

Development and validation of an improved hardiness tool: The Hardiness Resilience Gauge

Paul T. Bartone
National Defense University, Washington DC USA

Kelly McDonald, Jonathan Stermac, Manolo Escobar, Justin McNeil, Steven Stein
Multi-Health Systems, Toronto, CANADA

Psychological hardiness has been identified in numerous studies as an important factor contributing to stress resilience at the individual level. Of the various instruments available to measure hardiness, the most commonly used is the short form of the Dispositional Resilience Scale (DRS-15; Bartone, 1995, 2013). Despite its proven utility in both military and non-military populations, the DRS-15 has some limitations. With only 5 items each to measure the hardiness sub-scales of commitment, control and challenge, the scales sometimes show low reliability, and may not fully capture the underlying constructs. The present work builds on the DRS, revising and adding new items to improve reliability and validity. Based on our understanding of the hardiness construct and its dimensions, 21 new items were written to represent hardiness commitment (7), control (6), and challenge (8). These items plus the original DRS-15 items were administered to a census-matched sample of N=2,021 men and women across the United States, ages 18 to 65. Data analysis included examination of item skewness and kurtosis, item response theory plots, scale reliabilities, item-total correlations, and confirmatory factor analysis. The final scale retains 28 items. Confirmatory factor analysis showed an excellent fitting hierarchical model with three factors, commitment, control and challenge nested under a broad hardiness factor (CFI=.977; RMSEA=.084). Reliability coefficients for new Hardiness Resilience Gauge are strong, at .93, .85, .84 and .89 for total hardiness, challenge, control and commitment respectively. Further data on reliability and validity indicate the HRG is an excellent new tool for measuring hardiness.

Keywords: hardiness, measurement, stress, resilience, DRS, HRG

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Since it was first identified by Kobasa (1979) in a study of stress and health in telephone executives, the concept of personality hardiness has proved to be an important factor influencing human resilience. A sizable body of literature now indicates that personality hardiness can be a potent resiliency resource, protecting some individuals against the ill effects of stress on health and performance (Bartone, 1989; Contrada, 1989; Kobasa & Puccetti, 1983; Wiebe, 1991; Bartone, 1999).

Hardiness is conceived as a personality style or world view that develops early in life and is reasonably stable over time, though amenable to change under certain conditions (Bartone, 2006; Maddi & Kobasa, 1984). Hardy persons have a strong sense of life and work *commitment*, a greater feeling of *control*, and are more open to change and *challenges* in life. They tend to interpret stressful and painful experiences as a normal aspect of existence, part of life that is overall interesting and worthwhile.

Brief history of hardiness measurement

Measuring hardiness was somewhat problematic in the early years. It was originally assessed by Kobasa (1979) with an amalgam of 18 different scales including over 100 items to assess the dimensions of Commitment, Control and Challenge. This original collection of items was later reduced to several shorter versions (Ouellette, 1993), but these hardiness scales still had a number of shortcomings. For example, they used different metrics and response scales, had only negative items, and lacked factorial validity (Funk, 1992). A shorter and more coherent hardiness test with 50 items was developed by Bartone (1989) for use with blue collar workers. Later, this scale was refined into a 45-item hardiness measure with a balance of positive and negative items, and equal numbers of items to measure the facets of commitment, control and challenge (Dispositional Resilience Scale or DRS; Bartone, Ursano, Wright & Ingraham, 1989). Bartone continued to revise this scale, creating a short 15-item version which is in wide use today (Johnsen, Bartone, Sandvik, Gjeldnes, Morken, Hystad & Stornæs, 2013; Bartone, Valdes & Sandvik, 2013). However, the brevity of the scale still imposes some limitations. At 5 items each, the sub-scales of commitment, control and challenge sometimes show lower reliability coefficients than is desired, and may not fully capture the complexity of the hardiness facets. It was to address these concerns that the current revision effort was undertaken. For ease of presentation, in what follows methods and results are presented together.

Methods and Results

Creating the Hardiness Resilience Gauge (HRG)

Item development. The 15 items of the DRS were retained for the HRG and 21 additional items were created. Seven of the original 15 items were slightly modified for clarity. Twenty-one new items were written by the authors: eight for the Challenge subscale, six for the Control subscale, and seven for the Commitment subscale. Professional, academic, and theoretical jargon was avoided to create easily understood items that would apply to all respondents. These items were also designed to be cross-culturally applicable and free from linguistic bias including idiomatic expressions. This resulted in 36 total items for further evaluation, 13 Challenge, 11 Control, and 12 Commitment.

Normative Sample. A normative sample of N=2,016 answered an online survey that included the 36 hardiness scale items, as well as a series of demographic questions and several additional instruments as described below. The sample was representative of the adult population (18 years and older) of the United States, and was matched to U.S. census data from 2016 for age, sex, race/ethnicity, education, geographic region, and employment status (U.S. Bureau of the Census, 2016). Participants were recruited from all 50 states, with specific demographic targets. To ensure data integrity, responses were carefully screened for patterns of inconsistency or questionable validity. Respondents who answered too quickly or too slowly were excluded from the sample. Cases that contained too many omitted items were also excluded, along with cases in which identical consecutive responses appeared too often. This resulted in elimination of 143 cases. From the remaining 1,873 cases, cells were created containing an equal numbers of cases in the age and sex groups, with proportional representation in the race, region, education and employment groups.

Item Selection. Participants in the normative sample responded to 36 items intended to assess the three hardiness subscales. There were 13 items measuring Challenge, 12 items measuring Commitment, and 11 items measuring Control. The goal here was to retain the most psychometrically sound items, with at least eight items per subscale. The best items were selected based upon good responses distributions, item-total correlations, factor loadings, and item response theory characteristics. The result was 28 items selected for the HRG. The Challenge and Commitment subscales each contain ten items and the Control subscale contains eight items.

Reliability. Cronbach's alpha coefficient for the total hardiness scale was .93, suggesting excellent reliability. The alpha values for the subscales were also high, at .85, .84, and .89 for the Challenge, Control, and Commitment subscales respectively. Test-retest data were available for 168 individuals who were assessed two to four weeks apart (mean interval = 22.1 days, SD = 1.6

days). The test-retest values were high for Total Hardiness ($r = .81$), and also for the subscales of Challenge ($r = .80$), Control ($r = .74$) and Commitment ($r = .79$). The effect sizes for the differences between Time 1 and Time 2 were small, indicating that the differences between Time 1 and Time 2 scores did not indicate any meaningful change in scores. Descriptive statistics, effect sizes, and correlations are presented in Table 4.5.

Validity

Factor Structure. Confirmatory factor analyses (CFAs) were conducted using the normative sample. The expected hierarchical model was tested, along with two alternative models. The first alternative model consisted of a one-factor model in which all of the items loaded onto a single hardiness factor. The second model consisted of a three-factor solution in which the three factors of Challenge, Control, and Commitment are uncorrelated. The hierarchical model showed superior fit, with CFI=.98, RMSEA=.08. This confirms a factor structure in which three hardiness facets, challenge, control and commitment are nested under a general hardiness factor.

Relationship to other constructs. The validity of the HRG was further evaluated by examining its overlap with other psychological measures. These analyses address the convergent and discriminant validity of the HRG, providing evidence it is measuring what is intended.

HRG and Coping Styles. People who are higher in hardiness tend to have more adaptive coping styles that prompt them to take actions to remove the source of their stress (Eschleman et al., 2010). Therefore, it was expected that higher scores on the HRG would be related to more adaptive coping styles. In order to test this, the 1,500 participants in our normative sample also completed the Coping Inventory for Stressful Situations (CISS; Endler & Parker, 1990). As expected, results revealed that Total Hardiness scores were positively correlated with Task-Oriented Coping, $r(1,469) = .68, p < .001$, and negatively correlated with Emotion-Oriented Coping $r(1,471) = -.30, p < .001$. Examination of the relationships between the HRG subscales and the CISS coping styles revealed similar results. Overall, the HRG scores are meaningfully related to coping styles in expected ways. These results suggest that people with higher HRG scores are more likely to use positive coping strategies and less likely to use negative coping strategies compared to those who have lower scores on the HRG (Table 1).

Table 1. Correlations between the HRG and the Coping Inventory for Stressful Situations (CISS)

	CISS Scale	
	Task-Oriented Coping	Emotion-Oriented Coping
Total Hardiness	.68	-.30
Challenge	.62	-.26
Control	.55	-.22
Commitment	.61	-.31

Note: All correlations significant at $p < .001$.

HRG and Burnout. Burnout stems from chronic occupational stress, resulting in exhaustion and a loss of interest, confidence, and effort. Because hardiness protects against the negative effects of stress, it was expected that those who are higher in hardiness would be less likely to suffer from burnout symptoms. Burnout was assessed with the Maslach Burnout Inventory (MBI; Schaufeli, Leiter, Maslach, & Jackson, 1996). Results showed that the Commitment subscale of the HRG was negatively related to Emotional Exhaustion, $r(113) = -.29, p = .001$. This indicates that people who have a stronger sense of purpose in life (as measured by the Commitment subscale) are less likely to report emotional exhaustion. The correlation between Total Hardiness and Emotional Exhaustion is also significant, $r(113) = -.19, p < .05$.

The Cynicism subscale of burnout measures a person's cynical attitudes towards his work. Given previous research documenting that hardy employees tend to be more engaged and dedicated to their work (Lo Bue et al., 2013), it was expected that those who are higher in hardiness would have less cynical attitudes towards their work. Results confirmed total Hardiness is negatively related to Cynicism, $r(111) = -.37, p < .001$. All of the HRG subscales were also negatively related to the Cynicism subscale.

The Professional Efficacy subscale measures how competent and successful a person feels in her work. Given previous researching showing that hardy employees are more satisfied and successful in their jobs (e.g., Steinhardt et al., 2003), it was expected that those who are higher in hardiness would have stronger feelings of professional efficacy. As expected, Total Hardiness was positively related to Professional Efficacy, $r(110) = .44, p < .001$. All of the HRG subscales were also positively related to the Professional Efficacy subscale. Overall, HRG scores are meaningfully related to MBI scores. People who are higher in hardiness report less emotional exhaustion and cynicism, and more professional efficacy. Table 2 provides a summary of hardiness HRG scale correlations with the burnout scales.

Table 2. Correlations between the HRG and the Maslach Burnout Inventory (MBI)

	MBI Subscales		
	Emotional Exhaustion	Cynicism	Professional Efficacy
Total Hardiness	-.19*	-.37***	.44***
Challenge	-.09	-.27**	.35***
Control	-.13	-.27**	.41***
Commitment	-.29**	-.47***	.43***

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

HRG and Satisfaction. Respondents in the normative sample also completed the Satisfaction with Life Scale (SWLS; Diener, Emmons, Larsen, & Griffen, 1985), a measure of general life satisfaction. It was expected that those who scored higher in hardiness would report greater life satisfaction and greater relationship satisfaction. The SWLS is a 5-item measure with a 7-point response scale, ranging from “Strongly Disagree” to “Strongly Agree.” It is designed to measure global judgements of one’s life satisfaction. Relationship satisfaction was assessed using a single-item indicator on a 7-point response scale, ranging from “Strongly Disagree” to “Strongly Agree.” Participants responded to the following item: I am satisfied with my relationships. As expected, Total Hardiness was positively related to SWLS scores, $r(1,498) = .48, p < .001$, and to the single-item indicator of relationship satisfaction, $r(1,461) = .46, p < .001$. Thus, those who are higher in hardiness report more life and relationship satisfaction. Similar findings were observed when looking at the HRG subscales individually.

Conclusion

This paper describes the development and validation of the Hardiness Resilience Gauge (HRG), a new tool for measuring psychological hardiness. Prior research has shown that hardiness is a key factor influencing individual resilience under stress. The HRG measure improves substantially on the earlier Dispositional Resilience Scale (DRS), providing increased reliability and better content area coverage for the three hardiness facets of challenge, control and commitment. While slightly longer than the DRS-15, it is still fairly brief and easy to administer, consisting of just 28 items. Also, it was designed to be easily adaptable for use in other languages and cultures. As such, the HRG should prove to be a useful tool for measuring hardiness in research, clinical and consulting applications.

Disclosure: Dr. Bartone receives royalties for the HRG.

The HRG Hardiness Resilience Gauge is available from MHS Assessments, at www.mhs.com/hrg

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