members and strengths of the family unit as a whole.

Measures and assessment procedure

All self-report information and measures were collected at baseline and at the conclusion of the 8-week intervention and were completed in the Spanish language. Following the consent process, baseline assessment was conducted at the church site prior to initiation of intervention activities. Survey instruments measuring emotional well-being and subjective health status were delivered in person using a paper-and-pencil format. A research assistant was available to assist participants who experienced difficulty in completing survey instruments on their own. At baseline, the research assistant also obtained blood pressure values and distributed accelerometers to assess physical activity. Similar procedures were employed when collecting data at postintervention.

Background measures

A brief questionnaire was used to elicit demographic information, participants' health-related quality of life, and information regarding medical comorbidities (i.e., hypertension, hypercholesterolemia, and diabetes). Body mass index (BMI) was calculated from self-report measures of height (to the nearest centimeter) and weight (to the nearest 0.1 kg).

Table 1 | Positive psychology skills imparted in the 8-week Internet-based intervention

Week 1	Focusing on personal strengths (Skill 1)	Identifying and focusing on one's strengths as a form of self-affirmation to evaluate the resources possessed to cope with a stressful event.
Week 2	Positive events (Skill 2)	Training of individuals to note positive life events in their day-to-day encounters.
Week 3	Capitalizing of positive events (Skill 3)	Capitalizing is an expressive response to positive events and includes telling others about it, marking the occurrence in some way, or even thinking about the event again later on.
Week 4	Gratitude (Skill 4)	Gratitude is defined as a feeling of thankfulness and appreciation expressed toward others, which may include other people, nature, or God.
Week 5	Altruistic behaviors/acts of kindness (Skill 5)	Engagement in volunteerism and other altruistic behaviors.
Week 6	Mindfulness (Skill 6)	Mindfulness is defined as the ability to intentionally pay attention to and maintain non-judgmental awareness of one's thoughts, feelings, and physical sensations in the present moment
Week 7	Positive reappraisal (Skill 7)	Positive reappraisal is a form of coping in which the significance of the event is reinterpreted in a more positive way.
Week 8	Attainable goals (Skill 8)	Setting of realistic goals and imparting techniques to increase their progression and attainment.

The sociodemographic metrics that were assessed included baseline age (in years), sex, educational attainment, income, employment status, health insurance coverage, marital status, and Hispanic/Latino background.

Measures of psychological well-being

Participants completed multiple hedonic and eudaimonic measures of psychological well-being at baseline and postintervention (8 weeks): (i) engagement in happiness-inducing behavior (HIB) [42] defined as prescribed strategies or behaviors known to induce happiness, for example, relaying gratitude and focusing on positive events; (ii) depressive symptoms (Center for Epidemiologic Studies-Depression scale [CES-D]) [43]; (iii) dispositional optimism (Life Orientation Test-Revised [LOT-R]) [44]; (iv) emotional vitality (select items from the General Well-being Schedule) [45, 46]; and (v) happiness (Subjective Happiness scale) [47]. In addition, overall psychological functioning was assessed with the Mental Health Composite Scale of the 12-item Short Form Health Survey (SF-12) [48]. The majority of scales capturing psychological well-being have undergone previous psychometric testing and show adequate validity and reliability in the English and Spanish language [49–51]. The HIB required translation into Spanish and our team conducted a forward and back-translation to ensure linguistic equivalency.

Physical health outcomes

Sitting blood pressure was captured using an automatic sphygmomanometer (the OMRON HEM-907 XL). This measurement device has been validated across multiple cohort studies including the National Health and Nutrition Examination Survey (NHANES), Coronary Artery Risk Development in (Young) Adults (CARDIA), and the Hispanic Community Health Study/Study of Latinos (HCHS/SOL) [10, 52]. Briefly, after a 5-min rest period, three systolic and diastolic blood pressure readings were taken with participants in the seated position; the last two readings were averaged to generate the final blood pressure measure. Subjective appraisal of physical health was assessed using the Physical Health Composite Scale of the SF-12 [48]. Self-report sleep data were collected using the Pittsburgh Sleep Quality Index (PSQI) [53]. The PSQI is a 19-item self-administered questionnaire used to derive a global sleep quality score ranging from 0 to 21, with higher scores indicative of poorer quality sleep (Cronbach's $\alpha = .80$ to $.87$).

Physical activity via accelerometer

Objective counts were used to capture physical activity using an accelerometer (Actigraphy Model GT3X) as worn on seven consecutive days before and after the 8-week intervention. The device, worn

at the hip, is a small and lightweight triaxial accelerometer. Used during waking hours, it captures the frequency, intensity, and duration of physical activity. Raw data were downloaded and processed for analysis using standardized statistical software. Physical activity was logged in epoch lengths of 1 min. Data points were included in the analysis if the accelerometer displayed at least 10 hr of data in a 24-hr period on at least 3 days.

Statistical analyses

Data analysis was conducted using SPSS 23 (IBM SPSS Statistics 23 for Windows, 2015). Descriptive statistics summarizing baseline characteristics for the total sample are reported for sociodemographic factors, chronic illness status (diabetes, hypertension, and hypercholesterolemia) and quality of life; these are presented as frequencies, percentages, and means as appropriate. Due to the pilot nature of this study, intervention effects are examined through exploratory analyses of impact on outcomes. At the individual level, we calculated reliable change indices (RCI) for each participant following the recommendations of Jacobson and Truax [54]. The RCI addresses if changes participants experience are statistically reliable by comparing pre-post change with the reliability of the measurement instrument. RCI scores were calculated using the following equation: $RCI = \frac{x_2 - x_1}{SE_{diff}}$ where x_1 represents a participant's baseline score and x_2 represents a participant's postintervention score, and SE_{diff} represents the standard error of difference between the two scores. RCI scores that are greater than 1.96 are considered to be reliable ($p < .05$). We present the percentage of participants who experienced reliable change on each outcome measure. At the sample level, we conducted paired-samples *t*-tests to determine the magnitude of pre-post changes in participants' psychological well-being, physical health outcomes, and physical activity as a function of the intervention. These tests were used to produce effect sizes (Cohen's *d*).

RESULTS

Baseline characteristics of the sample

Table 2 provides participant characteristics ($n = 19$). The mean age was 54.06 years ($SD = 9.67$) at baseline and a majority of the sample was female (68.8%). Approximately 6.3% of participants were born in the USA, 12.5% of participants did not disclose their ancestry, and the majority of the remaining foreign-born participants (75%) reported Mexican ancestry. This church-based sample was of low socioeconomic status based on education and income. Overall, 50% had less than an eighth-grade education and 31.3% reported annual incomes below \$20,000. At baseline, the average weight for females

Table 2 | Baseline sample demographics

Characteristic	Total (n = 16)
Age	54.06 (9.67)
Sex (%)	
Female	68.80
Education (%)	
≤Eighth grade	50.00
Some HS	6.30
HS/GED or more	43.70
Income (%)	
<\$20,000	31.30
\$20,000 to <\$39,000	18.80
\$40,000 to <\$75,999	18.80
\$76,000 or more	6.30
Missing income	25.00
Currently employed (%)	56.30
Has healthcare coverage (%)	68.80
Married (%)	68.80
Mexican/Mexican American (%)	81.3
Time in the USA	
U.S. born (%)	6.3
Years in USA for non-natives, <i>M</i> (<i>SD</i>)	26.50 (10.96)
Weight (lbs)	
Male	183.80 (21.96)
Female	170.64 (29.87)
Diabetic status (%)	43.80
High blood pressure or hypertension (%)	62.50
High cholesterol (%)	75.00
Number of days in past month that mental health kept participant from doing usual activities	3.44 (7.20)
Number of days in past month that physical health kept participant from doing usual activities	7.13 (11.87)

Data are presented as mean (*SD*) unless otherwise indicated

was 170.64 lbs (*SD* = 29.87) whereas the average weight for males was 183.80 lbs (*SD* = 21.96). A total of 43.8% of the initial sample reported being diagnosed with diabetes at baseline, 62.50% reported having high blood pressure or hypertension, and 75% of the initial sample reported having hypercholesterolemia. Participants reported that their physical health prevented them from doing their usual day-to-day activities 7.13 days in the past month (*SD* = 11.87) and that their mental health prevented them from doing their usual activities 3.44 days in the past month (*SD* = 7.20).

Feasibility of implementation and process evaluation

Figure 1 presents descriptive data summarizing overall enrollment and rate of dropout. Eleven of 19 Hispanic/Latino adults completed the 8-week program for a 57.89% retention rate, with a majority of factors leading to dropout unrelated to program content or mode of delivery (i.e., childcare duties, physical ailments, travel outside the country, and fluctuating work schedule). No systematic differences were evident when comparing adults who completed the 8-week intervention versus non-completers by age or years in the USA ($p > .55$).

However, completers were more likely to be female than male, $\chi^2 = 5.03$, $p = .03$. Participants who completed the program attended 83.75% of the study sessions (i.e., 6.7 out of 8 sessions). Participants identified multiple competing demands for missed class sessions including healthcare appointments, travel outside the country (i.e., vacation to the home country), and familial responsibility.

After each session, participants were asked to evaluate their experience, by indicating whether they felt satisfied, dissatisfied, or neutral about (a) the session as a whole, (b) clarity of instructions provided for skill sets being fostered, (c) enjoyment of the activity/skill taught during each session, and (d) whether they felt confident in successfully implementing skillsets in the home setting and during day-to-day activities. Table 3 summarizes participant ratings for the 8-week intervention. The large majority of participants agreed that they felt satisfied overall with each session (97.1%) and felt satisfied in how individual skills were presented and explained by the licensed social worker delivering the intervention (98.5%). In addition, a large majority of participants felt satisfied with the group-based activities conducted at each session (98.5%) and felt

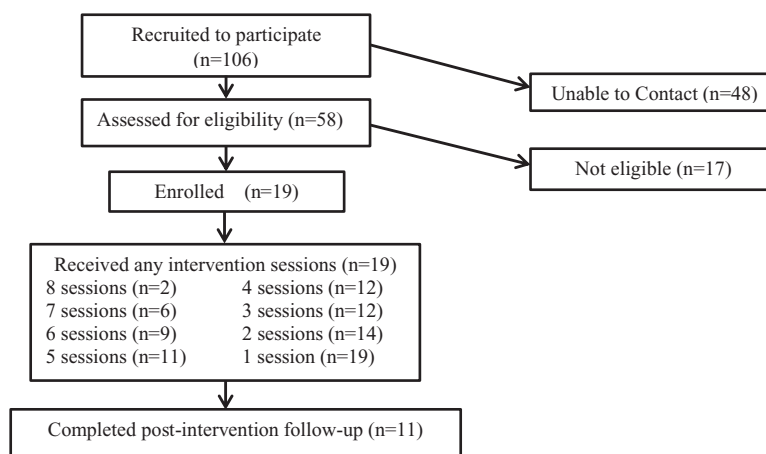


Fig 1 | CONSORT diagram.

Table 3 | Process evaluation documenting participant ratings of the curricular content and delivery

	n (%) Identifying as satisfied							
	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8
1. Did you like today's session?	10 (83.3)	11 (100)	11 (91.7)	6 (85.7)	8 (88.9)	8 (88.9)	6 (100)	7 (100)
2. Were the strategies and skills taught in today's session clearly presented and understandable?	11 (91.7)	11 (100)	10 (83.3)	6 (85.7)	8 (88.9)	6 (66.7)	6 (100)	7 (100)
3. Did you like the practical in-class activity?	11 (91.7)	11 (100)	10 (83.3)	6 (85.7)	8 (88.9)	8 (88.9)	6 (100)	7 (100)
4. Do you feel confident that you will be able to put into practice the skills you learned in today's session?	10 (83.3)	11 (100)	11 (91.7)	6 (85.7)	8 (88.9)	7 (77.8)	6 (100)	7 (100)

satisfied with their confidence in putting each skill to practice (98.6%) at home or during day-to-day activities. Taken together, these responses indicate high acceptability of the intervention.

Changes in intervention outcomes

Psychological well-being

Most participants showed reliable increases in HIBs and emotional validity. Table 4 summarizes the percentage of participants who showed reliable improvement, unreliable change, and reliable deterioration across outcomes, using the RCI. Participants' self-reported usage of HIB showed the most robust results with 72.7% of participants showing reliable improvement at the postintervention assessment. In addition, 54.5% of the sample showed reliable improvement in emotional vitality at the postintervention assessment. Finally, 27.3% of participants showed reliable improvement in subjective happiness. We did not find reliable improvement for optimism, depressive symptoms, or sleep quality.

A similar pattern was found exploring group-level changes from baseline to postintervention (Table 5). The largest effect size was found for differences in self-reported usage of strategies or behaviors known to boost happiness, that is, HIB scale, $d = 0.84$;

however, this difference was not statistically significant, $p = .06$. Slightly smaller, but statistically significant increases ($ps < .01$) were found in emotional vitality ($d = 0.73$) and subjective happiness ($d = 0.62$). Changes in HIB seemed to be driven most strongly by participants reporting increased use of savoring and goal-setting skills after receiving the intervention ($M_{savor} = 5.76$, $SD_{savor} = 1.33$ and $M_{goal} = 4.67$, $SD_{goal} = 1.53$) relative to baseline ($M_{savor} = 4.39$, $SD_{savor} = 1.52$ and $M_{goal} = 3.42$, $SD_{goal} = 1.41$), $ps < .05$, with large effect sizes, $d_{savor} = 0.95$ and $d_{goal} = 0.84$. Changes in the other 9 domains of the 11-domain scale were not statistically significant, $ps > .10$. Participants did not show statistically significant changes in their optimism, depressive symptomatology, or self-reported mental health.

Physical health and physical activity via pedometer data

As seen in Table 4, only one participant showed a reliable change on any of the physical health outcomes and that was for sleep with evident deterioration. Table 5 reveals a similar pattern with no statistically significant changes, $ps \geq .17$. Similar to the physical health outcomes, participants did not experience reliable changes in physical activity and changes in physical activity as a result of the intervention were small, and opposite of the expected

Table 4 Summary of participants showing reliable improvement, uncertain change, and reliable deterioration on the reliable change index

	Reliable improvement	Uncertain change	Reliable deterioration
	<i>n</i> (%)	<i>n</i> (%)	<i>n</i> (%)
Psychological well-being			
Happiness-inducing behavior (HIB)	8 (72.7)	1 (9.1)	2 (18.2)
Emotional vitality	6 (54.5)	5 (45.5)	0 (0)
Subjective happiness (SHS)	3 (27.3)	8 (72.7)	0 (0)
Optimism (LOT-R)	0 (0)	11 (100)	0 (0)
Depressive symptoms (CES-D)	1 (9.1)	6 (54.5)	4 (36.4)
Mental health (SF-12)	–	–	–
Physical health			
Physical health (SF-12)	–	–	–
Sleep quality	0 (0)	10 (90.9)	1 (9.1)
Ambulatory blood pressure (systolic)	–	–	–
Ambulatory blood pressure (diastolic)	–	–	–
Physical activity			
Pedometer data (steps/min)	–	–	–

Reliable improvement: RCI > 1.96 for positive skill use, vitality, and optimism; RCI < -1.96 for depressive symptoms and sleep quality. Unreliable change -1.96 ≥ RCI ≤ 1.96 for all outcomes. Reliable deterioration: RCI < 1.96 for positive skill use, vitality, and optimism; RCI > -1.96 for depressive symptoms and sleep quality. RCI scores were only calculated for participants with postintervention data.

Table 5 Change from baseline to postintervention on psychological well-being and physical health outcomes

	Baseline			Postintervention			Pre–post change		
	<i>α</i>	<i>M</i>	<i>SD</i>	<i>α</i>	<i>M</i>	<i>SD</i>	<i>t</i>	<i>p</i>	<i>d</i>
Psychological well-being									
Happiness-inducing behavior (HIB)	.88	4.07	0.76	.89	4.61	0.86	2.13	.06	0.84
Emotional vitality	.85	18.81	3.94	.87	22.09	4.72	3.74	.004	0.73
Subjective happiness (SHS) ^a	.86	5.42	0.97	.74	6.00	0.89	3.10	.01	0.62
Optimism (LOT-R) ^b	.73	10.73	3.77	.74	11.00	4.27	0.37	.72	0.07
Depressive symptoms (CES-D) ^c	.83	5.27	4.58	.68	3.54	3.50	-1.64	.13	-0.41
Mental health (SF-12)	–	43.08	4.96	–	43.75	4.89	0.39	.71	0.14
Physical health									
Physical health (SF-12)	–	45.40	11.90	–	47.99	11.37	1.15	.28	0.22
Sleep quality	.71	6.27	4.34	.78	6.64	3.64	0.45	.66	0.09
Ambulatory blood pressure (systolic)	–	116.60	10.92	–	121.80	13.43	1.48	.17	0.47
Ambulatory blood pressure (diastolic)	–	68.00	12.54	–	72.70	11.72	1.46	.18	0.34
Physical activity									
Pedometer data (steps/min)	–	6.45	0.96	–	6.37	1.47	-0.13	.90	-0.06

^aTo achieve adequate reliability, we had to drop the following item from the subjective happiness scale, “Some people are generally not very happy. Although they are not depressed, they never seem as happy as they might be.” The reliability improved from 0.51 to 0.74 in the preintervention assessment and from 0.76 to 0.86 in the postintervention assessment when dropping the item.

^bTo achieve adequate reliability, we had to drop the following items from the optimism measure, “Overall, I expect more good things to happen to me than bad” and “I’m always optimistic about my future”. The reliabilities improved from 0.05 to 0.73 in the preintervention assessment and from 0.64 to 0.74 in the postintervention assessment when dropping these items.

^cTo achieve adequate reliability, we had to exclude the following items from the postintervention measure of depression, “I felt hopeful about the future.” The reliabilities improved from 0.81 to 0.83 in the preintervention assessment and from 0.54 to 0.68 in the postintervention assessment when excluding these items.

direction, but not statistically significant (*p* = .90; see Table 5).

DISCUSSION

To achieve AHA’s strategic impact goals of reduced CVD and mortality by 20% by 2020 [55], intentional strategies targeting vulnerable populations are needed to promote and maintain favorable cardiovascular health across the lifespan. These intentional strategies will likely draw from a range of strategies

including psychosocial interventions. This study is the first evaluation of a Spanish-language psychosocial intervention intended to improve cardiovascular health in U.S. Hispanics/Latinos by increasing emotional well-being. In addition, cultural tailoring for Hispanic/Latino populations is highly needed given sparse availability of resources for this population. Our adapted curriculum included heightened focus on familial and interpersonal relationships with infusion of religious and/or spiritual elements.

This single-arm trial demonstrates that this intervention was feasible, acceptable, and could produce increases in emotional well-being and the behaviors the intervention targeted. Strategies to increase engagement are warranted; however, participants who engaged at the outset and made it past the first session had an 83.75% attendance rate.

This intervention seemed to lead to the largest benefits in the behaviors it targeted directly (namely the HIB of savoring and goal-setting) and emotional well-being outcomes of emotional vitality and happiness. It is worth noting that goal-setting was not taught through a specific lesson, but rather was a meta-skill present across lessons especially in structure of having a weekly topic and homework assignment. Similarly, a specific week was not dedicated to savoring but savoring permeates topics such as capitalization, active-constructive responding, and mindfulness. We did not find significant impacts on physical health outcomes with reliable change scores nor when using paired sample *t*-test procedures. It is possible that response on physical health, being more downstream, is more complex than changing happiness behaviors or emotional well-being. Larger studies are needed, particularly those that explore the types of people for whom benefits in emotional well-being may translate to better physical health or the types of environments or settings that might influence this relationship.

Our purposeful design of a culturally appropriate psychological intervention recognizes inherent variation in the conception of well-being in adults of Hispanic/Latino heritage and the need for customization of content and mode of delivery. Issues of diversity in the field of positive psychology [15] prompted curricular adaptation as evidence to-date is largely derived from populations characterized as Western, highly educated, industrialized, and economically advantaged. If a prescriptive approach is to be taken to boost psychological well-being, it appears erroneous to assume a shared universal positive psychological model or overarching theory where identical antecedents, correlates, and influences of well-being are ascribed across all racial/ethnicity groups.

Our small pilot had a moderate retention rate approaching 60%. Study-specific factors were not typically identified as deterrents to participation; instead, multiple environmental and intrapersonal obstacles were mentioned including lack of childcare, travel outside the country, and health-related challenges (e.g., hospitalization). Informed by previous trials in Hispanic/Latino adults, future improvements for retention include increased logistical convenience (e.g., provision of childcare, flexible scheduling options, alternative transportation and associated compensation) and more frequent contact such as through delivery of weekly text messages reinforcing intervention content and

reminding participants of upcoming in-person sessions [56]. Technology could also be garnered to connect people through synchronous or asynchronous methods [57], for instance through deployment of interventions using live video sessions directed by a trained group facilitator or therapist. The bilingual principal investigator noted additional needed improvements in Spanish-language proficiency of practitioners delivering the intervention and need for reduction of in-class and at-home assignments requiring written reports.

Given the pilot nature of the study, we had a small sample size which limited the power to detect impact of the intervention on behavioral and physiologic outcomes. Results are largely applicable to Hispanics/Latinos of Mexican heritage and those who attend church services, thus limiting generalizability. This was not a randomized experiment and therefore lacked a control group so we cannot differentiate potential effects of the intervention from nonspecific effects such as participation in a group. Future trials should include an attention-control group as a comparator when testing for overall efficacy. We also cannot tell if our cultural tailoring per second was more beneficial than a nontailored intervention but those comparisons are rarely done in intervention research. Instead, a more fruitful effort might be more systematic methods for quantifying and comparing adaptations in different settings.

The observed findings subscribe to the notion that improvements in emotional well-being are possible and demonstrate the effectiveness of this intervention in minority populations that are underserved and often under-resourced. When exploring psychosocial antecedents of physical health, future studies should employ larger-scale studies of longer duration to examine downstream effects of emotional well-being interventions on physical health, and to better understand the types of people (e.g., those with chronic kidney disease, relatively healthy adults, those who have experienced a cardiac event, among others) who garner largest physiological benefits from these emotion-boosting interventions. Nevertheless, albeit preliminary, this study is a first step into exploring more deeply the relationship between emotional well-being interventions and physical health in minority populations. Additional questions abound, however, such as if additional tailoring is needed by country of origin (e.g., Mexican vs. Puerto Rican vs. Cuban), nativity status, and level of acculturation or whether well-being subtypes exist that might differentially influence cardiovascular health. For example, if existential indicators of well-being (e.g., meaning and purpose in life) are found to have a stronger influence on physical health when compared with emotional indicators (e.g., happiness), then this would suggest that psychosocial interventions should focus on building meaning and purpose, rather than positive

emotions. Psychosocial interventions such as this one, however, will likely play a critical role in the future of health and healthcare and in reaching communities underserved by traditional practices.

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Compliance with Ethical Standards

Conflict of Interest: Authors Hernandez, Cheung, Carnethon, Penedo, Moskowitz, Martinez, and Schueller declare that they have no conflict of interest.

Ethical Approval: All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards. This article does not contain any studies with animals performed by any of the authors.

Informed Consent: Informed consent was obtained from all individual participants included in the study.

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