A validity and reliability study of the coping self-efficacy scale

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Abstract

Objectives—Investigate the psychometric characteristics of the coping self-efficacy (CSE) scale, a 26-item measure of one's confidence in performing coping behaviors when faced with life challenges.

Design—Data came from two randomized clinical trials (*N*1 = 149, *N*2 = 199) evaluating a theory-based Coping Effectiveness Training (CET) intervention in reducing psychological distress and increasing positive mood in persons coping with chronic illness.

Methods—The 348 participants were HIV-seropositive men with depressed mood who have sex with men. Participants were randomly assigned to intervention and comparison conditions and assessed pre- and post-intervention. Outcome variables included the CSE scale, ways of coping, and measures of social support and psychological distress and well-being.

Results—Exploratory (EFA) and confirmatory factor analyses (CFA) revealed a 13-item reduced form of the CSE scale with three factors: Use problem-focused coping (6 items, α = .91), stop unpleasant emotions and thoughts (4 items, α = .91), and get support from friends and family (3 items, α = .80). Internal consistency and test–retest reliability are strong for all three factors. Concurrent validity analyses showed these factors assess self-efficacy for different types of coping. Predictive validity analyses showed that residualized change scores in using problem- and emotion-focused coping skills were predictive of reduced psychological distress and increased psychological well-being over time.

Conclusions—The CSE scale provides a measure of a person's perceived ability to cope effectively with life challenges, as well as a way to assess changes in CSE over time in intervention research.

Stress and coping theory has provided a foundation for a wide range of descriptive studies of the stress process. There is less evidence for its utility as a foundation for coping interventions. One of the impediments of the translation of stress and coping theory into intervention has to do with well-documented problems with the measurement of intervention-associated changes in coping (Folkman & Moskowitz, 2004). The present study describes a measure of coping self-efficacy (CSE), which provides an alternate approach to the measurement of coping for intervention studies. This measure focuses on changes in a person's confidence in his or her ability to cope effectively, which, according to self-efficacy theory (Bandura, 1997), is an important prerequisite to changing coping behaviour. Stress and coping theory defines stress

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as a person-environment relationship that is evaluated as personally significant and as exceeding a person's resources for coping. This process is referred to as 'primary appraisal'. Coping is defined as behavioural or cognitive efforts to manage situations that are appraised as stressful (Lazarus & Folkman, 1984). Coping involves both *emotion-focused coping* (i.e. responses that focus on managing emotional responses to stressful events), and *problem-focused coping* (i.e. responses that focus on changing problematic aspects of stressful events). The choice of coping strategy is influenced by the appraisal of options for coping, referred to in stress and coping theory as 'secondary appraisal' (Lazarus & Folkman, 1984). Secondary appraisal refers to the question, 'What can I do?' A key aspect of secondary appraisal is the judgment concerning the extent to which the individual can control the outcome of the situation. Self-efficacy contributes to this judgment, which in turn influences coping (see Park & Folkman, 1997 for review). *Maladaptive coping* (e.g. coping that fails to regulate distress or manage the underlying problem) occurs when people respond to uncontrollable stressors primarily with problem-focused coping strategies, or when people respond to controllable stressors primarily with emotion-focused coping strategies (Strentz & Auerbach, 1988; Vitaliano, DeWolfe, Maiuro, Russo, & Katon, 1990). *Adaptive coping* refers to situations in which there is a fit between the controllability of the stressful situation and the choice of coping strategy (i.e. emotion-focused versus problem-focused). When people obtain a 'fit' between stressful events and their coping strategies, they experience fewer psychological symptoms than when there is a lack of fit (Park, Folkman, & Bostrom, 2001).

Cognitive behavioural interventions such as coping effectiveness training (CET; Chesney, Chambers, Taylor, & Johnson, 2003; Chesney, Chambers, Taylor, Johnson, & Folkman, 2003; Chesney, Folkman, & Chambers, 1996; Folkman & Chesney, 1995), which are based on social cognitive theory (Bandura, 1997) as well as stress and coping theory (Lazarus & Folkman, 1984), strive to increase adaptive coping, and, by doing so, reduce psychological distress and improve well-being. Perceived self-efficacy, defined as a belief about one's ability to perform a specific behaviour, is a pivotal component of social cognitive theory in that beliefs of personal efficacy determine the acquisition of knowledge on which skills are founded (Bandura, 1997). Thus, beliefs about one's ability to perform specific coping behaviours, or CSE, would be expected to influence outcomes of interventions designed to improve coping. This concept is also relevant to stress and coping theory and the secondary appraisal of controllability. Part of secondary appraisal is the judgment that an outcome is controllable through coping; another part addresses the question of whether or not the individual believes he or she can carry out the requisite coping strategy. Beliefs about self-efficacy are not a general disposition; a high level of efficacy in one domain does not necessarily correlate with high levels of self-efficacy in other domains (DiClemente, 1986; Hofstetter, Sallis, & Hovell, 1990).

To achieve predictive and explanatory power, measures of self-efficacy must be designed and tailored to the sphere of activity (Forsyth & Carey, 1998). For example, self-efficacy regarding diabetic self-care behaviours has been identified as a pivotal psychosocial variable in diabetes research (Glasgow & Osteen, 1992; Jenkins, 1995), with scores on self-efficacy significantly associated with self-care by diabetics in the areas of diet, exercise and blood glucose testing (Williams & Bond, 2002). Efficacy beliefs also predict adherence to habits that lower cardiovascular risk and prevent myocardial infarctions in persons with coronary heart disease (Ewart, 1992; Jensen, Banwart, Venhaus, Popkess-Vawter, & Perkins, 1993). These lines of clinical investigation each developed specialized efficacy scales.

The current study is designed to assess the reliability and validity of the CSE scale, a 26-item measure of perceived self-efficacy for coping with challenges or threats. The original instrument was developed by the authors, in collaboration with Dr Albert Bandura of Stanford University, for use in two randomized clinical trials investigating the efficacy of a theory-based

CET intervention in reducing psychological distress and increasing positive mood in persons coping with chronic illness. In this paper, we subjected the CSE scale items to focused analyses with the specific goal of deriving a psychometrically sound and reduced form of the scale for use in future research. Analyses included assessing construct validity through exploratory and confirmatory factor analyses (EFA and CFA, respectively), assessing reliability through internal consistency coefficient alphas and test–retest correlations, and assessing concurrent and predictive validity through partial correlations and multiple regression analyses, respectively.

Methods

Participants

The analyses for this study are based on the data collected from 348 HIV-seropositive men with depressed mood who have sex with men (MSM) living in the San Francisco Bay area and who were enrolled in one of two randomized clinical trials investigating the efficacy of CET. Data were collected from 1992 through 1994 for the Positive Education Project (Study 1, $N = 149$) and from 1997 through 2000 for the CHANGES Project (Study 2, $N = 199$). With two exceptions, socio-demographic characteristics and indicators of health functioning were similar for the participants in the two studies. At baseline, participants' mean age for the combined studies was 40.5 ($SD = 7.9$, range 24–69), 79% of participants were white, 56% were college educated, the median income was approximately $25,000, and the mean CD4 count was 403 ($SD = 195$, range 1–1,353). This 'count' represents the number of white cells that are sometimes called *T-helper cells*, which coordinate the various activities of the immune system; HIV + persons with counts of < 500 are closely monitored, and HIV medication is recommended for those with < 350. Participants in Study 2 were less likely to be employed full-time (33% vs. 66%, $p < .01$) and more likely to have been diagnosed with an AIDS-defining condition (63% vs. 7%, $p < .01$).

Procedures

Details of the participant recruitment, enrolment, randomization, and intervention procedures for each study are described elsewhere (Chesney *et al.*, 2003, 2003; Chesney *et al.*, 1996). The following summaries provide a brief description of the intervention groups used for each study. Participants in both studies were assessed at baseline and at 3, 6, and 12 months.

Study 1 assessed the effects of a theory-based CET intervention on psychological distress and positive mood in HIV-seropositive gay men. The two comparison groups were an active informational control (Info) condition designed to control for the social support of simply participating in a group and a waiting-list control (WLC) condition designed to control for the effects of assessment. During the 3-month intervention phase, (1) CET participants showed significantly greater decreases in perceived stress and burnout than participants in the Info condition, and (2) regression analyses indicated that significant increases in CSE mediated the reductions in psychological distress. In general, however, the significant treatment group differences were not sustained during the maintenance phase.

Study 2 was designed to address the problems of maintaining intervention effects and to test new advances in stress and coping theory related to the enhancement of positive psychological states. The three treatment conditions included two CET groups that received the same training during the 3-month intervention phase – an expanded 12-session version of CET similar to that used with Study 1 participants. To compare the efficacy of two alternative CET maintenance phase programmes to sustain treatment effects over the next 9 months, the 'standard' group (CET-S) followed the same approach as Study 1 with six maintenance sessions (three monthly and then three bimonthly), while the 'enhanced' group (CET-E) met biweekly for 18 sessions

to enhance integration of coping skills into daily life. The comparison group was a minimal contact control (MCC) condition where participants received a total of 7 short phone calls during their 12-month study period to assess level of distress and refer to care if necessary.

Measures

In addition to questions pertaining to socio-demographic characteristics (age, ethnicity, level of education, employment status, personal income in past year) and indicators of health functioning (CD4 count, AIDS diagnosis), the following self-report measures were used in the current psychometric study. All reported coefficient alphas and sample descriptive statistics are based upon the combined baseline data of the two studies.

CSE was assessed with a 26-item measure of perceived self-efficacy for coping with challenges and threats.[1] Participants were asked, 'When things aren't going well for you, or when you're having problems, how confident or certain are you that you can do the following': They were then asked to rate on an 11-point scale the extent to which they believe they could perform behaviours important to adaptive coping, such as 'sort out what can be changed, and what cannot be changed', 'break an upsetting problem down into smaller parts', 'look for something good in a negative situation', and 'get emotional support from friends and family'. Anchor points on the scale were 0 ('cannot do at all'), 5 ('moderately certain can do') and 10 ('certain can do'). An overall CSE score was created by summing the item ratings[2] ($\alpha = .95$; scale mean $= 137.4$, $SD = 45.6$). The individual survey items are shown in Table 1.

Psychological distress and well-being was measured with seven instruments (see Table 3 for sample descriptive statistics). *Perceived stress* was assessed with the 10-item form of the Perceived stress scale (Cohen, Kamarck, & Mermelstein, 1983). The questions in the Perceived stress scale ask about the frequency on a 5-point scale ('never' to 'very often') with which participants have experienced stress-related thoughts and feelings during the past month. An overall score was created by summing the item ratings ($\alpha = .87$). *Burnout* was assessed with a scale developed for these CET studies. Participants in pilot studies of CET often described their distress as being a combination of anger and emotional fatigue or exhaustion. A 16-item 'burnout scale' was formed based, in large part, on items from the anger and fatigue subscales of the Profile of mood states (McNair, Lorr, & Droppleman, 1981). An overall burnout score was created by summing the 5-point item ratings ('not at all' to 'extremely'). The 16 items ask how often during the past month participants have been feeling worn out, resentful, annoyed, fatigued, bitter, exhausted, helpless, cynical, irritated, drained, overwhelmed, enraged, emotionally numb, angry, burnt out, or furious ($\alpha = .94$). *Anxiety* was assessed with the widely used 20-item state form of the State-Trait Anxiety Inventory (STAI; Spielberger, Gorsuch, & Lushene, 1974). This form of the STAI is designed to assess feelings of anxiety at the time the respondent completes the scale. An overall anxiety score was created by summing the 4-point item ratings ('not at all' to 'very much so'; $\alpha = .94$). *Negative and positive morale* were assessed with modified versions of the two subscales of the Affect balance scale (Bradburn & Caplovitz, 1965). Items are rated on a 4-point scale ('none' to 'often') and are summed to create an 8-item negative morale score ($\alpha = .72$) and an 8-item positive morale score ($\alpha = .89$). Examples of negative morale questions included asking how much one feels, 'very lonely or remote from other people' and, 'that you couldn't do something because you just couldn't get going'.

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[1] The scale items were developed by several of the authors (MC, SF, and JT), first by creating sample items based upon stress and coping theory and the Ways of Coping Questionnaire, with consultation from Dr Albert Bandura of Stanford University. The set of items were refined based on pilot testing for face validity both with staff at the Center for AIDS Prevention Studies at the University of California, San Francisco, and with a sample of HIV-infected participants.

[2] Because most of the measures are summated rating scale scores, our standard scoring rule was that individuals must answer at least 80% of the applicable items; otherwise their summary score was set to missing for that scale. For a given scale, we estimated an individual's score for the missing item(s) by adding in their mean for the items that they answered for each item that they skipped, resulting in a 'corrected sum'.

Examples of questions for positive morale included items such as how much one feels 'on top of the world' and 'particularly excited or interested in something'. *Optimism* was assessed with the widely used 12-item Life Orientation Test-Revised (LOT-R; Scheier & Carver, 1985;Scheier, Carver, & Bridges, 1994). Items are rated on a 5-point scale ('strongly disagree' to 'strongly agree') and summed to create an overall optimism score (α = .86). *Positive states of mind* (PSOM) were assessed with the 6-item scale developed by Horowitz *et al.* (Horowitz, Adler, & Kegeles, 1988). Participants were asked how much trouble, if any, they had in achieving each of six types of positive states of mind: focused attention, productivity, responsible caretaking, restful repose, sensuous nonsexual pleasure, and sharing with others. An overall score was created by summing the 4-point item ratings ('unable to have it' to 'have it easily'; α = .80).

A 50-item shortened version of the Ways of Coping instrument (Folkman & Lazarus, 1988), revised for use with gay men (Folkman, Chesney, Cooke, Boccellari, & Collette, 1994) was used to assess coping styles. Participants were first asked to think about the ways they had responded to stressful situations in the past 3 months. They were then given a wide range of thoughts and behaviours and asked to rate their coping responses on a 4-point scale ('not used' to 'used a great deal'). Scores were created by summing the item ratings for each subscale. Five of the original eight subscales were used in the current study (see Table 3 for sample descriptive statistics): *positive reappraisal* (10 items; α = .83; e.g. 'looked for the silver lining – the bright side of things'); *social support* (5 items; α = .80; e.g. 'talked to someone to find out more about the situation'); *distancing* (8 items; α = .70; e.g. 'went on as if nothing happened'); *cognitive escape avoidance* (7 items; α = .77; e.g. 'hoped a miracle would happen'); and *planful problem solving* (7 items; α = .77; e.g. 'just concentrated on what I had to do next').

Social support was measured with three variables (see Table 3 for sample descriptive statistics). *Perceived social support* was assessed with 23 items from the Social relationships scale (O'Brien, Wortman, Kessler, & Joseph, 1993), modified for gay men. An overall score for perceived social support was created by summing the 5-point item ratings over the following five domains: emotional and material support, affirmation, and subjective and objective social integration (α = .93). A single item (*amount of support*) asked 'how many people do you have nearby that you can count on for real help (such as pet-sitting, giving you rides to the hospital or store, helping if you are sick) in times of trouble or difficulty?' Response categories were 'none', '1 person', '2–5 people', '6–9 people', and '10 or more people'. An additional single item asked 'do you have a *primary partner*? By 'primary' we mean a relationship with someone where you feel committed to this person above anyone else'.

Overview of the statistical analyses

To assess the construct validity of the CSE scale, the 26 items from the baseline questionnaire administered to the Study 1 participants were submitted to EFA. The EFA was followed by CFA to derive a factor structure containing the best performing subset of items from the original CSE instrument. This factor structure was fit to the Study 2 baseline data in a subsequent CFA to validate the generalizability of the factor structure in a new sample. Reliability for the derived CSE scale scores was measured via internal consistency coefficient alpha (Cronbach, 1951) at baseline and via test–retest correlations for longitudinal data using data only from control participants.

To assess concurrent validity at baseline, separate Pearson partial correlations were calculated for each of the derived CSE scale scores and other instruments that have known properties (Anastasi, 1988), while controlling for the effects of the other CSE scale scores. Finally, to assess predictive validity, baseline to Month 3 residual gain scores for each of the three scale scores were constructed by (1) regressing the Month 3 (post-intervention) score on to the

baseline (pre-intervention) score, (2) using the regression weights from this first equation to calculate the predicted post-intervention score from the pre-intervention score, and (3) subtracting the predicted score from the participant's actual post-intervention score. These residual gain scores and two control variables – the baseline score of the outcome measure and intervention group assignment (CET [1] versus other [0]) – were then regressed simultaneously on to each outcome. Separate analyses were conducted using data from the Month 3 (end of the intervention phase) and Month 12 (end of the maintenance phase) assessments.

Results

Exploratory factor analysis of the Study 1 baseline data

An initial EFA of the 26 baseline CSE item responses from the Study 1 sample was conducted to identify a probable factor structure. Though only six of 149 participants had not responded to all items, we used the Mplus computer program to perform the analyses because Mplus features full-information maximum likelihood (FIML), which enables the software to make use of incomplete cases' available data (Muthén & Muthén, 2001). Simulation studies have shown FIML typically outperforms common *ad hoc* missing data-handling methods, such as listwise deletion, across a wide variety of data analysis scenarios (Arbuckle, 1996; Wothke, 2000). The 26 items included in the original CSE measure were 'mapped' to the curriculum of the CET intervention, in which individuals were being taught how to increase their adaptive coping by selecting the appropriate coping strategy when faced with challenges and threats in their lives. Emphasis was placed on both problem-focused and emotion-focused coping strategies, including seeking social support and engaging in spiritual and/or meditation activities. Therefore, the number of factors to retain was determined by a combination of coping theory and empirical findings. We anticipated extracting, as a minimum, two distinct factors: problem- and emotion-focused coping. However, we recognized that the empirical data might suggest other groups of items that indicate the presence of additional coping factors of interest, such as seeking support or engaging in spirit-focused activities. Items were assigned to the factor on which they had the largest rotated factor loading.

Using Promax rotation to allow for correlated factors, we extracted two to five factors and evaluated the interpretability of each extracted factor. A two-factor solution was rejected because a number of conceptually similar items had split loadings across the two factors. Four- and five-factor solutions yielded several nonsensical doublet factors; that is, pairs of items with no discernable theoretical connection that spuriously loaded on to those factors. The presence of doublet factors may indicate that too many factors were extracted in these solutions. By contrast, the three-factor solution yielded clearly interpretable results. Based upon prior expectations in conjunction with the empirical aggregation of the items with the factors, the three factors were labelled *use problem-focused coping*, *stop unpleasant emotions and thoughts*, and *get support from friends and family*.

The first factor consists of items that measure an individual's self-efficacy with respect to overcoming problems by analysing the nature of the problem and employing cognitive strategies to make the respondent's perception of the problem less severe (e.g. 'break an upsetting problem down into smaller parts'). The second factor measures a respondent's self-efficacy with respect to altering his emotional response to an unsettling event or problem rather than addressing the characteristics of the problem itself (e.g. 'take your mind off negative thoughts'). These two factors map on to the existing theoretical domains of problem-focused coping and emotion-focused coping, respectively. The third extracted factor represents a set of items that captures a social dimension by tapping the respondent's perception of his ability to reach outside himself and seek help from friends and family to cope with problems (e.g. 'get emotional support from friends and family').

The factors were moderately related: *use problem-focused coping* was positively correlated with *stop unpleasant emotions and thoughts* ($r = .67$) and with *get support from friends and family* ($r = .60$). *Stop unpleasant emotions and thoughts* was, in turn, positively correlated with *get support from friends and family* ($r = .54$). Survey items and standardized loadings for each item on its parent factor are shown in Table 1. These factors and their associated items were used as the basis for specifying the first CFA model described below.

Confirmatory factor analyses of the Study 1 and Study 2 baseline data

CFA models may be usefully employed in an exploratory context to further refine the results derived from EFAs because CFAs provide tests of parameter estimates and global model fit. These tests enable investigators to identify items that are weakly related to their parent factors and remove those items from subsequent analyses, which results in a shorter, more pure measurement instrument (Neilands & Choi, 2002). To evaluate global model fit, we report the chi-squared tests of model fit and several descriptive fit indices, described below. Though preliminary examination of the items' univariate distributions suggested the items possessed an approximately normal distribution, we opted to report a chi-squared test of model fit and parameter estimate standard errors that are robust to departures from normality (Yuan & Bentler, 2000). Even with corrections for non-normal data, the chi-squared test of absolute model fit can be sensitive to trivial misspecifications in the model's structure (Bollen & Long, 1993). Consequently, we also report the following descriptive measures of model fit that are often used to evaluate the soundness of a model: the standardized root mean residual (SRMR; Bollen, 1989), the comparative fit index (CFI; Bentler, 1990), and the root mean square error of approximation (RMSEA; Browne & Cudek, 1993). Hu and Bentler (1999) provide recent simulation evidence and guidelines suggesting that CFI values of .95 or higher, RMSEA values of .06 or lower, and SRMR values of .08 or lower indicate good model fit when these fit statistics are considered together. Vandenberg and Lance (2000, p. 44) note, however, that Hu and Bentler's simulation study, while extensive, is a single study; its findings should be replicated independently before these cut-off values are canonized. Vandenberg and Lance point to an extensive body of prior simulation research that suggests cut-off values of .90 for the CFI and related incremental fit indices, .08 for the RMSEA, and .10 for the SRMR. Consequently, Vandenberg and Lance suggest treating the Hu and Bentler fit criteria as high confidence values and the previously recommended cut-offs as acceptable lower bounds of good model fit. We follow this approach in evaluating the global model fit tests and indices reported below. All CFAs reported below were fit using Mplus 2.12 (Muthén & Muthén, 2001).

Our initial CFA model using the data from Study 1 extended the EFA results reported above by assigning each of the 26 CSE items to the factor with which it was most strongly associated in the EFA results. The overall fit of this model was poor on an absolute basis $\chi^2(296) = 605.83$, $p < .0001$; descriptive model fit statistics also indicated poor fit: CFI = .85, RMSEA = .08, and SRMR = .08. Starting with the item that had the lowest factor loading value, we removed items one at a time, refitting the model after each item's removal, until we attained satisfactory global model fit. Our final model contained half of the original items. The fit of this model was very good on a descriptive basis: CFI = .95, RMSEA = .07, and SRMR = .05, though it failed the absolute model fit test, $\chi^2(62) = 112.20$, $p < .0001$. Factor loadings from the final CFA model for Study 1 appear in Table 1 in boldface type. For this model, the factor correlations were nearly identical to those found with the EFA model.

A limitation of the 'EFA followed by CFA' model-building approach outlined in the preceding paragraph is that repeated examination of the data under different model scenarios can lead to sample-specific solutions that may not generalize to new samples. To guard against this possibility, we fit the final model from the previous paragraph to the Study 2 data. Results from

this analysis indicated satisfactory model fit: the exact test of model fit was rejected, $\chi^2(62) = 113.81$, $p < .0001$, but descriptive model fit statistics indicated satisfactory fit (CFI = .94, RMSEA = .08, SRMR = .06). Factor loadings from the CFA model for Study 2 appear in Table 1 in boldface type. For this model, the factor correlations were, again, nearly identical to those found with the Study 1 EFA and CFA models. Moreover, as seen in Table 1, the factor loadings from the EFA of Study 1's data, the final CFA of Study 1's data, and the CFA of Study 2's data are highly consistent across both studies and their respective factor analyses.

Confirmatory factor analyses of the Study 1 and Study 2 follow-up data

To assess the temporal stability of the model, we refit it to the pooled Study 1 and Study 2 data at 3, 6, and 12 months following baseline. In general, results indicated satisfactory model fit at each follow-up point: 3 months ($\chi^2(62) = 158.68$, $p<.0001$, CFI = .95, RMSEA = .07, SRMR = .06); 6 months ($\chi^2(62)=201.55$, $p<.0001$, CFI = .92, RMSEA = .09, SRMR = .06); and 12 months ($\chi^2(62)=152.36$, $p<.0001$, CFI = .95, RMSEA = .08, SRMR = .05). Factor loadings (not shown to conserve space) were consistent with those reported in Table 1 for baseline data.

Reliability analyses

Reliability for the three derived CSE scales was measured via Cronbach's internal consistency coefficient alpha (Cronbach, 1951) at baseline using data from all study participants and via test–retest correlations for longitudinal data using data only from control participants (i.e. WLC for Study 1 and MCC for Study 2). Although the sample sizes for the test–retest correlations were reduced by excluding intervention participants, we were able to remove the possible confounding influence of the CET intervention on participants' behaviours and, in turn, its impact on subsequent assessments of CSE scores. For Study 1, the sample size for the test–retest correlation coefficient from baseline to Month 3 is 38; for Study 2, the sample sizes from baseline to Months 3, 6, and 12 are 61, 57, and 56, respectively. Because the WLC participants in Study 1 were crossed over to receive the CET intervention at the end of the intervention phase (Month 3), they no longer served as controls during the 9-month maintenance phase and, therefore, test–retest correlation coefficients for their 6- and 12-month follow-up assessments were not calculated.

In order to compute test–retest correlation coefficients, CSE scale scores were created by taking the mean of the items in each scale so that they would be in the same metric as the original items (i.e. 0–10). At baseline, sample descriptive statistics for each scale, using data from the combined studies, was as follows: *use problem-focused coping* (N = 346, mean = 5.6, SD = 2.1), *stop unpleasant emotions and thoughts* (N = 348, mean = 4.5, stdev = 2.2), and *get support from friends and family* (N = 348, mean = 5.1, SD = 2.3).

As shown in Table 2, the coefficient alpha for each scale was virtually identical using data from either study. Using data from the combined studies, the baseline coefficient alpha for each scale was strong, ranging from .80 for *get support from friends and family* to .91 for *use problem-focused coping* and *stop unpleasant emotions and thoughts*. Although not shown in Table 2, for purposes of comparison, we also computed the coefficient alphas for the CSE scales at each of the three follow-up assessments using the data from the combined studies and found that the alphas remained essentially unchanged from those reported at baseline.

The test–retest correlation coefficients for baseline to Month 3 were relatively similar across the two studies. In addition, all of the correlation coefficients were strong, ranging from .40 to .80 (all $p < .005$). Within each scale, the strongest correlations were typically between data collected at baseline and then at the 3- and 6-month follow-up assessments. There was some drop-off in the magnitude of the correlations between the baseline and the 12-month data, as

might be expected, given the increasing length of time between the baseline and follow-up assessments.

Validity analyses

To assess concurrent validity, separate Pearson partial correlations were calculated for each of the three derived CSE scale scores and measures of psychological distress and well-being, ways of coping, and social support using baseline data from the combined studies, while controlling for the effects of the other two CSE scale scores ($N = 347$ for all analyses). Sample descriptive statistics and Pearson partial correlations for the individual measures are shown in Table 3.

Partial correlations evaluating the independent relationships between measures of psychological distress and well-being and each of the three derived CSE scale scores were, on average, largest for feeling able to stop unpleasant emotions and thoughts (absolute partial r's ranged from .20 to .28, all ps < .0001). Several of the partial correlations between the distress and well-being measures and feeling able to use problem-focused coping skills were also similar in magnitude. For example, when faced with challenges and threats, participants who felt more self-efficacious in being able to stop unpleasant emotions and thoughts and/or using problem-focused coping skills also reported less stress and anxiety and more optimism. On average, the independent relationships between levels of psychological distress and well-being and feeling able to get support from friends and family were somewhat weaker, with the exception of positive states of mind (partial $r = .26$, $p < .001$).

The patterns of association between the three derived CSE scales and the ways of coping subscales also provided evidence of convergent and divergent validity. As to how they cope with stressful situations, individuals who reported greater confidence in their ability to use problem-focused coping also tended to report greater use of planful problem solving as a coping style (partial $r = .27$, $p < .001$). Individuals who were more confident in their ability to stop unpleasant emotions and thoughts were also less likely to use cognitive escape-avoidance (partial $r = -.20$, $p < .001$) as coping styles. Lastly, individuals who were more confident in their ability to get support from friends and family were also more likely to seek out social support (partial $r = .21$, $p < .001$) and less likely to use distancing (partial $r = -.22$, $p < .001$) as coping styles. In addition, and as would be expected, these individuals also were much more likely to report higher levels of perceived social support (partial $r = .60$, $p < .001$) and having more people who provide 'real' support to them when needed (partial $r = .36$, $p < .001$).

To assess their relative independent predictive validity, baseline to Month 3 residual gain scores for each of the three CSE scale scores were regressed simultaneously on to each outcome, controlling for intervention group assignment and the baseline score of the outcome measure. Separate analyses were conducted using outcome data from the Month 3 (end of the intervention phase; $N = 300$ or 301) and Month 12 (end of the maintenance phase; $N = 223$) assessments. As noted previously, the WLC participants in Study 1 were crossed over to receive the CET intervention at the end of the intervention phase (Month 3), so they were not included in the Month 12 analyses because they were no longer control group members. The standardized regression coefficients for the individual measures are shown in Table 4.

At Month 3, residualized change in self-efficacy for stopping unpleasant emotions and thoughts was more predictive of decreased levels of psychological distress and increased levels of well-being (absolute βs ranged from 0.21 to 0.35, all ps < .001) than were residualized changes in using problem-focused coping or getting support from friends and family (absolute βs ranged from 0.01 to 0.16). As might be expected, for the ways of coping subscales, residualized changes in using problem-focused coping were associated with higher levels of positive reappraisal and planful problem solving (βs = 0.20 and 0.28, respectively; both $p < .001$). In

addition, individuals who reported increased self-efficacy regarding obtaining support from friends and family also reported higher levels of perceived social support ($\beta = 0.27$, $p < .001$).

In general, by Month 12, the association between changes in each of the three CSE scales and the outcome measures had weakened, with several exceptions. Residualized change in self-efficacy for stopping unpleasant emotions and thoughts was predictive of decreased levels of perceived stress ($\beta = -0.20$, $p < .01$) and increased levels of optimism ($\beta = 0.21$, $p < .01$) and positive states of mind ($\beta = 0.21$, $p < .01$). For the ways of coping subscales, residualized changes in using problem-focused coping were associated with lower levels of cognitive escape avoidance ($\beta = -0.24$, $p < .01$).

Discussion

The CSE scale was developed to measure individuals' evaluations of their CSE, rather than their coping strategies *per se*. Exploratory and confirmatory factor analyses of the CSE scale revealed three factors: *use problem-focused coping, stop unpleasant emotions and thoughts*, and *get support from friends and family*. The three derived CSE scales demonstrate good reliability and validity. Although the scales are moderately correlated, results of the concurrent validity analyses indicate that the scales assess self-efficacy with respect to different types of coping and lend support to using the factors separately. In line with stress and coping theory, predictive validity analyses showed that change in using problem- and emotion-focused coping skills was predictive of reduced psychological distress and increased psychological well-being over time.

One of the major challenges in coping research is the measurement of change in coping. It is difficult to assess such changes with instruments that assess coping directly, such as the Ways of Coping scale (Folkman & Lazarus, 1988), because such measures are intended to assess coping in relation to specific stressful events. Even if participants are asked to focus on a chronic, recurring event, such as arguments with a family member, such events differ from occasion to occasion for multiple reasons, so that pre- and post intervention comparisons of coping are difficult to interpret. The CSE scale, however, is not administered with reference to a specific stressful event. The CSE scale assesses the person's *confidence* with respect to carrying out coping strategies, so that changes in CSE scores can be attributed to changes in the individual's confidence regarding the ability to cope.

The three factors in the CSE scale are consistent with the three major aspects of coping taught in CET – problem-focused coping, emotion-focused coping, and social support. The CSE scale advances our ability to explore the theoretical links between the secondary appraisal of stress, which asks 'what can I do?', and the major coping functions postulated by stress and coping theory – the regulation of distress and the management of underlying problems. CSE items, such as 'Sort out what can be changed, and what cannot be changed', address generic skills needed for problem-focused coping. Other items, such as 'take your mind off unpleasant thoughts', also address generic skills needed for emotion-focused coping. Social support emerged as a third CSE factor. Social support often involves both problem-focused coping (e.g. seeking advice) and emotion-focused coping (e.g. taking your mind off unpleasant thoughts). Its definition as a separate CSE factor – although related to the other two – is consistent with the hybrid nature of social support and the emphasis given to social support skills in CET. To date, measures of secondary appraisal have been rather general evaluations of the controllability of a situation (e.g. Folkman, Lazarus, Dunkel-Schetter, DeLongis, & Gruen, 1986). The CSE scale allows important specificity in the measurement of secondary appraisal, an advance particularly relevant to coping intervention research.

There are a number of limitations to the present study. First, the sample is not population based. It was self-selected, and included only MSM and persons with a chronic health condition. This may limit generalizability to other populations, particularly persons coping with conditions other than HIV, healthy persons, and women. Second, although two different samples were studied, they were not large. These findings need to be validated in larger, as well as cross-cultural, samples. Third, while our analyses uncovered important differences in three CSE subscales' relationships with other variables (indicative of divergent validity), it is also possible that the three types of CSE could be related to a higher-order, general CSE factor. With three lower-order factors extracted in the present investigation, it was not possible to evaluate this possibility statistically in the present investigation. Recent developments in stress and coping theory that post-date the two clinical trials reported here highlight the role of positive emotions in the stress process and the meaning-based coping processes that support them (Folkman & Moskowitz, 2000a, 2000b). Many of these meaning-based coping processes, such as reordering life goals and searching for the benefits associated with enduring a stressful period, suggest that future efforts might include developing a fourth dimension to the CSE scale – self-efficacy related to meaning-based coping. Inclusion of a fourth dimension would enable statistical investigation of the presence of a higher-order general CSE factor. Finally, a number of items in the CSE scale were not included in the three factors identified in this analysis. We encourage investigators to administer the entire CSE scale in descriptive as well as intervention research. By doing so, the subscales identified here can be scored, and other potential dimensions of CSE can be explored.

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Table 1

CSE scale: standardized exploratory factor analysis (EFA) and confirmatory factor analysis (CFA) loadings

Factor	Study 1		Study 2
	EFA	CFA	CFA
Use problem-focused coping			
Break an upsetting problem down into smaller parts	**.89**	**.87**	**.83**
Sort out what can be changed, and what cannot be changed	**.86**	**.80**	**.75**
Make a plan of action and follow it when confronted with a problem	**.85**	**.85**	**.80**
Leave options open when things get stressful	**.80**	**.77**	**.82**
Think about one part of the problem at a time	**.71**	**.78**	**.79**
Find solutions to your most difficult problems	**.68**	**.78**	**.75**
Resist the impulse to act hastily when under pressurise	.61	—	—
Try other solutions to your problems if your first solutions don't work	.54	—	—
Talk positively to yourself	.49	—	—
Stand your ground and fight for what you want	.48	—	—
See things from other person's point of view during a heated argument	.46	—	—
Develop new hobbies or recreations	.29	—	—
Stop unpleasant emotions and thoughts			
Make unpleasant thoughts go away	**.97**	**.91**	**.88**
Take your mind off unpleasant thoughts	**.89**	**.81**	**.80**
Stop yourself from being upset by unpleasant thoughts	**.86**	**.89**	**.91**
Keep from feeling sad	**.73**	**.78**	**.82**
Keep from getting down in the dumps	.55	—	—
Look for something good in a negative situation	.52	—	—
Keep yourself from feeling lonely	.44	—	—
Visualize a pleasant activity or place	.36	—	—
Pray or meditate	.29	—	—
Get support from friends and family			
Get friends to help you with the things you need	**.94**	**.95**	**.92**
Get emotional support from friends and family	**.76**	**.73**	**.79**
Make new friends	**.58**	**.63**	**.63**
Do something positive for yourself when you are feeling discouraged	.42	—	—
Get emotional support from community organizations or resources	.22	—	—

Note. For Study 1, total baseline $N = 149$; 143 participants responded to all 26 CSE items and 6 participants each missed 1 item. For Study 2, total baseline $N = 199$; there were no missing data for the 26 CSE items. $p < .0001$ for all loadings. Items within each factor are sorted by their EFA loadings. Bold type signifies items that were retained in the final, reduced version of the CSE scale.

Table 2

Summary of the internal consistency and test–retest reliability analyses for the derived CSE scales

CSE scale	Cronbach's internal consistency coefficient alpha at baseline			Test–retest correlation coefficients for longitudinal data control participants only		
	Study 1	Study 2	Combined studies	Baseline to month[a]	Study 1 WLC	Study 2 MCC
Use problem-focused coping (6 items)	.92(N = 147)	.91(N = 199)	.91(N = 346)	3	.61	.65
				6	—	.59
				12	—	.40
Stop unpleasant emotions and thoughts (4 items)	.91(N = 149)	.91(N = 199)	.91(N = 348)	3	.80	.68
				6	—	.68
				12	—	.49
Get support from friends and family (3 items)	.79(N = 149)	.80(N = 199)	.80(N = 348)	3	.49	.52
				6	—	.54
				12	—	.49

Note. $p < .005$ for all test–retest correlation coefficients.

[a]For Study 1, the sample size for the test–retest correlation coefficient from baseline to Month 3 is 38; for Study 2, the sample sizes from baseline to Months 3, 6, and 12 are 61, 57, and 56, respectively. Because the WLC participants in Study 1 were crossed over to receive the CET intervention at the end of the intervention phase (Month 3), they no longer served as controls during the 9-month maintenance phase and, therefore, do not have test–retest correlation coefficients for the 6- and 12-month assessments.

Table 3

Summary of the concurrent validity analyses: descriptive statistics and partial correlations of the derived CSE scale scores with measures of psychological distress and well-being, ways of coping, and social support using baseline data from the combined studies

Measures	Mean or %	*SD*	Use P-F coping[a]	Stop unplea[b]	Get support[c]
Psychological distress and well-being					
Perceived stress	19.7	6.1	−.31***	−.28***	−.11*
Burnout	25.1	12.5	−.11*	−.25***	−.17**
Anxiety	48.8	11.3	−.25***	−.27***	−.12*
Negative morale	11.5	4.5	−.12*	−.20***	−.16**
Positive morale	12.0	5.1	.19***	.23***	.17**
Optimism	18.6	5.6	.32***	.26***	.00
Positive states of mind	11.8	3.4	.15**	.24***	.26***
Ways of coping					
Positive reappraisal	9.5	5.6	.15**	.06	.04
Social support	6.6	3.4	.05	−.06	.21***
Distancing	8.2	4.0	−.09	.14**	−.22***
Cognitive escape-avoidance	9.2	4.5	−.01	−.20***	.01
Planful problem-solving	8.9	3.9	.27***	−.04	.02
Social support					
Perceived social support	62.1	15.1	.00	.00	.60***
Amount of Support[d]	2.0	0.9	−.05	−.01	.36***
Primary partner	40%	—	.00	−.06	.16**

Note. N = 347 for all analyses.

*
p < .05,

**
p < .01,

**
*p < .001.

[a]Controlling for 'Stop unpleasant emotions and thoughts' and 'Get support from friends and family'.

[b]Controlling for 'Use problem-focused coping' and 'Get support from friends and family'.

[c]Controlling for 'Use problem-focused coping' and 'Stop unpleasant emotions and thoughts'.

[d]Response categories: 0 = 'none', 1 = '1 person', 2 = '2–5 people', 3 = '6–9 people', and 4 = '10 or more people.'

Table 4

Summary of the predictive validity analyses: standardized regression coefficients for the baseline to Month 3 residual gain in the derived CSE scale scores as predictors of psychological distress and well-being, ways of coping, and social support at Months 3 and 12 using data from the combined studies

	Standardized β for the baseline to Month 3 residual gain in the 3 CSE scale scores[a]					
Outcome measures[b]	**Outcome at Month 3 (end of intervention phase)**			**Outcome at Month 12 (end of maintenance phase)**		
Psychological distress and well-being	Use P-F coping[c]	Stop unplea[d]	Get support[e]	Use P-F coping[c]	Stop unplea[d]	Get support[e]
Perceived stress	−.13*	−.35***	−.01	−.16*	−.20**	−.06
Burnout	−.11	−.31***	.03	−.13	−.17*	−.14*
Anxiety	−.16**	−.28***	−.02	−.17*	−.16*	−.05
Negative morale	−.10	−.29***	−.05	−.11	−.15*	−.07
Positive morale	.12*	.30***	−.02	.12	.18*	.09
Optimism	.11*	.21***	−.01	.08	.21**	.03
Positive states of mind	.14*	.24***	.09	.13	.21**	.09
Ways of coping						
Positive reappraisal	.20***	.05	−.05	−.01	.12	−.04
Social support	.06	−.06	.17*	−.06	.12	−.03
Distancing	−.12	.21**	−.13*	−.09	.10	−.14
Cognitive escape-avoidance	−.10	−.09	−.08	−.24**	−.02	−.03
Planful problem solving	.28***	.02	−.13*	.10	.15	−.18*
Social support						
Perceived social support	.02	.09*	.27***	.02	.08	.16**

Note. The sample size available for each analysis was 300 or 301 for the Month 3 and 223 for the Month 12 assessments. Because the WLC participants in Study 1 were crossed over to receive the CET intervention at the end of the intervention phase (Month 3), they no longer served as controls during the 9-month maintenance phase and, therefore, are not included in the Month 12 analyses.

*
$p < .05$,

**
$p < .01$,

***$p < .001$.

[a]Simultaneous entry of the three predictor variables.

[b]Adjusted for baseline score and intervention group assignment (CET[1] versus other[0]).

[c]Use problem-focused coping.

[d]Stop unpleasant emotions and thoughts.

[e]Get support from friends and family.