

The Injury Resilience Index: Development and Psychometric Characteristics

David E. Victorson, PhD^{1,2} Kent F. Burnett, PhD³, Natalie R. Gela, BA¹

¹ Evanston Northwestern Healthcare, Northwestern University Feinberg School of Medicine ²

³ University of Miami Counseling Psychology Program

Introduction

- Approximately three million Americans sustain traumatic physical injuries each year that require inpatient hospitalization, while nearly 28 million Americans are treated in emergency departments due to traumatic physical injuries.¹
- While a sizable subset of those injured will develop acute and chronic psychological distress symptomatology,² others are more resilient to the negative emotional sequelae that can accompany traumatic events.³

Resilience Defined

- Psychological resilience is a multidimensional concept characterized by one's ability to "bounce back" or recover from negative or traumatic life experiences, resist the impact of trauma, and/or reconfigure one's self to become stronger in the face of future adversity.⁴
- Emerging from the physiological stress and psychological coping literatures⁵, the concept of resilience has been characterized as a cluster of traits⁶, states⁷, a process or even an outcome.⁸ Most research to date has focused on the dispositional aspects of resilience.⁹

Measuring Resilience

- Often challenging to measure, resilience has traditionally been operationalized through associated concepts such as optimism, cognitive flexibility, hardness, social support/resources and mastery (e.g., coping self-efficacy).⁴
- Our search revealed five different self-report instruments that have been developed to measure resilience with adults:
 - Baruth Protective Factors Inventory¹⁰
 - Connor-Davidson Resilience Scale¹⁰
 - Resilience Scale for Adults¹¹
 - Brief-Resilient Coping Scale¹²
 - Resilience Scale¹³

- Limitations of these measures have been reported in a recent systematic review⁸ to include: the need for additional psychometric investigation⁹, lack of administration/scoring procedures^{10, 12}, questionable reliability and generalizability^{11, 12} and gender-biased item development.¹³
- To date, no self-report measure of resilience has been developed and tested specifically for adults who have sustained a traumatic physical injury. In order to fill this gap, we developed and tested the **Injury Resilience Index - a brief factor-analytically derived, retrospective, self-report instrument.**

Purpose of Study

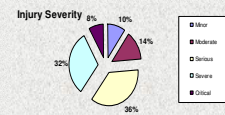
In a sample of hospitalized, physically-injured patients:

- Examine the factor structure and internal consistency of the Injury Resilience Index
- Examine the convergent validity of the Injury Resilience Index with other instruments measuring constructs expected to converge in (either) a positive (or) inverse manner.

Methods

Item Development: IRI item pool developed through qualitative analysis of patient comments derived from clinical field notes, expert input/review and comprehensive literature search. IRI items were measured on a 5-point Likert-type scale: Response options ranged from "Not at all" to "Very much."

Participants: A total of 168 participants were consecutively recruited on an ongoing basis from the hand, multiple trauma and burn services at a large Southeastern level-1 trauma center to complete the experimental version of the **Injury Resilience Index (IRI)** and external measures used to examine IRI validity. Within the first few days of admission or when a patient was cognitively capable as determined by their attending physician (average of eight days), a trained graduate level research assistant approached eligible participants (>18 years; English speaking and admitted to the hand, multiple trauma or burn service for a traumatic injury; cognitively intact). Study approved by university IRB.
•Male (n = 111); Female (n = 57)
•Average age = 34.5 years (SD = 11.1 years)
•Race/Ethnicity: Caucasian = 34%, African American = 33%, Hispanic = 23%, Other = 10%
•Education: < High School = 18%; High School = 33%; > High School = 49%



•Type of Injury	
Blunt: 52 (31%)	Mechanical Burn: 6 (4%)
Penetrating: 35 (21%)	Amputation: 4 (2%)
Thermal Burn: 29 (17%)	Electrical Burn: 2 (1%)
Crush: 23 (14%)	De-Gloving: 3 (2%)
Complicated Infections: 8 (5%)	Chemical Burn: 1 (.6%)
•Mechanism of Injury	
Motor Vehicle: 77 (46%)	Sharp/Shear: 5 (3%)
Gunshot: 21 (12%)	Assault: 4 (2%)
Fire/Flames: 16 (10%)	Human Bite: 3 (2%)
Occupational: 14 (8%)	Combustible: 3 (2%)
Fall: 6 (4%)	Self-Inflicted: 3 (2%)
Scald: 6 (4%)	Other: 3 (2%)
Animal Bite: 6 (4%)	Fireworks: 1 (.6%)

Validity Measures

•Health Related Hardiness Scale¹⁴
 -34 items; measures presence of hardness; reports of high internal consistency and construct validity

•Social Support Questionnaire¹⁵
 -6 items; measures social support network and satisfaction; reports of high internal consistency and construct validity

•Life Orientation Test- Revised¹⁶
 -10 items; measures dispositional optimism; reports of high internal consistency and construct validity

•General Perceived Self-Efficacy Scale¹⁷
 -10 items; measures perceived personal competence in a variety of stressful situations; reports of high internal consistency and construct validity

•Injury Distress Index²
 -32 items; measures symptoms of posttraumatic stress, depression, anxiety and pain; reports of high internal consistency and construct validity

Results

- Exploratory factor analysis (EFA) revealed 5 factors on the Injury Resilience Index (see items and factor loadings in Table 1):

- **Hardiness**
- **Social Support and Satisfaction**
- **Anticipated Growth**
- **Optimism**
- **Coping Self-Efficacy**

Table 1: Injury Resilience Index Pattern and Structure Coefficients, Eigenvalues & Percentages of Variance

Since my injury occurred...	Hardiness		Social Support & Satisfaction		Anticipated Growth		Optimism		Coping Self Efficacy	
	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5	Factor 6	Factor 7	Factor 8	Factor 9	Factor 10
I think because of my efforts, I will get better.	0.588	0.792	0.003	0.276	0.002	0.223	0.138	0.287	0.009	0.235
My doctors will determine how soon I will recover.	0.597	0.587	-0.008	0.170	-0.015	0.154	0.008	0.170	0.210	0.369
I am making an effort to recover from this.	0.731	0.801	0.024	0.308	-0.020	0.188	0.170	0.330	0.050	0.294
I am trying to prevent as many additional problems as possible.	0.588	0.730	-0.014	0.228	0.110	0.204	0.112	0.278	0.024	0.274
I am doing things that I know will help my recovery.	0.561	0.717	0.027	0.437	-0.016	0.156	0.130	0.351	0.101	0.121
I can rely on others for emotional support if I need them.	-0.071	0.138	0.403	0.401	0.003	0.201	-0.213	0.024	-0.061	0.183
I can rely on others for things like money, transportation or assistance if needed.	-0.140	0.107	0.403	0.428	-0.024	0.340	0.344	0.361	-0.026	0.204
I am satisfied with the emotional support I receive from others.	0.071	0.324	0.403	0.713	0.107	0.308	0.674	0.166	0.014	0.132
I am satisfied with the help I receive with things like money or transportation.	-0.050	0.247	0.406	0.409	-0.003	0.304	0.324	0.408	0.088	0.291
I can rely on others to help me with my rehabilitation if I need assistance.	0.134	0.297	0.793	0.760	0.002	0.308	0.540	0.329	0.107	0.280
I am satisfied with the help I receive from others with my rehabilitation.	0.130	0.376	0.770	0.704	-0.028	0.203	0.501	0.296	0.059	0.256
The things I have been through because of the accident will make me stronger.	0.293	0.309	0.041	0.310	0.441	0.603	0.006	0.304	0.222	0.430
How I am affected by the accident is an opportunity for growth.	-0.027	0.265	-0.003	0.219	0.906	0.929	-0.050	0.300	-0.041	0.220
How I am affected by the accident will cause me to change in positive ways.	0.017	0.380	0.390	0.295	0.715	0.771	0.005	0.304	0.058	0.393
I am optimistic about things to come.	0.009	0.287	0.008	0.166	0.120	0.324	0.300	0.608	-0.026	0.160
I think positively about my future.	-0.002	0.305	0.009	0.208	0.000	0.208	0.710	0.771	0.146	0.304
I think something positive will come out of this.	0.232	0.454	-0.028	0.219	0.043	0.315	0.612	0.691	0.080	0.150
I have to be real to get through difficult times.	-0.003	0.185	-0.006	0.169	0.041	0.202	0.504	0.209	0.690	0.695
I am able to bounce back from challenging situations pretty well.	0.128	0.300	0.006	0.300	-0.020	0.202	0.025	0.202	0.792	0.790
Initial Eigenvalues	6.403	4.482	2.983	1.482	1.482	1.482	1.209	1.209	1.209	1.209
Percentage of Variance	34.616	23.841	15.941	7.788	7.788	7.788	6.662	6.662	6.662	6.662

- Scores of the Injury Resilience Index demonstrated internal consistency coefficients (Cronbach's alpha) between .70-.85.
- Pearson correlations among factors ranged between small to medium (r's between .25 - .64)

Table 2: Pearson Correlations and Internal Consistency Reliability Coefficients

	Hardiness	Social Support & Satisfaction	Anticipated Growth	Optimism	Cronbach's Alpha	Number of Items
Hardiness	1.0	---	---	---	0.84	5
Social Support & Satisfaction	.37**	1.0	---	---	0.85	6
Anticipated Growth	.50**	.35**	1.0	---	0.82	3
Optimism	.48**	.29**	.43**	1.0	0.73	3
Coping Self Efficacy	.31**	.32**	.64**	.26**	0.70	2

Table 3: Correlations between the Injury Resilience Index (IRI) and validity measures

Validity Measures	IRI Subscales				
	IRI Hardiness	IRI Social Support & Satisfaction	IRI Anticipated Growth	IRI Optimism	IRI Coping Self Efficacy
Health Related Hardiness Scale	0.36**	0.38**	0.36**	0.17	0.45**
Social Support Questionnaire	0.29**	0.56**	0.40**	0.27*	0.36**
Life Orientation Test-Revised	0.45**	0.44**	0.38**	0.44**	0.35**
General Perceived Self Efficacy Scale	0.48**	0.45**	0.17	0.29*	0.47**
Injury Distress Index - Depression Subscale	-0.25**	-0.39**	-0.14	-0.29**	-0.26**
Injury Distress Index - Anxiety Subscale	-0.21**	-0.37**	-0.19*	-0.27**	-0.23**
Injury Distress Index - Pain Subscale	-0.13	-0.17*	-0.13	-0.23**	-0.01
Injury Distress Index - Posttraumatic Stress Subscale	-0.26**	-0.29**	-0.09	-0.19*	-0.14

*p < .05. **p < .01

- Statistically significant positive correlations between IRI scales and validity instruments measuring same or related constructs (see Table 3).
- Unlike its original tripartite conceptual definition, hardness was comprised of control and commitment items, while challenge items (e.g., anticipated growth) extracted into a distinct factor.
- Statistically significant inverse correlations between IRI scales and measures of injury related distress (see Table 3).

Conclusions

- Strong preliminary support for the internal consistency and construct validity of the Injury Resilience Index.
- IRI demonstrates potential to be used as a brief screening and identification tool for treatment and resource planning following traumatic physical injury, as well as an outcome measure following resilience-promoting psychosocial interventions.

References

- National Safety Council (2007). Injury Facts. 2007 Edition ed. Itasca.
- Victorson, D.E., Endler, C.E., Burnett, K.F., Quinella, E.A. (in press). The Injury Distress Index: Development and Validation. *Archives of Physical Medicine and Rehabilitation*.
- White, B., Dines, S., Warner, A.M. (2000). Considering resilience in the rehabilitation of people with traumatic disabilities. *Rehabilitation Nursing*, 5(1), 9-12.
- Leipson, S.J. & Reversion, T.A. (2006). Resilience and Posttraumatic Growth: Recovery, Resilience and Reconfiguration. In L. Calhoun & K. Tedeschi (Eds.), *Handbook of Posttraumatic Growth: Research and Practice* (pp. 24-46). Mahwah, NJ: Lawrence Erlbaum Associates, Inc.
- Tedeschi, K. & Silver, J. (2004). Resilience: A historical review of the construct. *Healthcare Nursing Practice*, 18, 3-8.
- Isacsson, C. S. (1997). The trail and process of resilience. *Journal of Advanced Nursing*, 25, 123-129.
- Olsson, C. A., Bond, S., Burns, J. M., Wells-Bond, D. A., & Sawyer, S. M. (2003). Adolescent violence: A concept analysis. *Journal of Adolescence*, 26, 1-11.
- Alamy, N. K., Kelly, E.M., Soto, M. L. & Myers, J. (2008). A review of instruments measuring resilience. *Issues in Comprehensive Pediatric Nursing*, 29(2), 153-125.
- Bartoni, K. E. & Carrall, J. J. (2002). A formal assessment of resilience: The Baruth Protective Factors Inventory. *The Journal of Individual Psychology*, 58, 235-244.
- Connor, K. M., & Davidson, J. R. (2003). Development of a new resilience scale: The Connor Davidson Resilience Scale (CD-RISC). *Depression and Anxiety*, 16, 75-82.
- Fitzroy, D., Hjermid, O., Rosenwerg, J. H., & Martinussen, M. (2003). A new rating scale for adult resilience: What are the central protective resources behind healthy adjustment? *International Journal of Psychiatric Research*, 12, 65-76.
- Stanton, V. G., & Waldron, K.A. (2004). The development and psychometric evaluation of the Brief Resilient Coping Scale Assessment. *Journal of Nursing Measurement*, 11, 94-101.
- Wagnild, G. M., & Young, M. M. (1993). Development and psychometric evaluation of the Resilience Scale. *Journal of Nursing Measurement*, 7, 165-178.
- Poltack, S. L., Duffy, M. J. (1996). The Health-related Hardiness Scale: development and psychometric analysis. *Nursing Research*, 41(6), 218-222.
- Sarason, I.G., Sarason, B.R., Shearin, E.N. & Pierce, G.R. (1987). A brief measure of social support: Practical and theoretical implications. *Journal of Social and Personal Relationships*, 4, 497-503.
- Schaefer, M. F., Carver, C. S., & Briggs, M.W. (1994). Distinguishing Optimism from Neuroticism (and trait anxiety, self-esteem, and self-efficacy): A reevaluation of the Life Orientation Test. *Journal of Personality and Social Psychology*, 67(6), 1073-1078.
- Schwarzer, R., & Jerusalem, M. (1995). Generalized Self-Efficacy scale. In J. Weinman, S. Wright, & M. Johnston, (Eds.), *Measures of health psychology: A user's portfolio. Causal and control beliefs* (pp. 35-37). Windsor, UK: NFER-Nelson.

Table 3: *p < .05. **p < .01