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Dimensionality of Coping

An Empirical Contribution to the Construct Validation of the Brief-COPE with a Greek-speaking Sample

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Abstract

The construct of coping has received increasing attention over the past years in relation to psychological and physical health, yet its dimensional and conceptual understanding is not consistent across theoretical models. The present study investigates the dimensionality of coping in a sample of 1127 Greek-speaking adults using the Brief-COPE. Both exploratory and confirmatory factor analyses revealed a structure comprised of eight factors, four of which were broader, and included active/positive, avoidant, support seeking and negative emotional approaches. Results indicated adequate psychometric characteristics for the Greek translation of the Brief-COPE for this population. Associations between coping strategies with gender, education, and psychological symptomatology are also discussed.

Keywords

- *anxiety*
- *CFA*
- *coping*
- *reliability*
- *strategies*
- *validation*

The construct of coping was first introduced by Lazarus in his 1966 book *Psychological Stress and the Coping Process* (Folkman & Moskowitz, 2004), and has received significant attention in the psychological literature of the past several decades. Coping is of critical importance to physical and psychological health and well-being when a person experiences a stressful situation (Miller, Brody & Summerton, 1988; Skinner, Edge, Altman, & Sherwood, 2003) and has been associated with a range of psychological and health outcomes. Coping appears to be a multidimensional construct, although the literature does not present a universally accepted understanding of the many possible ways with which people cope (Suls, David & Harvey, 1996). Following the suggestion put forward by Folkman and Lazarus (1980), several theorists distinguish between *problem focused coping*, which refers to actively responding to the stressor, solving the problem while trying to manage or change the situation by seeking information, seeking instrumental help, planning and direct action, and *emotion focused coping*, which refers to attempts to manage the emotions created by the stressful event, through emotion oriented reactions such as minimizing, distancing, self controlling, seeking social support, avoidance, self-blame, venting, avoidance and positive reappraisal (Felsten, 1998; Folkman et al., 1986).

Carver, Scheier, and Weintraub (1989), considered this binary distinction too simplistic, and proposed that the dimensions have to be further subdivided (Schwarzer & Schwarzer, 1996). They added avoidance-focused coping to describe the actions and cognitive changes attempted in order to avoid a stressful situation (Endler, 1997; Endler & Parker, 1994). This dimension, which received subsequent empirical support, included venting, distraction, denial, social aversion, behavioral and mental disengagement, and alcohol and drug use (Carver et al. 1989; Felsten, 1998; Gutiérrez, Peri, Torres, Caseras, & Valdés, 2007; Litman, 2006; Zuckerman & Gagne, 2003).

A coping strategy may be considered adaptive when it leads to the attainment of desired goals, higher levels of subjective well-being or the tackling of emotional distress (Lazarus, 1991; Folkman & Moskowitz, 2004). There is substantial evidence that problem-focused or approach coping and seeking social support are related to positive health outcomes and increased well-being, and are therefore considered more adaptive (Kneebone & Martin, 2003; Wodka & Barakat, 2007), while emotion-focused and

avoidance coping are considered less adaptive (Penley, Tomaka & Wiebe, 2002), and have been associated with depression, smoking and panic attacks (Ottenbreit & Domson, 2004; Haaga, Thorndike, Friedman-Wheeler, Pearlman, & Wernicke, 2004). Differences in coping strategies employed may also partly account for the gender differences reported for various physical and psychological symptoms, because women may be more likely than men to employ emotion-focused and avoidance coping (Eaton & Bradley, 2008; Hall, Chipperfield, Perry, Ruthig, & Goetz, 2006; Matud, 2004; Tamres, Janicki & Hegelson, 2002), which may be related to their higher vulnerability to depression and anxiety.

Based on the major theories that describe coping, several measures of the coping construct have been developed (e.g., Endler & Parker, 1990; Folkman & Lazarus, 1980, 1985; Tobin, Holroyd, Reynolds, & Wigal, 1989), one of them being the Coping Orientation to Problems Experienced inventory (COPE; Carver et al., 1989; Carver et al., 1993), which is used widely. What distinguishes the COPE from other measures of coping is that it is primarily a theoretically derived measure, based on Carver and Scheier's self-regulation theory (1981, 1982), which holds that individuals make decisions and act upon them in ways that reduce the gap between actual and desired outcomes, or goals. People use well-rehearsed or new coping strategies that they perceive to be effective for them in the situation, consistent with their interpretation of the experience. The strategies vary between individuals as well as within the individual, at different stages of the experience and in different situations (Johnson, 1999). This process falls within the secondary appraisal stage as proposed by Lazarus (1966).

COPE assesses several distinct strategies (Carver et al., 1989) employed by individuals in general or specified situations, respectively yielding measures of dispositional or situation-specific coping. It is composed of 15 scales, each with a specific conceptual content. However, failures to complete the whole measure, observed frustration of participants, and other problems in administration (Carver, 1997; Carver et al., 1993) led to the development of a less extensive version, the Brief-COPE (Carver, 1997), which is increasingly used in research. The Brief-COPE consists of 14 two-item scales, namely, acceptance, active coping, positive reframing, planning, use of instrumental support, use of emotional support, behavioral disengagement, self-distraction,

self-blame, humor, denial, religion, venting and substance use (Carver, 1997; Muller & Spitz, 2003). With the exception of a couple of scales, the instrument presents good reliability.

Although, the COPE measures were designed to assess more fine-grained aspects of coping, factor analytic studies have demonstrated that broader dimensions of coping also exist. Identification of broader factors is important as it permits further refinement of coping theory. Evidence from several studies, with both Exploratory Factor Analysis (EFA) and Confirmatory Factor Analysis (CFA), suggests that there exist dissimilar factor structures, thus requiring further replication and confirmation in terms of their theoretical meaningfulness. In an attempt to constructively organize the existing research findings, Table 1 summarizes the resulting multiple factor structures for both the full and the Brief COPE, although the latter has not been extensively factorized since its development. As a result of the inconsistent nomenclature used to designate the multiple underlying factors that have emerged in various factor analytic studies, a coding system of 38 letters has been used in the table to organize the information presented. It should be noted that the present classification maintains the original factor labels provided by the authors of each factor analytic study, although conceptual similarities are apparent among factor names. In addition, some authors have designated broader dimensions with the same label as that used by Carver to describe single subscales, adding to the complicatedness in summarizing factor analytic results. When reviewing the studies summarized in this table, it became apparent that most of them resulted in an *active/positive* coping dimension, which includes at least the scales of active coping, planning and positive reframing, while in other studies additionally acceptance, humor, religion and sometimes other components of the Full COPE. Another fairly consistent dimension of coping appears to be *seeking support*, which usually includes the scales of seeking instrumental and emotional support but sometimes additional scales as well (e.g., venting). A third factor, typically labelled *avoidance/disengagement* also emerges in some studies including scales of behavioural disengagement, mental disengagement, self-distraction, denial and sometimes substance use. However, other studies have demonstrated the presence of as many as 15 (Full COPE) and 12 factors (Brief-COPE), reflecting the original conceptualization of the

subscales. Thus, the three above-mentioned dimensions seem to fairly consistently define the construct of coping, but do not always emerge intact.

This study therefore aims to examine the dimensionality of the Brief-COPE through EFA and CFA with a large sample in order to more clearly establish the fundamental dimensions of coping and in consequence to further our theoretical understanding of the construct. Furthermore, the absence of confirmatory factor analytic techniques to verify the scale's theoretical underpinnings has been criticized in the work of Carver (e.g., Schwarzer & Schwarzer, 1996), and therefore the present study addresses this gap along with some more recent studies (e.g., Cooper, Katona & Livingston, 2008; Muller & Spitz, 2003).

The study also provides additional evidence regarding the psychometric properties of the Brief-COPE with a non-English-speaking sample. While the COPE inventory has demonstrated sufficient validity in studies with non-English speaking populations (Bishop et al., 2001; Hudek-Knežević et al., 1999; Kallasmaa & Pulver, 2000; Sica et al., 1997), the Brief-COPE has not received extensive attention with regards to this issue. So far, to the best of our knowledge, empirical validations of the measure have been reported for Spanish, Canadian-French and French versions (Perczek et al., 2000; Fillion et al., 2002; Muller & Spitz, 2003). Since research on health psychology in Greek speaking populations has started to attract more interest (e.g., Anagnostopoulos & Karademas, 2007), testing the applicability of such a brief coping measure seems important. In the context of this psychometric investigation, the convergent validity of the instrument was examined, in relation to self reported psychological symptomatology using the Brief Symptom Inventory (BSI; Derogatis 1993; Loutsiou-Ladd, Panayiotou, & Kokkinos, 2008), because there is abundant evidence on the association between coping and psychological and physical health (e.g., Ball, Tannenbaum, Armistead, & Maguen, 2002).

Method

Participants

A total of 1127 individuals who had taken part in five previous studies conducted in Cyprus and Greece with the Brief-COPE as one of their measures were included in the sample. The studies were as follows. Study 1 examined the association between social anxiety and alcohol use and involved 126 Greek-Cypriot

Table 1. Comparative summary of factor analytic findings using the COPE and Brief COPE

Full COPE	Source	Factor analysis (no of items)	Sample	Factors
	Carver et al., 1989	EFA, 2nd order EFA (52)	978 undergrads	11 factors (g/h, r, s, f/e, t/w, o, b, u, l, d, v)
	Fontaine, Manstead, & Wagner, 1993 Clark, Bormann, Cropanzano, & James, 1995	EFA-PCA, oblique (60) CFA (60)	420 English students 306 US undergrads	4 2nd-order factors (g, n, p, o) 14 scales (n, g, a, b, c, l, d, s, u, r, o, w, t, v) Good fit for both 13 and 15 scale model
	Sica, Novara, Dorz, & Sanavio, 1997	EFA – PCA, Varimax 2nd Order PCA, Varimax (60) CFA (60)	521 Italian undergrads	15 factors (e, f, h, g, t/w, r, b, o, v, u, d, l, s, a, c) 13 factors (n, h/g, t/w, r, b, o, v, u, d, l, s, a, c) 13 factors (n, g/h, a/d, b, c, o, r, u, t/w, l, s, d, b)
	Hudek-Knežević, Kardum, & Vukmirović, 1999	CFA (60)	403 Croatian undergrads	5 2nd-order factors (n/f, p, x, h/g, b) (almost fit, correlations between factors) 4 factors (g, n/u, p, o) c, a, and b were examined separately Study 1: 9 factors (y, z, a, n, b, a/d, p, c, b)
	Stanton, Kirk, Cameron, & Danoff-Burg, 2000 Kalliasmaa & Pulver, 2000 Lyne & Roger, 2000 Bishop et al., 2001	Study 1 EFA – ML, Promax (60) EFA – PCA, Varimax (60) 2nd order EFA-PCA (60) EFA – PCA, Varimax (60)	400 undergrads 515 Estonian undergrads 539 NHS staff 243 males Singapore Police Force 746 undergrads	3 factors (although 4 and 5 were also possible) (c, p, d) 3 2nd-order factors (e, f, p) 3 factors (g, p, i) 5 factors (g, h, i, p, j)
	Zuckerman & Gagne, 2003	EFA – MLE, Varimax (60) CFA – MLE	746 undergrads	5 factors (g, h, i, p, j)
	Litman, 2006	EFA-PA, Promax (60)	Study 1: 230 undergrads Study 2: 357 undergrads	Study 1: 4 factors (l, p, n, f) Study 2: 3 factors (k, p, n)
	Gutiérrez et al., 2007	EFA-PCA, EFA-ML, Varimax, Oblimin, CFA (60)	471 Spanish outpatients	4 factors (without b, c, a) (l, o/s, d, n)
<i>Brief COPE</i>				
	Carver, 1997	EFA, oblique	168 community Hurricane victims	9 factors (a, b, c, d, e/f, g/h/i, j/k, l/m, o)
	Perczek et al., 2000	EFA, oblique	148 undergrads	12 factors (k, g/h, l, a, n, d, j, i, c, o, b, m)
	Fillion, Kovacs, Gagnon, & Endler, 2002 (f was not included)	EFA	132 French – Canadian women cancer patients	8 factors (d, k, g, e*, b, c, a)
	Prado et al., 2004	CFA	252 HIV + African American mothers	3 factors (g, n, p)

Table 1. (Continued)

Source	Factor analysis (no of items)	Sample	Factors
David & Knight, 2008 Miyazake, Bodenhorn, Zalaquett, & Ng, 2008	CFA categorical EFA EFA-WLS, CFA	383 gay men 555 International students in the US	2 higher order factors (d, g) 7 factors (q, b, m, n, c, a, l)

Notes: a = Substance use; b = Religion; c = Humor; d = Behavioral disengagement; e = Emotional support; f = Instrumental support; g = Active coping; h = Planning; i = Positive reframing; j = Venting; k = Self-distraction; l = Denial; m = Self-blame; n = Social support; o = Acceptance; p = Avoidance; q = Positive coping; r = Suppression of competing activities; s = Restraint; t = Positive reinterpretation; u = Focus on and venting of emotions; v = Mental disengagement; w = Growth; x = Positive attitude; y = Emotional processing; z = Emotional expression; a = Distress-contaminated coping; b = Problem-focused coping; c = Task; d = Social/emotional; e = Rational/active coping; f = Emotion coping; g = Self-help; h = Approach; i = Accommodation; j = Self punishment; k = Self-sufficient; l = Engagement

* Separate questions for friends, and husband/partner scale

college students (Panayiotou, Strahan, & Clements, 2005). Study 2 investigated the emotional and behavioral profiles of children with learning difficulties among 196 Greek-Cypriot parents. Study 3 involved 294 Greek-Cypriot young adults and their parents who completed measures of social anxiety and coping (Panayiotou, & Konstantinou, 2006). Study 4 assessed depression in a community sample of 146 individuals from Cyprus and, finally, study 5 examined burnout in a nationwide statistically selected sample of 365 special education teachers in Greece (Kokkinos & Davazoglou, 2008).

The full sample consisted of 455 male (40.1%) and 672 female (59.9%) participants. Participants' age ranged from 16–66 years ($M = 35.19$, $SD = 11.82$), with the majority (62.8%) aged between 31–50. This distribution is representative of a slightly younger population than the one reflected in the latest census of the Republic of Cyprus, according to which individuals aged 31–50 make up about 29 percent of the population, while individuals aged 51–65 make up about 15 percent of the population (Statistical Service of the Republic of Cyprus, 2006). The Greek sample was representative of the general population in terms of geographical distribution, although there was a greater percentage of women, a characteristic inherent to the teaching profession.

Measures

Brief-COPE (Carver, 1997) The Brief COPE is a 28-item measure of strategies used by individuals to cope with problems and stress. The items measure 14 coping approaches that responders use, answered on a four-point Likert-type scale ranging from 'not at all' to 'very much'. The Greek version of the Brief-COPE was developed using the method of front and back translation by two bilingual psychologists. Differences in translation were resolved through consensus.

Brief Symptom Inventory (BSI, Derogatis, 1993; Loutsiou-Ladd et al., 2008) Participants in studies 2 and 3 also took the BSI, a 53-item self-report symptom inventory used in clinical and research settings. It covers nine main psychological symptom dimensions, namely somatization, obsessive-compulsive, interpersonal sensitivity, depression, as well as general measures of psychopathology and distress. Each item is scored on a five-point Likert-type scale of distress. Previous research with Greek speaking participants (Loutsiou-Ladd et al., 2008) showed that the instrument in Greek, results in a single factor structure that

resembles the General Severity Index (GSI). Thus, only this index, the GSI, was used for analysis in this study.

Procedure

All participants responded to the 28 items of the Brief-COPE in the context of larger questionnaire packages put together separately for each study included in this report. In all cases, instructions directed participants to indicate ways in which they typically cope with the stress in their life, rather than in specific situations.

Results

Descriptive statistics and reliability analysis

Table 2 shows the means, standard deviations and Cronbach's alpha reliability coefficients for each of the 14 scales. Reliability indices are compared to those reported by Carver (1997). Since means and SDs are not reported by Carver (1997), the means and SDs in our sample were compared to that of Perczek et al. (2000). No marked differences were observed. All but one (self-distraction) reliability coefficients were comparable to those originally reported by Carver and appear satisfactory. One-way ANOVAs were used to examine scale mean differences between men and women. As shown on Table 2, women scored significantly higher than men on self-distraction, [$F(1,1113) = 35.48, p < .001$], emotional support, [$F(1,1107) = 28.70, p < .001$], instrumental support, [$F(1,1116) = 8.80, p < .001$], venting, [$F(1,1106) = 13.96, p < .001$] and religion, [$F(1,1113) = 35.48, p < .001$]. Moreover, there were no significant gender differences in symptomatology as reported on the BSI, [$t_{(488)} = 1.34, p > .05$]. Individuals with at least some college education reported using most strategies to a greater degree than their lower educated counterparts (in all cases $p < .001$), except for denial and behavioral disengagement. To the contrary, religion was reported to a greater degree by individuals with no college education, [$F(1, 1109) = 5.58, p < .05$].

Scale intercorrelations

Pearson correlations were calculated between all Brief-COPE scales. Results, as presented in Table 3, indicated statistically significant associations, of small-to-medium range, between most scales.

Similarly weak but significant correlations between COPE scales have been reported by Carver et al. (1989) and indicate that the various coping strategies are distinct but not mutually exclusive.

Construct validity

EFA was performed on all 28 items to examine the factor structure of the instrument on the entire sample. Since significant correlations were observed between the various scales, oblique (direct oblimin) rotation was used. Eight factors with eigenvalues over 1 were extracted, which explained 62.20 percent of the variance ($KMO = .82$). Inspection of the content of these factors indicated that they contained entire subscales with both items that were included in the original taxonomy, therefore no scales were fragmented. A few items (2, 13, 24, 8, 19, 9) loaded on more than one factor; in those cases, the item was included in the factor that corresponded to the a priori conceptual scales. The first extracted factor included the items of planning, positive reframing, active coping and acceptance scales. Overall, this factor appeared to form an active/positive coping dimension. The second factor consisted of the behavioral disengagement scale items; the third consisted of the substance use items; the fourth contained the instrumental and the emotional support scales, and can be construed as the seeking support dimension. The fifth factor corresponded to religion, the sixth to humor, the seventh to self-distraction and denial (reflecting the avoidance dimension), and the eighth to venting and self blame (henceforth termed the expression of negative feelings dimension). All factors yielded reliabilities over .55. The observed factor loadings and cross-loadings emerging from the EFA, and the reliabilities for these factors, are shown in Table 4.

Confirmatory factor analysis

The raw data were also subjected to CFA using the AMOS 16.0 program (Arbuckle, 2007). Based upon the entire sample, maximum likelihood estimation method was applied. The eight-factor model that was extracted based on EFA was initially tested so that each item loaded only on its corresponding factor. Several indices were used to assess model fit. The chi-square goodness-of-fit is a generally recognized index that tests the null hypothesis that there is no difference between the hypothesized model and the data. The higher the probability associated with the chi-square, the

Table 2. Descriptive statistics, internal reliability and gender differences of the Brief COPE subscales

	Greek Brief- COPE Men		Men vs. Women Differences	Greek Brief- COPE Women		F	Greek Brief- COPE Overall		Perceik, Carver, Price, & Pozo- Kaderman (2000)		Greek Brief- COPE		Carver (1997)	
	M	SD		M	SD		M	SD	M	SD	M	SD	α	α
Self-distraction	5.14	1.72	5.73	1.54	35.48***	5.50	1.64	5.41	1.73	.50	.71			
Active coping	6.44	1.62	6.49	1.50	.35	6.47	1.55	5.95	1.72	.67	.68			
Denial	4.10	1.63	4.07	1.58	.07	4.08	1.60	3.83	1.98	.58	.54			
Substance use	2.64	1.33	2.54	1.36	1.55	2.58	1.35	2.76	1.52	.93	.90			
Use of emotional support	4.83	1.69	5.38	1.68	28.70***	5.16	1.70	—	—	.68	.71			
Use of instrumental support	5.42	1.76	5.73	1.68	8.80**	5.60	1.71	—	—	.76	.64			
Behavioral disengagement	3.12	1.31	3.09	1.29	.79	3.10	1.30	3.29	1.44	.69	.65			
Venting	4.81	1.60	5.31	1.60	25.47***	5.11	1.62	5.21	1.70	.48	.50			
Positive reframing	6.44	1.61	6.48	1.50	.22	6.46	1.54	5.41	1.77	.72	.64			
Planning	6.70	1.45	6.77	1.36	.58	6.74	1.40	6.00	1.66	.76	.73			
Humor	4.02	1.59	4.16	1.69	1.87	5.73	1.66	3.84	1.90	.62	.73			
Acceptance	5.67	1.75	5.77	1.48	1.17	5.74	1.59	6.24	1.56	.57	.57			
Religion	4.39	1.93	4.82	1.84	13.96***	4.65	1.89	4.94	2.21	.75	.82			
Self-blame	5.75	1.53	5.85	1.37	1.32	5.81	1.44	—	—	.50	.69			

Notes: * $p < .05$; ** $p < .01$; *** $p < .001$

Table 3. Intercorrelations between the 14 Brief-COPE subscales

	1	2	3	4	5	6	7	8	9	10	11	12	13	
1. Self-distraction	1.00													
2. Active coping	.39*	1.00												
3. Denial	.28**	.14*	1.00											
4. Substance use	.11**	.14**	.10**	1.00										
5. Emotional support	.27**	.29**	.17**	.13*	1.00									
6. Instrumental support	.19**	.37**	.14*	.15**	.64*	1.00								
7. Behavioral disengagement	.11*	-.08*	.36*	.14*	.13*	.10**	1.00							
8. Venting	.27**	.23**	.19**	.14*	.38**	.35**	.12**	1.00						
9. Positive reframing	.30	.57*	.08**	.09*	.22*	.34**	-.12**	.19**	1.00					
10. Planning	.24*	.63*	.04	.10**	.21**	.33**	-.15*	.25*	.57*	1.00				
11. Humor	.23*	.12**	.07*	.18**	.18*	.16*	.18*	.26*	.19*	.12*	1.00			
12. Acceptance	.16**	.31**	.05	.11*	.07*	.20**	.02	.14**	.32*	.35*	.13*	1.00		
13. Religion	.17**	.19**	.07	-.01	.18**	.18**	.04	.10**	.18*	.22*	-.01	.14	1.00	
14. Self-blame	.22**	.33**	.17*	.13**	.25*	.31**	.16*	.29**	.32*	.38*	.16**	.30*	.18**	1.00

Notes: * $p < .05$, ** $p < .01$, *** $p < .001$

Table 4. Factor loadings and cross loadings emerging from Oblique Rotation Component Analysis of Greek Brief-COPE

Item	Observed factor loadings							
	1	2	3	4	5	6	7	8
25	.70							
14	.69							
17	.69							
12	.67							
7	.66							
2	.60						.31	
20	.52							
13	.51							-.36
24	.50	.40						
16		.74						
6		.71						
8		.50					.49	
11			.97					
4			.97					
10				-.80				
5				-.79				
23				-.79				
15				-.73				
22					.91			
27					.84			
18						.84		
28						.71		
19						.45	.45	
3							.69	
1							.58	
21								-.70
26		.33						-.59
9							.32	-.42
Alphas	.82	.69	.93	.81	.75	.62	.57	.55

Notes: 1 = Active/positive coping; 2 = Behavioral disengagement; 3 = Substance use; 4 = Seeking support; 5 = Religion; 6 = Humor; 7 = Avoidance; 8 = Expression of negative feelings

closer the fit (Bollen, 1989). Another recommended index is the ratio of chi-square to degrees of freedom (Tanaka, 1993), which needs to be close to 1 (Carmines & McIver, 1981). Chi square statistic was 2237.33 based on 323 degrees of freedom ($p < .001$, chi-square/d.f. = 6.92), which was statistically significant, as would be expected in a large sample. Indices of fit (Comparative Fit Index (CFI), which is recommended to be > 0.90 ; Mueller, 1996 = .81; Root-Mean-Square Error of Approximation (RMSEA), recommended to be < 0.08 and ideally $< .05$; Hu & Bentler, 1999 = .073 Akaike's Information Criterion (AIC); Akaike, 1987; = 240.33) suggested that this model was a misfit for the data and required modifications.

Adjustments were performed based on modification indices and meaningfulness of associations among items, thus resulting in a second eight-factor model with acceptable fit (Figure 1). Item 13 ('I've been criticizing myself') loaded on two factors, Active Coping and Expression of Negative Feelings.¹ Intercorrelations between most of the eight broad factors and between individual items were also included in the final model. The chi-square statistic for this model was 922.367 based on 299 degrees of freedom ($p < .001$, chi-square/d.f. = 3.085). Indices of fit were as follows: CFI was .938, above .90, which is typically considered evidence of good fit (Mueller, 1996), RMSEA was .043, and AIC was 1192.37.

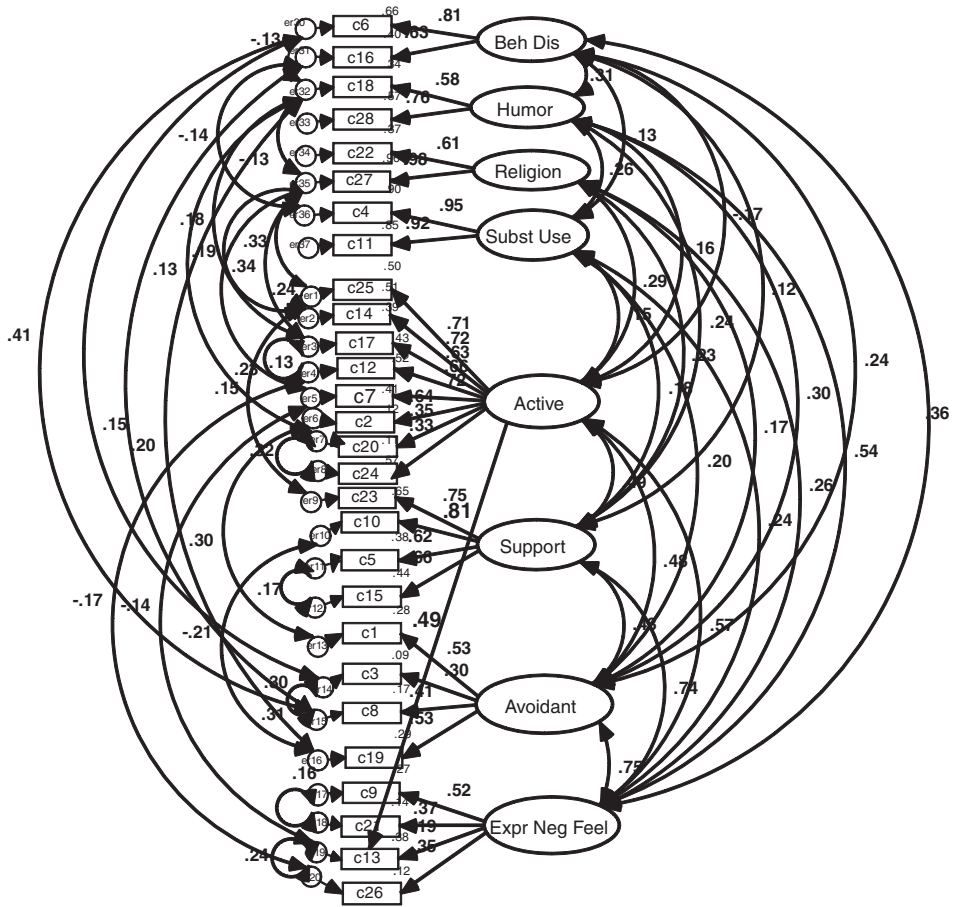


Figure 1. Path diagram of the final confirmatory factor model of the Brief-COPE.

Convergent validity

In order to investigate the convergent validity of the instrument, bivariate correlations were obtained between the GSI score of the BSI and the eight extracted factors. Overall, psychopathology did not appear to relate to the active/positive coping dimension ($r = .04, p > .05$), or religion ($r = .07, p > .05$), but higher psychopathology showed small correlations with humor ($r = .15, p = .05$), the seeking support dimension ($r = .15, p = .01$), and substance use ($r = .19, p < .01$), and moderate correlations with the expression of negative feelings dimension ($r = .32, p < .01$), behavioral disengagement ($r = .39, p < .01$), and avoidance dimension ($r = .43, p < .01$).

Discussion

The present study sought to investigate the factorial structure of the Brief-COPE with a large Greek-speaking sample in order to: (1) clarify the complex picture regarding the fundamental dimensions of the construct of coping using the Brief-COPE; (2) apply CFA, in order to verify its structure; and, finally, (3) examine the scale's psychometric properties in order to appraise its appropriateness for Greek-speaking samples. Overall, the results are in partial agreement with previous factor analytic findings suggesting the presence of broader underlying dimensions of coping. The psychometric properties

of the Greek scale seem well supported, thus providing evidence for its utility in clinical and health-related research. Descriptive statistics were very similar to those reported by Perczek et al. (2000). Internal reliability of the a priori scales was similar to that originally reported by Carver (1997) for all but one scale. The obtained small-to-medium correlations among the subscales suggest that the coping strategies measured are not entirely orthogonal but yet distinguishable (Carver et al., 1989), in that individuals tend to employ a variety of different strategies to deal with stress, which are not mutually exclusive. It should be noted, however, that the large sample size may have contributed to the emergence of so many significant correlations among the scales.

The main goal of the study was to examine the factorial structure of the scale in order to identify broad dimensions of coping strategies. With the exception of, perhaps, Perczek et al. (2000), who identified 12 factors that almost replicated Carver's original taxonomy, most other studies show that several scales tend to cluster together into broader factors (Cooper et al., 2008; Fillion et al., 2002; Zuckerman & Gagne, 2003), while in some cases factors were made up of single subscales (Miyazake et al., 2008). Indeed, our EFA showed that some factors consisted of a single scale's items, while some factors contained clusters of several scales. Thus, religion, humor and substance-use scales emerged as independent factors, which is in agreement with Miyazaki et al. (2008) and Fillion et al. (2002); the latter study, also in line with our results, additionally identified behavioral disengagement as an independent factor. This latter finding may indicate that behavioral disengagement, at least in this culture, is not construed as a part of the avoidant style as found in some previous studies, but represents a distinct coping strategy that may describe passive inactivity (helplessness) rather than the active and emotionally laden avoidance that characterizes the avoidance factor below.

The broader dimensions, emerging in the present study, also reflected previous findings. Emotional and instrumental support scales loaded together on a factor (seeking support), while active/positive strategies including planning, positive reframing and acceptance also clustered together as reported by Miyazaki et al. (2008). The avoidance factor included denial and self-distraction. These three broad dimensions have also been reported in studies using the Full COPE and reflect Carver's theorizing regarding the fundamental aspects of coping, but are here shown for the first time to emerge with the use

of the Brief-COPE using EFA. In addition, our findings indicated the presence of a fourth broad dimension, namely the expression of negative feelings, that has not been described previously, which included venting and self-blame. This may describe Folkman and Lazarus's (1980) notion of emotion-focused coping and appears to represent a basic way in which people approach problems that apparently can also be measured through the Brief-COPE. Thus, the data of the present study support an eight-factor structure that includes four broad dimensions of coping.

CFA indicated good fit for the eight-factor model, which, however, required adjustments with regards to the classification of certain items and the inter-correlations between factors. Such inter-correlations have been found in other studies and may also reflect the multiple bivariate correlations shown in Table 3. Moreover, the final model also indicates moderate-to-strong correlations between the eight factors. There are particularly strong associations between the two coping dimensions that can be considered maladaptive, namely expression of negative feelings and avoidance, potentially indicating that both these approaches are fueled by intense negative emotion that is difficult to tolerate, and also between expression of negative feelings and seeking support. The latter correlation may indicate that the need to seek support increases when people experience intense emotions that stimulate venting or when they feel that they are to blame for a problem (guilt). The presence of moderate correlations between coping dimensions that appear contradictory, such as active/positive coping and avoidance, or active/positive coping and expression of negative feelings, may indicate that, when needed, individuals can employ a variety of strategies to cope with their distress that are different but not mutually exclusive.

With regards to symptom reporting on the GSI score of the BSI in relation to coping, psychopathology was mostly related to the dimensions of expression of negative feelings, behavioral disengagement and avoidance, showing that these may reflect ineffective ways to cope. It is difficult to know using the present data the direction of causality (psychopathology leading to poor coping or vice versa) or whether both poor coping and symptomatology can be attributed to other basic etiological factors such as personality or temperament. Associations between symptoms and coping that are usually considered adaptive, namely seeking support and humor, were small, and only a minor association was found with active/positive coping. Avoidance coping has similarly

previously been linked with depression (e.g., Ottenbreit & Domson, 2004; Penland, Masten, Zelhart, Fournet, & Callahan, 2000), and avoidant and emotion-focused coping with anxiety (Feldner, Zvolensky, & Leen-Feldner, 2004; Schmidt, Eggleston, Trakowski, & Smith, 2005; Spira, Zvolensky, Eifert, & Feldner, 2004; Zeidner, 2007). On the other hand, active and problem-focused strategies have been associated with better health outcomes (Penley et al., 2002). Since the Greek BSI used in this study was not sensitive enough to examine the relation between coping and specific types of symptomatology, further research using more specialized measures of psychopathology and mental health is needed in order to better understand the mechanism linking coping to specific disorders.

Women reported more use of self-distraction, support, venting and religion. Indeed, there is similar evidence showing that women may be more likely than men to employ emotion-focused and avoidance coping (e.g., Eaton & Bradley, 2008; Hall et al., 2006), which may be partly responsible for their higher propensity toward depression, anxiety and other emotional disorders. In addition, in the present cultural context, religion may represent another important coping mechanism on which women rely. Having a college-level education was associated with a wider coping repertoire, particularly for active/positive approaches, which may be linked to a stronger sense of controllability. Similarly, the higher reported use of religion among individuals with less than college education could be associated with a lower sense of controllability, and therefore a need to resort to the supernatural during times of distress. Thus, education may be an important means through which people's resilience against stress and psychopathology can be improved. The construct of coping in this population appears to be construed in a largely similar way as it appears in other populations studied, suggesting that the possible mechanisms employed when individuals are called to cope with difficulties are similar across many cultures.

In conclusion, this study makes significant contributions to both national and international research. Regarding the use of the Brief-COPE with Greek-speaking samples, the results suggest that it is a rather useful measure of coping strategies. At the international level, the study provides additional evidence regarding the cross-cultural validation of coping as conceptualized by Carver, by confirming its multidimensional structure, while, on the other

hand, verifying the complexity of the coping repertoire available to people in the face of stress. At a more practical level, as the participants of our study seem to rely on both specific and broad coping approaches, such as active coping, avoidant coping, support seeking and expression of negative feelings to cope with stressful situations, these dimensions may be related to demographic factors such as gender and education and have ramifications for psychopathology and quality of life.

Notes

1. It is possible that while self-criticism may be involved in the expression of negative feelings about the self, it may constitute a starting step of an active coping process, where the individual takes responsibility to resolve the situation. The multiple connotations of this item may be responsible for the relatively low reliability of the self-blame subscale to which it belongs.

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