

Validation of the ways of coping checklist after a disaster

Validación de la lista de verificación de formas de afrontamiento después de un desastre

Marcelo Navarro-Fernandez, Andrea Araneda, Elizabeth Pardo-González,
Carlos Serrano, Valeria Melo-León, Verónica Needham-Quintanilla
and Marcelo Leiva-Bianchi

Received 25th November 2021 / Send for modification 22th July 2023 / Approved 23th August 2023

ABSTRACT

Objective Although widely used, the validity of the Coping Ways Checklist (WCC) is a persistent problem.

Methods By studying a sample (n=285) obtained from a population that had experienced the same traumatic event (an earthquake), using with parallel factor analysis and exploratory structure model (ESEM), a scale of 46 items was obtained: Ways of the Coping Checklist after a disaster (WCC-D).

Results The results indicate a valid model of six dimensions and two dimensions correlated with the post-traumatic stress scale used as criterion.

Discussion The good properties of the WCC-D and its relationship to posttraumatic stress were discussed. The WCC-D is made available in a format ready to be applied and reviewed by health personnel.

Key Words: Stress coping styles; disasters; post-traumatic stress; parallel factor analysis; ESEM (*source: MeSH, NLM*).

RESUMEN

Objetivo Aunque se utiliza ampliamente, la validez de la Lista de Verificación de Estilos de Afrontamiento (WCC) es un problema persistente.

Métodos Mediante el estudio de una muestra (n=285) obtenida de una población que había experimentado el mismo evento traumático (un terremoto), utilizando un análisis factorial paralelo y un modelo exploratorio de ecuaciones estructurales (ESEM), se obtuvo una escala de 46 ítems: Ways of the Coping Checklist after a Disaster (WCC-D).

Resultados Los resultados indican un modelo válido de seis dimensiones y dimensiones correlacionadas con la escala de estrés postraumático utilizada como criterio.

Discusión Se discutieron las buenas propiedades de la WCC-D y su relación con el estrés postraumático. Se deja la WCC-D disponible en un formato listo para ser aplicada y revisada por personal de salud.

Palabras Clave: Estilos de afrontamiento del estrés; desastres; estrés postraumático; análisis factorial paralelo; ESEM (*fuentes: DeCS, BIREME*).

MN: Psicol. M. Sc. Psicología. Facultad de Ciencias Sociales y Humanidades, Universidad Autónoma de Chile. Talca, Chile. navarro.marcelo.f@gmail.com
AA: Psicol. M. Sc. Terapia de la Conducta. Laboratorio de Metodología, Ciencias del Comportamiento y Neurociencia, Universidad de Talca. Talca, Chile. andrea.araneda@gmail.com
EP: Psicol. Ph. D. Psicología. Facultad de Psicología, Universidad del Desarrollo. Santiago, Chile. elizabeth.pardo.go@gmail
CS: Psicol. Ph. D. Ciencias Humanas. Facultad de Ciencias Sociales y Humanidades, Universidad Autónoma de Chile. Talca, Chile. carlos.serrano@uautonoma.cl
VM: Psicol. Laboratorio de Metodología, Ciencias del Comportamiento y Neurociencia, Universidad de Talca. Talca, Chile valeria.carolina.melo@gmail.com
VN: Psicol. Laboratorio de Metodología, Ciencias del Comportamiento y Neurociencia, Universidad de Talca. Talca, Chile. vering@gmail.com
ML: Psicol. Ph. D. Psicología. Laboratorio de Metodología, Ciencias del Comportamiento y Neurociencia, Universidad de Talca. Talca, Chile. marcleiva@utalca.cl

People exposed to traumatic events respond by activating cognitive mechanisms to cope with stress. The way to process these events depends on the cognitive style of each person, also known as way of coping (1). The transactional model of stress conceptually defines the ways of coping as a dynamic process, in which the person makes a cognitive and behavioral effort to cope with demands of their environment (2).



The ways of coping can be classified in two forms (3). The first has two dimensions: regulate the effects or emotions of the person or emotional focus; and resolve the impact of the event or problem focused, which can also include the support of other people or social support focused (4). The second form is through the two-dimensional configuration of approach or avoidance of the trauma-

tic event. Each dimension has distinct sub-dimensions, which increases the conceptual complexity (5).

Based on these classifications, questionnaires have been developed to measure the ways of coping. The Ways of Coping Checklist (WCC) (1) is probably the most commonly used. The WCC contains 66 items which measure eight

Table 1. Validations of the WCC.

Source	Sample	Dimensions
Aldwin et al. 1980 (7)	100	7 (one problem-focused coping and six different kinds of emotion-focused coping)
Vitaliano et al. 1985 (8)	425	5 (problem-focused, seeking social support, blamed self, wishful thinking, and avoidance)
Aldwin & Revenson 1987 (9)	291	8 (instrumental action, negotiation, escapism, cautiousness, minimization, self-blame, seeking meaning, and support mobilization)
Smyth & Williams 1991 (10)	191	8 (focusing, problem solving/distancing, wishful thinking, acceptance/optimism, withdrawal/risk taking, positive reappraisal, substitution, and seeking social support)
Atkinson & Violato 1993 (11)	149	8 (problem-focused coping, accepting responsibility, confrontive coping, emotional distancing, positive reappraisal, seeking social support, cognitive escape/avoidance, and psychological escape/avoidance)
Parker et al. 1993 (12)	392	4 (problem - focused coping, confrontation/seeking social support, distancing/avoidance, and denial)
Bruchon-Schweitzer et al. 1996 (13)	468	3 (problem-focused, emotion-focused, and social-support seeking)
Munet-Vilaroa et al. 2002 (14)	1063	6 (problem solving, seeking social support, cognitive escape/avoidance, distancing, accepting responsibility, and confrontive coping)
Lundqvist & Ahlström 2006 (15)	510	8 (confrontive coping, distancing, self-controlling, seeking social support, accepting responsibility, escape-avoidance, planful problem solving, positive reappraisal)
Cousson-Gélie et al. 2010 (3)	622	4 (seeking social support, problem focused-coping, self-blame and avoidance)
Senol-Durak et al. 2011 (6)	472	7 (planful problem-solving, seeking refuge in supernatural forces, keep to self, seeking social support, seeking refuge in fate, escape/avoidance and accepting responsibility)
Padyab et al. 2012 (16)	739	7 (confrontive coping, distancing, self-control, seeking social support, escape avoidance, planful problem solving, positive reappraisal)

dimensions. Two short versions of WCC exist, which contain 21 items grouped in seven dimensions (6) (Table 1).

However, the validity of the WCC is problematic. A meta-analysis performed on 130 studies shows that WCC has questionable indices of reliability (5). The number of dimensions can also differ between three to eight ($M=6$; $SD=2$; Table 1). This is likely linked with other difficulty in evaluating ways of coping: the cognitive response is rarely produced by the same event (2,17). This would minimize the error produced by the event, leaving only individual and cultural differences (18,19).

An opportunity to solve these difficulties with a validation study is rare. It could only be done in a situation where a single traumatic event affects a culturally similar population where the WCC could then be applied. This was exactly the opportunity produced by the earthquake and tsunami of February 27, 2010 (F-27) in Chile (20-22).

METHOD

Sample

In total, 285 people over the age of 18 ($M=33.9$ years, 74.1% women) who were directly exposed to F-27 participated in this study. All were selected through non-probabilistic and convenience sampling. They were interviewed between six and eight months after F-27. The research

was conducted in accordance with the principles and ethical standards of the Declaration of Helsinki (23).

Instruments

The WCC has 66 items measured on Likert scale: 0="never used", 1="sometimes used", 2="often used", 3="always used" (24). It measures eight dimensions of coping (5): Confrontive Coping (items 7, 17, 28, 34 and 46), Distancing (items 12, 13, 15, 19, 21, 32, 41, 44 and 66), Self-Controlling (items 10, 14, 35, 37, 43, 53, 54, 57, 61, 62, 63, 64 and 65), Seeking Social Support (items 8, 18, 22, 31, 42 and 45), Accepting Responsibility (items 9, 25, 29 and 51), Escape-Avoidance (items 4, 11, 16, 24, 33, 40, 47, 50, 55, 58 and 59), Planful Problem-Solving (items 1, 2, 5, 6, 26, 27, 39, 48, 49 and 52) and Positive Reappraisal (items 3, 20, 23, 30, 36, 38, 56 and 60). Items 1, 6, 15, 19, 28 and 43 must be inverted (0="always used" to 3="never used").

To measure the symptoms of post-traumatic stress (PTSD) we used the criteria of the Davidson Trauma Scale (DTS). Items are classified according to the DSM-IV criteria for PTSD diagnosis: criterion B "re-experiencing" (Items 1 to 5); criterion C "avoidance and numbing" (Items 6 to 12); criterion D "hyperarousal" (Items 13 to 17). For each item, the person makes two evaluations, both on a scale of 0 (never/nothing) to 4 (daily/extreme) points: frequency

(number of times it has happened) and intensity (magnitude or severity) of the symptom (25).

Data analysis

To determine the construct validity of the WCC, we performed parallel factor analysis (PA), and exploratory structural equation modeling (ESEM). As the dimensionality of WCC has been a recurring problem in previous studies, we first performed a PA. This robust test allowed us to compare the observed eigenvalues ($\square_{\text{Observed}}$) with those obtained in random samples, which gives an exact and reliable number of dimensions. In this case, we carried out PA through the method of Horn and considering the mean of random eigenvalues (\square_{Mrandom}) for advised number of dimensions. The solution with the least difference between the observed eigenvalues and the mean of random eigenvalues was the better solution (26). The solution was admissible and it was relevant to perform the analysis if the following tests show values within the following limits: KMO > .51; Bartlett Sphericity Test ($p < .05$).

ESEM (ULSMV estimator and geomin oblique rotation) was performed to determine which items had loads in each factor. For this, the items were removed from each factor according to the information provided by the standardized weights matrix (STDYX), as follows: item has not a significant load; the load of the item on the factor is less than .3 ($w < |.3|$); or whose difference from the other weights of other factors was equal to or less than .2 (27). In the case that an item has loads in two factors, it was considered that it belongs to the factor whose load was higher. Only dimensions with at least three items were allowed. A model has an appropriate fit if: RMSEA < .06 ($CI_{90}[\text{MinRMSEA-MaxRMSEA}] = [.00-.06]$) and CFI > .9. Empirical and simulation studies indicate that ESEM is a robust test and more accurate than confirmatory factor analysis in order to group items into factors (28).

To determine concurrent validity, Pearson correlations were conducted between WCC items with DTS items. If the dimensions of WCC focused on emotions or avoiding the event are related to the DTS-PTSD dimensions, the better the criterion validity. All these correlations must be statistically significant ($p < .05$). We estimated the reliability for each dimension of the scale finally obtained using the Omega ($\square > .7$) test (29). Finally, using the percentile range method, we establish the cut-off points in order to determine low, moderate or high development of each way of coping. To compliment this, and using the same final sample, we gave the necessary descriptive statistics (M, SD) to understand the distribution of each dimension and

we proved if each one is distributed normally through the Kolmogorov-Smirnov (KS) and Shapiro-Wilks (SW) tests ($p > .05$). Data analysis were performed using FACTOR 10 (PA and reliability), MPLUS 7 (ESEM) and SPSS 14 (concurrent validity and cut-off points).

RESULTS

How many dimensions does the WCC have?

Based on PA, the number of dimensions of the WCC could be seven ($\square_{\text{Observed}} - \square_{\text{Mrandom}} = 0.012$). This is an acceptable solution (KMO = .835; $X^2 = 7191.5$; $p < .001$) that explained 41.8% of the total variance (Table 2). For its part, ESEM indicates that this solution had a good fit (RMSEA = .029; $CI_{90} [.025-.033]$; CFI = .920) (Table 2).

What are the dimensions of the WCC?

Based on ESEM, STDYX were analyzed. In total, we obtained one dimension with one item (which was discarded) and six dimensions with three or more items (which were admitted). Of these, three fit with the already known theoretical dimensions, with some variation: escape and avoidance (refusing to accept the event, fantasizing that it has not occurred or that it will disappear in time or when circumstances change, refusing to take it too seriously, or feeling better through addictive behaviors); social support (talking to someone who can provide information about the situation or do something about the event); and problem solving (remembering past experiences or people who could be an example in that situation, considering different alternatives and points of view to act, keeping the emotions as controlled as possible, changing personal aspects if will be necessary, or standing firm and thinking things could be worse). The three new dimensions were: personal growth (positive personal changes, learning from experience, doing creative or physical activities, resting, which allow to focus on the positive aspects of life); self-revelation (expressing feelings and asking others for advice, apologising if necessary); and faith (religious practices linked with believing in the help of a god, rediscovering the importance of life, or an inexplicable improvement in circumstances). In total, this new version of WCC had 46 items (Table 3).

Concurrent validity, reliability, norms and descriptive statistics of WCC

For concurrent validity, Table 4 shows us Pearson correlations between six new WCC dimensions and three DTS dimensions. Escape-avoidance and faith dimensions of coping were related with three dimensions of DTS ($p < .05$).

Table 2. Dimensions, observed eigenvalues, mean of random eigenvalues, differences and proportion of variance (%)

Dimension	□Observed	□Mrandom	□Observed-□Mrandom	% of variance
1	11.048	2.105	8.944	16.74
2	5.009	2.008	3.001	7.59
3	3.610	1.931	1.679	5.47
4	2.229	1.871	0.359	3.38
5	2.113	1.818	0.295	3.20
6	1.852	1.767	0.086	2.81
*7	1.733	1.722	0.012	2.63
8	1.634	1.677	-0.043	2.48
9	1.517	1.634	-0.117	2.30
10	1.455	1.593	-0.137	2.21
11	1.402	1.554	-0.153	2.12
12	1.292	1.517	-0.225	1.96
13	1.239	1.483	-0.244	1.88
14	1.205	1.448	-0.243	1.83
15	1.124	1.416	-0.292	1.70
16	1.117	1.384	-0.267	1.69
17	1.080	1.352	-0.272	1.64
18	1.042	1.322	-0.280	1.58
19	1.016	1.292	-0.277	1.54
20	0.936	1.263	-0.327	1.42
21	0.930	1.235	-0.305	1.41
22	0.905	1.206	-0.301	1.37
23	0.873	1.179	-0.305	1.32
24	0.827	1.153	-0.326	1.25
25	0.789	1.126	-0.337	1.20
26	0.773	1.100	-0.328	1.17
27	0.765	1.077	-0.312	1.16
28	0.752	1.052	-0.300	1.14
29	0.720	1.027	-0.307	1.09
30	0.688	1.004	-0.317	1.04
31	0.666	0.981	-0.315	1.01
32	0.663	0.959	-0.295	1.01
33	0.632	0.935	-0.303	0.96
34	0.619	0.914	-0.295	0.94
35	0.607	0.893	-0.286	0.92
36	0.597	0.871	-0.274	0.91
37	0.590	0.850	-0.259	0.89
38	0.548	0.829	-0.281	0.83
39	0.534	0.808	-0.274	0.81
40	0.504	0.788	-0.284	0.76
41	0.493	0.768	-0.275	0.75
42	0.470	0.748	-0.278	0.71
43	0.456	0.728	-0.272	0.69
44	0.455	0.709	-0.254	0.69
45	0.427	0.690	-0.263	0.65
46	0.423	0.671	-0.248	0.64
47	0.390	0.652	-0.262	0.59
48	0.386	0.633	-0.247	0.59
49	0.369	0.613	-0.244	0.56
50	0.364	0.596	-0.232	0.55
51	0.344	0.577	-0.233	0.52
52	0.324	0.560	-0.236	0.49
53	0.319	0.542	-0.223	0.48
54	0.314	0.524	-0.211	0.48
55	0.295	0.506	-0.210	0.45
56	0.276	0.488	-0.212	0.42
57	0.274	0.470	-0.196	0.42
58	0.268	0.452	-0.185	0.41
59	0.252	0.435	-0.183	0.38
60	0.243	0.417	-0.174	0.37
61	0.236	0.398	-0.162	0.36
62	0.229	0.379	-0.150	0.35
63	0.217	0.359	-0.142	0.33
64	0.199	0.339	-0.139	0.30
65	0.171	0.316	-0.145	0.26
66	0.168	0.288	-0.121	0.25

*: Number of dimensions according to the minimum difference reported.

Table 3. Standardized weights matrix

	Item	1	2	3	4	5	6	7
V01	I just concentrated on what I had to do next step.	.166	.101	-.085	-.051	-.014	.060	.234
V02	I tried to analyze the problem in order to understand it better.	.468	.015	-.216	-.247	.010	.010	.470
V03	I tried to find the lesson that God wanted me to learn.	.386	-.002	.628	.015	.034	-.015	-.102
V04	I felt that time would make a difference –the only thing to do was waiting.	.437	.232	.311	-.048	.010	-.064	.027
V05	I took the time to understand how I really felt.	.549	.135	-.008	-.323	.204	-.009	.320
V06	I did something which I didn't think would work, but at least I was doing something.	.480	-.038	.086	.096	.267	.038	.097
V07	I tried to get the person responsible to change their mind.	.462	.002	-.065	-.011	.310	-.020	.300
V08	I talked to someone to find out more about the situation.	.184	.233	.004	.009	.382	.217	.003
V09	I criticized or lectured myself.	-.226	.023	.048	-.394	-.434	-.069	.044
V10	I tried not to act impulsively.	.184	.277	-.117	-.036	.077	.169	.039
V11	I hoped for a miracle.	.274	.096	.713	.164	.004	-.027	-.153
V12	I went along with fate, it was just bad luck.	.242	.012	.051	.557	.010	-.156	-.019
V13	I went on as if nothing had happened.	.095	.447	-.109	.129	-.069	-.410	.090
V14	I tried to keep my feelings to myself.	.191	.079	-.021	.301	-.012	-.266	.248
V15	I tried to look on the bright side, to see the positive side of things.	.050	.746	.041	-.232	-.220	-.011	-.036
V16	I slept more than usual.	.010	.502	.015	.291	.049	-.128	-.169
V17	I expressed anger towards the person(s) who caused the problem.	.206	.127	.065	.244	.112	-.029	.023
V18	I accepted sympathy and understanding from others.	.189	.396	.070	.031	-.077	.369	-.133
V19	I told myself things that made me feel better.	.220	.473	.177	.024	.034	.130	.052
V20	I was inspired to do something creative.	.040	.325	-.100	-.012	.224	.083	.214
V21	I tried to forget the whole situation.	.029	.230	.304	.286	.136	-.187	-.013
V22	I got professional help.	.097	-.097	.163	.175	.578	.016	-.015
V23	I changed or grew as a person in a good way.	.003	.436	.150	.041	.092	.179	.026
V24	I waited to see what would happen before doing anything.	.277	.309	.009	.092	.123	.166	-.015
V25	I apologize for making a mistake.	-.108	.296	.120	-.075	.071	.313	.132
V26	I made a plan of action and followed it.	.040	.280	-.091	-.098	.339	.211	.187
V27	I talked to someone who could do something concrete about the problem.	.082	.049	.036	.028	.558	.321	.223
V28	I let my feelings out somehow.	.033	.178	.055	-.183	.190	.599	.034
V29	I realized that I brought the problem on myself.	.173	.112	-.352	.309	.239	.188	.027
V30	I gained from the experience.	-.135	.489	-.238	.018	.122	.227	.033
V31	I talked to someone who could do something about the problem.	.015	-.020	.005	.015	.406	.373	.261
V32	I accepted God's help to overcome the situation.	-.107	.046	.806	-.045	.001	.047	.014
V33	I tried to make myself feel better by eating, drinking, smoking, using drugs or medication, etc.	.015	.004	-.071	.524	-.023	.045	-.011
V34	I took a big chance or did something risky.	-.036	-.025	-.125	.297	.290	.058	.219
V35	I tried not to act too hastily or follow my first instinct.	-.140	.122	-.051	.085	.073	.128	.220
V36	I found new faith.	-.027	.052	.760	.121	-.009	.034	.053
V37	I maintained my pride and kept a stiff upper lip.	-.035	.120	.163	.410	.011	-.074	.010
V38	I rediscovered what is important in life.	-.129	.195	.575	-.003	-.155	.056	.177
V39	I changed my behavior so that things would turn out well.	-.045	.192	.344	.007	.283	-.003	.274
V40	I avoided being with people in general.	-.105	.045	.043	.611	.337	-.296	.035
V41	I refused to think too much about the problem.	-.144	.035	.153	.661	.033	-.045	.040
V42	I asked a friend or family member for advice.	-.058	-.058	-.081	.326	.031	.707	.086
V43	I told other people how bad things were.	-.030	-.018	-.024	-.392	.209	-.680	-.021
V44	I made light of the situation; I refused to take it too seriously.	-.060	.174	-.141	.519	.069	.069	.049
V45	I talked to someone about how I was feeling.	.012	.122	.107	-.039	.050	.495	.112
V46	I stood my ground and fought for what I wanted.	-.096	.236	.134	-.292	.045	.001	.588
V47	I blamed other people.	.205	.029	-.312	.651	.020	-.025	-.043
V48	I drew on my past experiences.	-.046	.156	-.404	.121	-.018	.159	.419

	Item	1	2	3	4	5	6	7
V49	I knew what had to be done, so I redoubled my efforts to make things work.	-.125	.300	-.065	-.141	.021	-.001	.621
V50	I refused to believe that it had happened.	.256	-.116	.127	.523	-.074	.047	.006
V51	I promised myself that things would be different next time.	.134	.056	-.013	.107	-.053	.097	.488
V52	I came up with a couple of different solutions to the problem.	.131	.186	-.161	.089	-.080	.266	.360
V53	I accepted the situation since nothing could be done.	.044	.305	.125	.006	-.330	.073	.190
V54	I tried to keep my feelings from interfering with other things too much.	-.057	.166	.065	.037	-.068	-.134	.469
V55	I tried not to focus on the situation; I took it lightly.	-.010	.233	-.297	.454	-.125	-.044	.043
V56	I changed something about myself.	-.020	.112	.285	.042	.177	.039	.410
V57	I imagine being in a better time or place.	.236	.024	.392	.074	-.233	.017	.388
V58	I wished the situation would go away or disappear.	.218	-.076	.533	.272	-.226	.059	.176
V59	I had fantasies or wishes about how things might turn out better.	.283	-.054	.115	.324	-.291	.138	.353
V60	I prayed.	.063	-.072	.688	-.049	-.062	.007	.247
V61	I prepared myself for the worst.	.147	-.025	.091	.094	-.100	-.096	.446
V62	I kept others from knowing how bad things were.	.109	-.122	.041	.302	.071	-.285	.528
V63	I thought about how a person I admire would handle this situation and used that as a model.	-.024	-.107	-.017	.171	.064	.082	.538
V64	I tried to see things from the other person's point of view.	.074	.065	.134	-.069	.027	.022	.590
V65	I reminded myself how much worse things could be.	.025	-.150	.040	.182	.051	-.021	.527
V66	I did exercise.	-.098	.313	-.016	-.016	.096	-.215	.191

Note. In **bold**, significant loadings, greater than .3, whose difference from the other loadings of other factors was equal to or greater than .2. In case that an item loads on two factors, it emphasizes with bold the highest load.

Table 4. Reliability, descriptive statistics, normality tests and correlations between WCC and DTS

WCC factors	□	M	SD	KS	p	SW	p	Re-experiencing	Avoidance/ numbing	Hyperarousal
Escape avoidance	.700	6.554	4.272	*.132	.000	*.918	.000	*.232	*.335	*.269
Faith	.811	12.260	5.965	*.075	.001	*.977	.000	*.227	*.327	*.339
Personal growth	.699	13.414	5.256	*.087	.000	*.990	.046	-.080	-.049	-.052
Problem solving	.804	14.449	5.902	.053	.053	.993	.236	.076	.031	.100
Self-revelation	.689	6.077	2.917	*.084	.000	*.977	.000	.043	-.040	.057
Social support	.517	3.161	2.063	*.124	.000	*.955	.000	.010	.027	-.003

Note. *: p<.05.

In regard to the reliability of dimensions, the values from the Omega test are between .811 (faith) and .517 (social support). Only problem solving dimension was normally distributed ($KS=.053$; $p<.053$; $SW=.993$; $p=.236$). Finally,

we established the cut-off points for low, medium and high levels of the development of the coping style (Figures 1 and 2) (Figure 1 and 2).

Figure 1. Ways of Coping Check List Disasters Version ready to be used English version

Below you will find a series of items which evaluate the way in which you cope with a difficult or stressful situation, _____ (write the traumatic event for example a disaster). Mark with an X the degree to which each item applies to your way of coping with this event. So, you might never, sometimes, often or always cope with this event in the way indicated by each phrase, and this is what you need to mark in each box.

Social support		Never	Sometimes	Often	Always	Total Social support=
1.	I talked to someone to find out more about the situation.	0	1	2	3	-----
2.	I got professional help.	0	1	2	3	
3.	I made a plan of action and followed it.	0	1	2	3	
Self-revelation		Never	Sometimes	Often	Always	Total Self-revelation=
4.	I apologized for making a mistake.	0	1	2	3	-----
5.	I let my feelings out somehow.	0	1	2	3	
6.	I asked a friend or family member for advice.	0	1	2	3	
7.	I talked to someone about how I was feeling.	0	1	2	3	
Personal growth		Never	Sometimes	Often	Always	Total Personal growth=
8.	I went on as if nothing had happened.	0	1	2	3	-----

9.	I tried to look on the bright side, to see the positive side of things.	0	1	2	3	
10.	I slept more than usual.	0	1	2	3	
11.	I told myself things that made me feel better.	0	1	2	3	
12.	I was inspired to do something creative.	0	1	2	3	
13.	I changed or grew as a person in a good way.	0	1	2	3	
14.	I waited to see what would happen before doing anything.	0	1	2	3	
15.	I gained from the experience.	0	1	2	3	
16.	I accepted the situation, since nothing could be done.	0	1	2	3	
17.	I did exercise.	0	1	2	3	
Escape and avoidance		Never	Sometimes	Often	Always	Total Escape and avoidance=
18.	I went along with fate, it was just bad luck.	0	1	2	3	-----
19.	I tried to keep my feelings to myself.	0	1	2	3	
20.	I realized that I brought the problem on myself.	0	1	2	3	
21.	I tried to make myself feel better by eating, drinking, smoking, using drugs or medication, etc.	0	1	2	3	
22.	I maintained my pride and kept a stiff upper lip.	0	1	2	3	
23.	I refused to think too much about the problem.	0	1	2	3	
24.	I made light of the situation; I refused to take it too seriously.	0	1	2	3	
25.	I blamed other people.	0	1	2	3	
26.	I refused to believe that it had happened.	0	1	2	3	
27.	I tried not to focus on the situation; I took it lightly.	0	1	2	3	
Faith		Never	Sometimes	Often	Always	Total Faith=
28.	I hoped for a miracle.	0	1	2	3	-----
29.	I tried to forget the whole situation.	0	1	2	3	
30.	I accepted God's help to overcome the situation.	0	1	2	3	
31.	I found new faith.	0	1	2	3	
32.	I rediscovered what is important in life.	0	1	2	3	
33.	I changed my behavior so that things would turn out well.	0	1	2	3	
34.	I wished the situation would go away or disappear.	0	1	2	3	
35.	I prayed.	0	1	2	3	
Problem solving		Never	Sometimes	Often	Always	Total Problem solving=
36.	I stood my ground and fought for what I wanted.	0	1	2	3	-----
37.	I drew on my past experiences.	0	1	2	3	
38.	I knew what had to be done, so I redoubled my efforts to make things work.	0	1	2	3	
39.	I promised myself that things would be different next time.	0	1	2	3	
40.	I came up with a couple of different solutions to the problem.	0	1	2	3	
41.	I tried to keep my feelings from interfering with other things too much.	0	1	2	3	
42.	I changed something about myself.	0	1	2	3	
43.	I prepared myself for the worst.	0	1	2	3	
44.	I thought about how a person I admire would handle this situation and used that as a model.	0	1	2	3	
45.	I tried to see things from the other person's point of view.	0	1	2	3	
46.	I reminded myself how much worse things could be.	0	1	2	3	
Finally, you can figure out the degree of development of each of your ways of coping, and which are predominant. To do this, select the total for each style and mark the box with an X.						
High	5-9	8-12	16-30	9-30	17-24	18-33
Middle	2-4	5-7	11-15	4-8	9-16	12-17
Low	0-1	0-4	0-10	0-3	0-8	0-11
Social support		Self-revelation	Personal growth	Escape and avoidance	Faith	Problem solving

Figure 2. Ways of coping check list disasters version ready to be used Spanish version

A continuación encontrará una serie de ítems que evalúan la forma en que afronta una situación difícil o estresante, _____
(escriba el evento traumático por ejemplo un desastre). Marque con una X el grado en que cada elemento se aplica a su forma de afrontar este evento. Por lo tanto, es posible que nunca, a veces, a menudo o siempre se enfrente a este evento de la manera indicada por cada frase, y esto es lo que debe marcar en cada casilla

Apoyo social	Nunca	A veces	A menudo	Siempre	Apoyo social total=
1. Hablé con alguien para averiguar más sobre la situación.	0	1	2	3	-----
2. Conseguí ayuda profesional.	0	1	2	3	
3. Hice un plan de acción y lo seguí.	0	1	2	3	
Auto-revelación	Nunca	A veces	A menudo	Siempre	Autorevelación total=
4. Me disculpé por cometer un error.	0	1	2	3	-----
5. Dejé salir mis sentimientos de alguna manera.	0	1	2	3	
6. Le pedí consejo a un amigo o familiar.	0	1	2	3	
7. Hablé con alguien sobre cómo me sentía.	0	1	2	3	
Crecimiento personal	Nunca	A veces	A menudo	Siempre	Crecimiento personal total=
8. Continué como si nada hubiera pasado.	0	1	2	3	-----
9. Traté de ver el lado positivo de las cosas.	0	1	2	3	
10. Dormí más de lo habitual.	0	1	2	3	
11. Me dije cosas que me hicieron sentir mejor.	0	1	2	3	
12. Me inspiré para hacer algo creativo.	0	1	2	3	
13. Crecí como persona de una buena manera.	0	1	2	3	
14. Esperé a ver qué pasaba antes de hacer nada.	0	1	2	3	
15. Gané de la experiencia.	0	1	2	3	
16. Acepté la situación, ya que no se podía hacer nada.	0	1	2	3	
17. Hice ejercicio.	0	1	2	3	
Escape evitación	Nunca	A veces	A menudo	Siempre	Escape evitación total=
18. Acepté mi destino, solo fue mala suerte.	0	1	2	3	-----
19. Traté de guardar mis sentimientos para mí.	0	1	2	3	
20. Me di cuenta de que yo mismo me había traído el problema.	0	1	2	3	
21. Traté de sentirme mejor comiendo, bebiendo, fumando, usando drogas o medicamentos, etc.	0	1	2	3	
22. Me mantuve firme y mantuve la compostura.	0	1	2	3	
23. Me negué a pensar demasiado en el problema.	0	1	2	3	
24. Tomé a la ligera la situación.	0	1	2	3	
25. Culpé a otras personas.	0	1	2	3	
26. Me negué a creer que había sucedido.	0	1	2	3	
27. Traté de no concentrarme en la situación.	0	1	2	3	
Fe	Nunca	A veces	A menudo	Siempre	Fe total=
28. Esperé un milagro.	0	1	2	3	-----
29. Traté de olvidar toda la situación.	0	1	2	3	
30. Acepté la ayuda de Dios para superar la situación.	0	1	2	3	
31. Encontré una nueva fe.	0	1	2	3	
32. Redescubrí lo que es importante en la vida.	0	1	2	3	
33. Cambié mi comportamiento para que todo saliera bien.	0	1	2	3	
34. Deseaba que la situación se fuera o desapareciera.	0	1	2	3	
35. Oré.	0	1	2	3	
Resolver problema	Nunca	A veces	A menudo	Siempre	Resolver problema total=
36. Me mantuve firme y luché por lo que quería.	0	1	2	3	-----
37. Me basé en mis experiencias pasadas.	0	1	2	3	
38. Sabía lo que tenía que hacer, así que redoblé mis esfuerzos para que las cosas marcharan bien.	0	1	2	3	
39. Me prometí a mí mismo que las cosas serían diferentes la próxima vez.	0	1	2	3	
40. Se me ocurrieron un par de soluciones diferentes al problema.	0	1	2	3	

41.	Traté de evitar que mis sentimientos interfirieran demasiado con otras cosas.	0	1	2	3	
42.	Cambié algo sobre mí.	0	1	2	3	
43.	Me preparé para lo peor.	0	1	2	3	
44.	Pensé en cómo una persona a la que admiro manejaría esta situación y lo usé como modelo.	0	1	2	3	
45.	Traté de ver las cosas desde el punto de vista de la otra persona.	0	1	2	3	
46.	Me recordé a mí mismo que las cosas podrían ser mucho peores.	0	1	2	3	
Por último, puede averiguar el grado de desarrollo de cada uno de sus estilos de afrontamiento y cuáles son predominantes. Para hacer esto, seleccione el total para cada estilo y marque la casilla con una X						
Alto	5-9	8-12	16-30	9-30	17-24	18-33
Medio	2-4	5-7	11-15	4-8	9-16	12-17
Bajo	0-1	0-4	0-10	0-3	0-8	0-11
Apoyo social		Auto-revelación	Crecimiento personal	Escape evitación	Fe	Resolver problema

DISCUSSION

The main finding is the partial confirmation of the dimensions originally proposed for the WCC. Now, WCC-D contains 46 items grouped into six dimensions. The three which coincide with the original structure refer to central aspects in the theory of coping: avoid, solve or socialize the problem (1). These dimensions also clearly appear in 83% of revised studies (Table 1). Regarding the new dimensions, two refer to complimentary ways to cope with stress: understand what has happened to you and express it to others. Although these elements are not dimensions in revised studies, they do have a clear theoretical base. Folkman and collaborators (2) indicated as key aspects of the definition of coping: a phenomenon, process oriented (personal growth) and contextual (self-revelation). The dimension of faith, which is also new in WCC-D, appears in a study by Senol-Durak and collaborators (6) and can be included in the process-oriented aspects.

Regarding the relationship with PTSD, the WCC-D shows its criterion validity. We believe that the symptoms of PTSD may increase along with the avoidance and emotional coping dimensions (30,31). Knowing that faith-based or avoidant coping styles increase PTSD symptoms is helpful for health interventions after disasters.

It should be noted that the reliability of the WCC-D dimensions, although particularly good, ended up being somewhat less than the original scale. This is because the dimensions of the WCC-D have fewer items than the original. However, the WCC-D has two significant advantages over the original version. It has greater construct validity and it is shorter. We leave the WCC-D available in a format suitable for being directly applied and corrected by professionals (Figure 1). Validation with events other than disasters is recommended for future research. In this regard, it is important that the same event is evaluated in those who participate ♦

Conflicts of interest: None.

Acknowledgments: FONDECYT-Chile N°1190578.

REFERENCES

- Folkman S, Lazarus RS. An analysis of coping in a middle-aged community sample. *J Health Soc Behav.* 1980; 21(3):219-39. <https://doi.org/10.2307/2136617>.
- Folkman S, Lazarus RS, Dunkel-Schetter C, DeLongis A, Gruen RJ. Dynamics of a stressful encounter: Cognitive appraisal, coping, and encounter outcomes. *J Pers Soc Psychol.* 1986; 50(5):992-1003. <https://doi.org/10.1037/0022-3514.50.5.992>.
- Cousson-Gélie F, Cosnefroy O, Christophe V, Sefrestan-Crouzet C, Merckaert I, Fournier E, et al. The Ways of Coping Checklist (WCC): validation in French-speaking cancer patients. *J Health Psychol.* 2010; 15(8):1246-56. <https://doi.org/10.1177/1359105310364438>.
- Litman JA. The COPE inventory: Dimensionality and relationships with approach- and avoidance-motives and positive and negative traits. *Pers Individ Dif.* 2006; 41(2):273-84. <https://doi.org/10.1016/j.paid.2005.11.032>.
- Kieffer KM, MacDonald G. Exploring factors that affect score reliability and variability in the Ways of Coping Questionnaire reliability coefficients: A meta-analytic reliability generalization study. *J Individ Differ.* 2011; 32(1):26-38. <https://doi.org/10.1027/1614-0001/a000031>.
- Senol-Durak E, Durak M, Elagöz FÖ. Testing the psychometric properties of the Ways of Coping Questionnaire (WCQ) in Turkish university students and community samples. *Clin Psychol Psychother.* 2011; 18(2):172-85. <https://doi.org/10.1002/cpp.677>.
- Aldwin C, Folkman S, Shaefer C, Coyne J, Lazarus R. Ways of Coping Checklist: Process measure. In: Annual Meeting of the American Psychological Association; 1980; Montreal, Canada. <https://doi.org/10.1037/07639-000>.
- Vitaliano PP, Russo J, Carr JE, Maiuro RD, Becker J. The Ways of Coping Checklist: Revision and psychometric properties. *Multivariate Behav Res.* 1985; 20(1):3-26. https://doi.org/10.1207/s15327906mbr2001_1.
- Aldwin CM, Revenson TA. Does coping help? A reexamination of the relation between coping and mental health. *J Pers Soc Psychol.* 1987; 53(2):337-48. <https://doi.org/10.1037/0022-3514.53.2.337>.
- Smyth KA, Williams PD. Patterns of coping in Black working women. *Behav Med.* 1991; 17(1):40-6. <https://doi.org/10.1080/08964289.1991.9937551>.
- Atkinson M, Violato C. A factor analysis of the Ways of Coping Questionnaire based on data from saddening experiences. *Psychol Rep.* 1993; 72(3):1159-64. <https://doi.org/10.2466/pr0.1993.72.3c.1159>.
- Parker JD, Endler NS, Bagby RM. If it changes, it might be unstable: Examining the factor structure of the Ways of Coping Questionnaire. *Psychol Assess.* 1993; 5(3):361-8. <https://doi.org/10.1037/1040-3590.5.3.361>.

13. Bruchon-Schweitzer M, Cousson F, Quintard B, Nuissier J, Rascle N. French adaptation of the Ways of Coping Checklist. *Percept Mot Skills*. 1996;83(1):104-6. <https://doi.org/10.2466/pms.1996.83.1.104>.
14. Munet-Vilaroa F, Gregorich SE, Folkman S. Factor structure of the Spanish version of the Ways of Coping Questionnaire. *J Appl Soc Psychol*. 2002; 32(9):1938-54. <https://doi.org/10.1111/j.1559-1816.2002.tb00265.x>.
15. Lundqvist LO, Ahlström G. Psychometric evaluation of the Ways of Coping Questionnaire as applied to clinical and nondclinical groups. *J Psychosom Res*. 2006; 60(5):485-93. <https://doi.org/10.1016/j.jpsychores.2005.08.019>.
16. Padyab M, Ghazinour M, Richter J. Factor structure of the Farsi version of the Ways of Coping Questionnaire. *J Appl Soc Psychol*. 2012; 42(8):2006-18. <https://doi.org/10.1111/j.1559-1816.2012.00928.x>.
17. Riquelme A, Buendia J, Rodríguez MC. Estrategias de afrontamiento y apoyo social en personas con estrés económico. *Psicothema* [Internet]. 1993; 5(1):83-9. Available at: <https://tinyurl.com/kc6vawyw>.
18. Cortina LM, Wasti AS. Profiles in coping: Responses to sexual harassment across persons, organizations, and cultures. *J Appl Psychol*. 2005;90(1):182-92. <https://doi.org/10.1037/0021-9010.90.1.182>.
19. Sawang S, Oei TPS, Goh YW, Mansoor W, Markhum E, Ranawake D. Confirmatory factor analysis of the way of coping checklist-revised (WCCL-R) in the Asian context. *Appl Psychol*. 2010; 59(2):202-19. <https://doi.org/10.1111/j.1464-0597.2009.00378.x>.
20. Pan American Health Organization. El terremoto y el tsunami del 27 de febrero en Chile: Crónicas y lecciones aprendidas en el sector salud [The earthquake and tsunami in Chile February 27: Chronicles and lessons learned in the health sector] [Internet]. Santiago de Chile: PAHO; 2010. Available at: <https://tinyurl.com/48bbekb2>.
21. Cova F, Rincón P. El terremoto y tsunami del 27-F y sus efectos en la salud mental. *Ter Psicol*. 2010; 28(2):179-85. <https://doi.org/10.4067/S0718-48082010000200006>.
22. Leiva-Bianchi M. Relevancia y prevalencia del estrés post-traumático post-terremoto como problema de salud pública en Constitución, Chile. *Rev. salud pública (Bogotá)*. 2011; 13(4):551-9. <https://doi.org/10.1590/S0124-00642011000400001>.
23. World Medical Association (WMA). Declaración de Helsinki de la AMM: Principios éticos para las investigaciones médicas en seres humanos [Internet]. WMA; 2013. Available at: <https://tinyurl.com/mwm9jr6x>.
24. Nava-Quiroz C, Vega-Valero C, Soria R. Escala de modos de afrontamiento: Consideraciones teóricas y metodológicas. *Univ Psychol* [Internet]. 2010; 9(1):139-47. Disponible en: <https://bit.ly/45G59FT>.
25. Davidson JRT, Book SW, Colket JT, Tupler LA, Roth S, David D, et al. Assessment of a new self-rating scale for post-traumatic stress disorder. *Psychol Med*. 1997; 27(1):153-60. <https://doi.org/10.1017/S0033291796004229>.
26. Garrido LE, Abad FJ, Ponsoda V. A new look at Horn's parallel analysis with ordinal variables. *Psychol Methods*. 2013; 18(4):454-74. <https://doi.org/10.1037/a0030005>.
27. Howard MC. A review of exploratory factor analysis (EFA) decisions and overview of current practices: What we are doing and how can we improve? *Int J Hum Comput Interact*. 2015; 32(1):51-62. <https://doi.org/10.1080/10447318.2015.1087664>.
28. Lai K, Green SB. The problem with having two watches: Assessment of fit when RMSEA and CFI disagree. *Multivariate Behav Res*. 2016; 51:220-39. <https://doi.org/10.1080/00273171.2015.1134306>.
29. Cho E, Kim S. Cronbach's coefficient alpha: Well-known but poorly understood. *Organ Res Methods*. 2015; 18:207-30. <https://doi.org/10.1177/1094428114555994>.
30. Leiva-Bianchi M, Baher G, Poblete C. Efecto de las estrategias de afrontamiento al estrés en los síntomas de estrés postraumático en sobrevivientes de un terremoto. *Ter Psicol*. 2012; 30(2):51-9. <https://doi.org/10.4067/S0718-48082012000200005>.
31. Tipsword J, Brown-Iannuzzi J, Jones A, Flores J, Badour C. Avoidance coping partially accounts for the relationship between trauma-related shame and PTSD symptoms following interpersonal trauma. *Violence Against Women*. 2021; 28(1):107-25. <https://doi.org/10.1177/1077801220988350>.