A Modified CD-RISC: Including Previously Unaccounted for Resilience Variables

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Abstract

Background. Resilience is considered as the capacity to overcome adversity. Identifying psychiatric patients with lower resilience scores may assist mental health or other healthcare professionals in tailoring treatment to patients' needs. The original 25-item Connor-Davidson Resilience Scale (CD-RISC) has been used widely to measure resilience. However, the factor structure of CD-RISC in the original paper has not been replicated in subsequent studies. We sought to modify the original 25-item CD-RISC to achieve a stable factor structure.

Methods. The original 25-item CD-RISC was modified to include three new items, and most original items were revised for clarity and relevance for respondents, to achieve a more precise and accurate response. A few items were deleted based on empirically driven modifications. A total of 266 respondents were obtained from a university-based psychiatric outpatient clinic and hospital psychiatric outpatient clinic. An exploratory factor analysis was conducted.

Results. A four-dimension factor structure was identified using this data set. One item, "have to act on hunch" was deleted from the factor analysis due to weak correlation with the other variables. The instrument had excellent internal consistency (Cronbach's Alpha = 0.94).

Conclusions. The modified 27-item CD-RISC achieved a stable factor structure and high internal consistency, and generated a more interpretable result than the original CD-RISC.

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Introduction

Resilience is the ability to overcome adversity and to return to a person's previously established functional baseline.[1] The concept of resilience has been studied among different subsets of people, including the general population,[2] the elderly,[1] soldiers returning from active military duty overseas,[3] and individuals who, due to their line of work, are predisposed to post-traumatic stress disorder (PTSD) and/or other mental illnesses.[2-4]

The scope of what has been included in the term "resilience" has adapted as increased interest in the subject spurred research in various subject populations.[1,2]

Initially, resilience was defined as the ability to cope,[1] and it often was used inter-changeably with hardiness.[5-7] Maddi and Khoshaba[8] defined hardiness as a measure of mental health, however, they did not take into account dimensions beyond psycho-logical. Richardson proposed a biopsycho-spiritual model (encompassing mind, body, soul, and current life events),[2,9,10] whereas Connor and Davidson proposed a more biopsychosocial model (including trust in one's instincts, control, spiritual influences, and personal competency).[2,11]

The definition of resilience has evolved to encompass flexibility,[1] positive adapt-

ation,[11-12] the ability to thrive in the face of adversity,[2] and the ability to maintain function during stressful events.[11,13] Resilience is considered a multi-dimensional concept that varies among people and is influenced by characteristics such as gender, ethnic background, cultural background, and educational level.[2,14]

Resilience has a strong and direct impact on patient health. A high level of resilience is protective against mental illnesses such as depression and PTSD,[2-5,7,15] as well as physical illness,[15] and is associated closely with an individual's overall well-being.[2,7] Additionally, a definitive correlation has been made between increasing levels of resilience and an individual's ability to use learned skills to alter his or her environment, or perception thereof, to attain a higher level of functioning.[14] With this application in mind, measures have been taken to develop self-reported resilience scales with the goal of identifying individuals with lower than average scores and who, as such, may be at increased risk of negative health outcomes. The implication is that these individuals could be identified and targeted resilience-building strategies could be developed and implemented accordingly.

CD-RISC. In 2003, Connor and Davidson[2] published a resilience scale, "Connor Davidson Resilience Scale" (CD-RISC). Items included in the scale were selected through a search of resilience literature. The CD-RISC survey is comprised of 25 items that were deemed to be components of resilience. A higher score suggested an individual was more resilient. To validate the scale, Connor and Davidson distributed it to five populations: a non-help-seeking general population, primary care outpatients, psychiatric outpatients in private practice, participants in a study of generalized anxiety disorder, and participants in two PTSD clinical trials.[2]

Other studies of cross-cultural validity and factor analysis. The CD-RISC has been used and validated across several groups, including South African and Chinese adolescents, Korean students, firefighters, nurses, and Indian students.[16-19] In addition to being validated across various groups, these studies also looked at factor structure of the 25-item resilience survey. Though the studies conducted among Chinese adolescents and Korean students found that the five-factor model of the original CD-RISC was reproducible,[17-18] studies conducted in India, South Africa, Australia, and the United States did not concur.[16,19] The evaluation among Indian students confirmed four factors: hardiness, optimism, resourcefulness, and purpose.[19] Jorgensen and Seedat[16] were unable to reproduce the original factor structure using a sample of 701 South African adolescents, however, they identified three factors in their study: tenacity, adaptation, and spirituality.

In two studies, the original 25-item CD-RISC five-factor model was shown to be unstable.[11,20] In 2007, Campbell-Sills and Stein[11] inquired about the composition of the original CD-RISC. They found, via factor analysis, that the 25-item scale was not stable over two identical populations. Thus, they comprised a 10-item abbreviated version of the CD-RISC and established strong psychometric factors structuring the new format. In this study, hardiness and persistence were identified initially as two stable factors, and further manipulation allowed for the formation of a uni-dimensional factor.[11] Burns and Anstey[20] confirmed the uni-dimensional measure of the original CD-RISC. Furthermore, Vaishnavi et al.[15] comprised a CD-RISC 2 scale that was made up of only two items from the original 25-item scale: "Able to adapt to change," and "Tend to bounce back after hardship or illness" to reflect the meaning of resilience.

Purpose. As the concept of resilience is studied further and understood, it is important to incorporate factors that influence resilience into these existing instruments. It is also important to relate the questions to participants directly, so that the participant may answer appropriately and precisely. In this study, we proposed modifications to the original 25-item CD-RISC such as the use of first-person verbiage and the addition of items that were neglected in the original CD-RISC.

Methods

Instrument. The instrument, a modified version of the original 25-item CD-RISC, was designed to measure resilience. Three new items were added to the original 25-item instrument, which take into account aspects that are associated with resilience but were neglected in the original CD-RISC. Two items, "My family is willing to help me make decisions and listen to me" and "My friends are willing to help me make decisions and listen to me" were added to the modified scale to address the perceived support from family and friends. This was relevant as a higher level of social support is associated with increased resilience.[21] The question "I find my job rewarding" was added to the modified scale to assess job satisfaction, which symbolizes purpose and balance, both of which are associated with increased resilience.[21]

Additionally, "Coping with stress strengthens" and "In control of your life" in the original 25-item CD-RISC were removed, and replaced with "I feel obligated to assist others in need", and "I have few regrets in life", respectively. The feeling of assisting others in need is tied to the feeling of having purpose and meaning in life, both of which are factors associated with resilience not represented in the original CD-RISC.[22,23] Having few regrets in life is tied to problem-solving, another factor tied to resilience.[13,24] The benefit of the two items we added outweighed the benefit of the old items. The two old items ("coping with stress strengthens" and "in control of your life") were ambiguous.

Several of the original items were reworded so that the modified statements were all presented in the first person (Table 1). This change in verbiage prompted readers to identify themselves as active participants in the various items. For example, we reworded one item from "Able to adapt to change," to "I am able to adapt to change," allowing the reader to understand that she/he is intended to be the subject performing the action.

Like the original CD-RISC, the modified CD-RISC is a self-reporting scale in a Likert-type fashion. Each item was rated from "not true at all" (1 point) to "true nearly all the time" (5 points). The total number of points in the modified survey was 135. No identifiers were collected to ensure subject confidentiality.

Participants. In the original 25-item CD-RISC study,[2] the total number of participants (inclusive of all five populations) was 828; 577 patients were from the general population, 139 were from primary care, 43 were psychiatric out-patients in private practice, 25 were from a study of generalized anxiety disorder, and 44 were from two clinical trials of post-traumatic stress disorder (PTSD). This investigation studied general outpatient psychiatry patients recognizing that the participants of general outpatient psychiatry clinics comprised 5% of those in the original study. The current study increased the desired subject number to 266 to increase power.

To mirror the original Connor and Davidson's methodology,[2] the modified CD-RISC was distributed to two Midwestern general psychiatry outpatient clinics, a university-based psychiatric outpatient clinic

Table 1. Content of the Original Connor-Davidson Resilience Scale (CD-RISC) versus the Modified CD-RISC.

Item no.	Description	
	Original 25-item CD-RISC Items	**Modified CD-RISC Items**
v1	Able to adapt to change	I am able to adapt to change
v2	Close and secure relationships	I have close and secure relationships
v3	Sometimes fate or God can help	Sometimes fate or God can help
v4	Can deal with whatever comes	I can deal with whatever comes
v5	Past success gives confidence for new challenge	Past success gives me confidence for new challenges
v6	See the humorous side of things	I see the humorous side of things
v7	Coping with stress strengthens	I feel obligated to assist others in need
v8	Tend to bounce back after illness or hardship	I tend to bounce back after illness or hardship
v9	Things happen for a reason	Things happen for a reason
v10	Best effort no matter what	I give my best effort no matter what
v11	You can achieve your goals	I can achieve my goals
v12	When things look hopeless, I don't give up	When things look hopeless, I don't give up
v13	Know where to turn for help	I know where to turn for help
v14	Under pressure, focus and think clearly	Under pressure, I focus and think clearly
v15	Prefer to take the lead in problem solving	I prefer to take the lead in problem solving
v16	Not easily discouraged by failure	I am not easily discouraged by failure
v17	Think of self as strong person	I think of myself as a strong person
v18	Make unpopular or difficult decisions	I can make unpopular or difficult decisions
v19	Can handle unpleasant feelings	I can handle unpleasant feelings
v20*	Have to act on hunch	I have to act on a hunch
v21	Strong sense of purpose	I have a strong sense of purpose
v22	In control of your life	I have few regrets in life
v23	I like challenges	I like challenges
v24	You work to attain your goals	I work to attain my goals
v25	Pride in your achievements	I have pride in my achievements
v26		My friends are willing to help me make decisions and listen to me
v27		My family is willing to help me make decisions and listen to me
v28		I find my job rewarding

*v20 was not included in the statistical analysis of the modified 27-item CD-RISC survey.

and a hospital psychiatric outpatient clinic. The inclusion criteria for this study were: 1) 18 years of age or older, 2) an established patient of the clinic (the patient could not be a new patient establishing care at the clinic), and 3) proficient enough in English to complete the survey (as perceived by the support staff). The exclusion criteria were:

1) minors, 2) new patients to the clinic at their initial visit, 3) patients for whom a translator was needed, or 4) patients with whom a guardian was present due to age or decreased mental capacity.

Procedures. Receptionists at both out-patient clinics were instructed of the inclusion criteria and distribution instructions as they were the individuals responsible for appropriate delivery of the modified CD-RISC survey. Upon appointment check-in, the modified CD-RISC survey was distributed to every third patient meeting the inclusion criteria. The cover sheet included an invitation to participate in the study, a description of the research, contact information for the principal investigator, and the patient's right to decline participation at any time. Patients were offered access to the aggregate results upon conclusion of the study. Participants were not compensated for their involvement. Completed surveys were secured in a manila envelope and were collected from the clinics every Friday afternoon until the desired number of participants was obtained (approximately 24 weeks).

Statistical analysis. All statistical analysis was conducted using SPSS (Version 18.0) for Windows. Descriptive statistics were presented as means and standard deviations for continuous variables, and frequencies and proportions for categorical variables. An exploratory analysis was conducted to identify underlying factor structure of the modified CD-RISC. To achieve better interpretation of the factors, a direct oblimin rotation method with the Delta value of 0 was applied to the factor analysis.[25] A p-value less than 0.05 was considered significant.

Results

The study consisted of 266 adult patients from two private outpatient psychiatric clinics, Via Christi Psychiatry Clinic (n = 208, 78%) and the KU Wichita Psychiatry Clinic (n = 58, 22%). Most participants (n = 165, 62%) reported being female and between 36 to 64 years of age (n = 170, 64%; see Table 2). Most respondents (n = 221, 84%) identified themselves as Caucasians, 39% (n = 102) reported being married, and 38% (n = 101) reported having a high school diploma, GED, or less than high school level of education.

Item v20 (I have to act on a hunch) did not have a strong correlation with any other variables. The maximum correlation coefficient (r = 0.257) between v20 and any other variables was v18 (i.e., I can make unpopular or difficult decisions). Item v20 and v18 did not belong to the same dimension. Factor analysis was based on the correlation matrix among the variables. As such, v20 was eliminated from the factor analyses process.

The average resilience score using the remaining 27-item CD-RISC was 93.45 (SD = 19.55). Table 3 shows the average resilience score for each survey item. Females' average resilience scores were lower (mean = 91.87, SD = 18.70) than males (mean = 96.08, SD = 20.71). However, the difference was not statistically significant, $t(261) = -1.70$, $p = 0.09$.

An exploratory factor analysis was conducted to explore the underlying structure of resilience. Four factors were identified through the factor analysis. The overall variance explained by these four factors was 60%. Factor 1 reflected one's flexibility to cope with change and challenge; factor 2 can be explained as social and familial support; factor 3 can be explained as spiritual support; and factor 4 can be explained as having a goal-oriented life (Table 4). Internal consistency was evaluated by Cronbach's alpha, with a value of 0.94, demonstrating excellent internal consistency.

Table 2. Demographics of study participants.

Demographics		n	%
Gender	Female	165	62
	Male	99	37
	No response	2	1
Age	18-25 Years	75	28
	26-64 Years	170	65
	≥ 65 Years	19	7
Marital Status	Single	89	34
	Married	102	39
	Have a Significant Other	11	4
	Divorced	48	18
	Widow/Widower	7	3
	Other	7	3
Education Level	Less Than High School Diploma	22	8
	High School Diploma or GED	79	30
	Less Than 2 Years of College	52	20
	Associate's Degree	20	8
	2+ Years of College But No Degree	30	11
	College Degree	35	13
	Master's Degree	22	8
	PhD/MD/JD/Doctorate Degree	4	2
Race and Ethnicity	Caucasian	221	84
	Hispanic	6	2
	African American	29	11
	Native American	2	1
	Asian American	5	2
	Other	1	< 1

Discussion

Our study focus was to modify the CD-RISC survey, implement the new instrument with a general psychiatric population, and use the original CD-RISC study as the foundation. The original study had a relatively low number of participants for the psychiatric outpatient group compared to the number of participants in the modified study, which was composed exclusively of psychiatric outpatients. Gender and race of participants in the original and modified studies were similar (Table 5). The original CD-RISC study found the average resilience score among psychiatric outpatients was 68.0, SD = 15.3.[2] This result coincided with the average score in this study (61.63, SD = 17.09), with only the first 25 items being factored into the score. Moreover, the modified CD-RISC demonstrated a slightly higher Cronbach's alpha (0.94) than the original CD-RISC's result (0.93), which suggested an excellent internal consistency of the instrument. This modified 27-item CD-RISC maintained the excellent internal consistency, but offered some advantages such as including the three neglected items and clearer wording, allowing for greater interpretability.

Table 3. Summary table of modified 27-item CD-RISC survey.*

Items	Mean	Standard Deviation
v1 I am able to adapt to change	3.65	1.07
v2 I have close and secure relationships	3.78	1.21
v3 Sometimes fate or God can help	3.70	1.32
v4 I can deal with whatever comes	3.33	1.05
v5 Past success gives me confidence for new challenges	3.46	1.11
v6 I see the humorous side of things	3.74	1.07
v7 I feel obligated to assist others in need	3.89	1.02
v8 I tend to bounce back after illness or hardship	3.48	1.07
v9 Things happen for a reason	3.69	1.21
v10 I give my best effort no matter what	3.93	0.92
v11 I can achieve my goals	3.75	0.72
v12 When things look hopeless, I don't give up	3.50	1.00
v13 I know where to turn for help	3.87	1.12
v14 Under pressure, I focus and think clearly	3.08	1.07
v15 I prefer to take the lead in problem solving	3.15	1.11
v16 I am not easily discouraged by failure	3.10	1.02
v17 I think of myself as strong person	3.46	1.12
v18 I can make unpopular or difficult decisions	3.33	1.03
v19 I can handle unpleasant feelings	3.17	1.01
v21 I have a strong sense of purpose	3.27	1.14
v22 I have few regrets in life	3.09	1.24
v23 I like challenges	3.20	1.08
v24 I work to attain my goals	3.68	0.99
v26 My friends are willing to help me make decisions and listen to me	3.60	1.20
v27 My family is willing to help me make decisions and listen to me	3.73	1.23
v28 I find my job rewarding	3.16	1.36

*v20 (I have to act on a hunch) is not included in the summary table of the modified 27-item CD-RISC survey.

The modified CD-RISC instrument can be useful in assessing psychiatric patients' resilience as they manage diseases such as PTSD, depression, and anxiety.[2-4] Resilience quantification can be used in the clinical setting to identify individuals with below average resilience scores. Furthermore, resilience of individuals in treatment for PTSD, depression, and anxiety can be monitored throughout selected therapy, and alterations in therapy can be made based upon their 27-item CD-RISC scores. This type of instrument utility is reflective of the biopsychosocial model for treatment established psychiatric disease and was made possible by the addition of items regarding perceived social support and feelings of life purpose; both are important components that can be addressed in therapy.

Limitations. In our study, all patients were recruited through two psychiatric

Table 4. Factor analysis results of the modified 27-item CD-RISC survey.

	F1	F2	F3	F4
v19. I can handle unpleasant feelings	**.812**	.076	.088	.039
v18. I can make unpopular or difficult decisions	**.807**	.061	.141	-.014
v8. I tend to bounce back after illness or hardship	**.783**	-.130	-.266	.075
v4. I can deal with whatever comes	**.690**	.009	-.070	-.154
v1. I am able to adapt to change	**.667**	.164	-.018	.065
v6. I see the humorous side of things	**.619**	.245	.023	-.030
v14. Under pressure, I focus and think clearly	**.584**	-.146	-.129	-.245
v5. Past success gives me confidence for new challenges	**.497**	.103	-.026	-.353
v16. I am not easily discouraged by failure	**.388**	-.176	-.361	-.326
v12. When things look hopeless, I don't give up	**.387**	-.002	-.196	-.335
v27. My family is willing to help me make decisions and listen to me	.038	**.807**	-.113	.062
v26. My friends are willing to help me make decisions and listen to me	-.051	**.776**	-.116	-.110
v7. I feel obligated to assist others in need	.107	**.622**	.205	-.149
v2. I have close and secure relationships	.173	**.551**	-.319	.003
v3. Sometimes fate or God can help	.035	.095	**-.768**	-.058
v9. Things happen for a reason	.089	.148	**-.671**	.083
v13. I know where to turn for help	.184	.344	**-.355**	-.168
v23. I like challenges	.014	-.001	.176	**-.883**
v24. I work to attain my goals	.108	.155	.119	**-.737**
v25. I have pride in my achievements	.051	.170	-.046	**-.676**
v21. I have a strong sense of purpose	.081	.091	-.249	**-.537**
v22. I have few regrets in life	-.017	-.071	-.397	**-.537**
v11. I can achieve my goals	.183	.124	-.182	**-.519**
v15. I prefer to take the lead in problem solving	.418	-.009	.187	**-.454**
v17. I think of myself as strong person	.397	-.015	-.119	**-.407**
v28. I find my job rewarding	.128	.157	-.215	**-.397**
v10. I give my best effort no matter what	-.100	.209	-.298	**-.385**

Table 5. Demographics of original 25-item CD-RISC versus modified CD-RISC survey.

Demographics		Original CD-RISC**		Modified CD-RISC	
		n	%	n	%
Gender*	Female	510	65	165	62
	Male	274	35	99	37
Race	White	588	77	221	84
	Non-White	181	23	43	16

* Two respondents did not report their gender in the 27-item modified CD-RISC survey.
** Data were from the original 25-item CD-RISC by Conner and Davison.[2]

clinics, which may limit the generalizability of our findings to other populations. The vast majority of study participants were middle-aged Caucasians, a limitation shared in the original CD-RISC study. This study did not assess if participants had been undergoing short or long-term therapy (counseling or pharmacotherapy), or if participants were compliant or noncompliant with treatment. These unknown factors are important, because long-term therapy and compliance have been associated with higher resilience scores.[2,20]

Conclusions

When comparing the modified CD-RISC to the original 25-item CD-RISC, the modified version maintained the excellent internal consistency. In addition, the modified version includes three neglected items and is easier to answer in a truer sense, given that it is phrased in the first person. The modified 27-item CD-RISC performs better than the original CD-RISC for the psychiatric population. Using an instrument that accounts for factors of resilience supported by current research allows for a greater identification of resilience levels in psychiatric patients. As resilience is a concept of great breadth and depth, it is of the utmost importance to continue research into how to quantify resilience, especially among this population. Identifying psychiatric patients with lower resilience scores may assist mental health or other healthcare professionals in tailoring treatment to patients' needs, likely resulting in improved health outcomes.

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