

# A Meta-Analytic Examination of Hardiness

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*Hardiness, which is a multidimensional personality trait that is hypothesized to protect people from the effects of stress, has attracted considerable research attention during the last 30 years. The current study provides a meta-analytic review of hardiness. Specifically, we examined the relationships between the hardiness facets, the relationship between hardiness and other personality variables, as well as the relationships between hardiness and several hypothesized criteria, including stressors, strains, social support, coping, and performance. Our analyses generally suggest that hardiness is: (a) positively related to other personality traits that are expected to protect people from stress, (b) negatively related to personality traits that are expected to exacerbate the effects of stress, (c) negatively related to stressors, strains, and regressive coping, and (d) positively related to social support, active coping, and performance. Regression analyses suggest that hardiness is significantly related to important criteria after the effects of other personality traits (e.g., the Five Factor Model traits) are controlled.*

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Researchers have long assumed that individual differences exist in the extent to which people effectively respond to and cope with stressful situations. This idea is perhaps best represented by the personality trait known as hardiness, which describes a person's predisposition to be resistant to the harmful effects of stressors and effectively adapt and cope with a demanding environment (Hull, Van Treuren, & Virnelli, 1987; Kobasa, 1979; Kobasa,

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Maddi, & Kahn, 1982). More specifically, hardy individuals are deeply committed to and engaged in many different life domains (e.g., family, friends, work, etc.), they generally believe that they control what happens in their lives, and they tend to perceive difficult situations as challenges rather than as threats. Thus, hardiness is likely to explain how some people are seemingly unaffected by stressful environments.

The objective of the current research is to provide a meta-analytic review of the hardiness literature. Specifically, we examine hardiness' relationship with other personality traits and with stressors, health outcomes, social support, coping, and job and school performance. We also examine whether hardiness is related to health-related, attitudinal, and behavioral criteria after the effects of other personality traits are controlled and we examined hardiness as a moderator of the stressor-strain relationship. Although there have been several previous efforts to examine the nature of hardiness and to examine its consequences (e.g., Hull et al., 1987; Kobasa, 1979; Maddi, 1999), including several qualitative reviews (e.g., Beehr & Bowling, 2005; Funk, 1992; Lambert & Lambert, 1999), the current meta-analysis offers benefits not provided by previous studies. Specifically, by allowing us to correct for the effects of statistical artifacts (e.g., sampling error and measurement error), the current meta-analysis provides more accurate estimates of the role of hardiness than are available from primary studies or narrative reviews (Hunter & Schmidt, 2004). In the following sections we discuss the nature of the hardiness construct and the theorized outcomes of hardiness.

## NATURE OF THE HARDINESS CONSTRUCT

Hardiness has generally been conceptualized as a multidimensional construct consisting of three subfacets: commitment, control, and challenge (Hull et al., 1987; Kobasa, 1979; Kobasa et al., 1982; Maddi et al., 2002). Commitment is the extent to which a person is engaged in a variety of life domains, such as family, friends, and work. This subfacet of hardiness is beneficial because it gives one a sense of purpose and it results in the development of social relationships that can be called upon during stressful situations. Although commitment to all areas of life is representative of hardy people, a strong sense of commitment to self is the most critically important (Kobasa, 1979). In addition, high-commitment people scan their environment to find something that piques their curiosity and seems meaningful (Maddi, 1990).

The control dimension of hardiness represents the extent to which a person believes that he or she is able to control events that happen in his or her life. Researchers have long recognized that people have an inherent need for control and that perceptions of control are intrinsically beneficial (Laza-

rus, 1966; Lefcourt, Martin, & Saleh, 1984; Wang, Bowling, & Eschleman, 2010). Perceptions of control allow people to feel that they can safely manage their environments and that they can anticipate future threats to their well-being. Indeed, the lack of control is often regarded as a source of stress (Van der Doef & Maes, 1999). The challenge subfacet reflects the extent to which people generally perceive difficult situations as challenges rather than as threats. That is, two individuals confronted with the same situation (e.g., changes in job duties), may perceive their circumstances quite differently. Whereas one person perceives the situation as an opportunity to grow and learn new things, the other may perceive it as unwelcome and threatening. This subfacet of hardiness is beneficial because it contributes to one's ability to be flexible and to adapt to potentially stressful situations.

Some studies have combined the commitment, control, and challenge subfacets into an overall measure of hardiness, whereas other studies have treated the subfacets as separate variables (see Hull et al., 1987). Given this inconsistency in how researchers have assessed hardiness, we conducted exploratory analyses examining the relationships between the three hardiness factors.

### **RELATIONSHIPS BETWEEN HARDINESS AND OTHER PERSONALITY CHARACTERISTICS**

Hardiness is just one of many personality characteristics that have attracted the interest of stress researchers. Self-esteem, optimism, Type-A personality, and neuroticism, for example, have all been examined as potential predictors of how one responds to stress (Cooper, Dewe, & O'Driscoll, 2001; Gunthert, Cohen, & Armeli, 1999; Maddi, 1999; Makikangas & Kinnunen, 2003). Indeed, some theorists have suggested that a variety of personality traits might contribute to the extent to which one is vulnerable to the effects of stressful situations (Beehr & Bowling, 2005; Cooper et al., 2001). We expect that various traits that provide resistance to the effects of stressors and adaptive responses to stressful situations will be positively related to each other and that traits that create vulnerabilities to the effects of stressful situations will be negatively related to traits that provide resistance.

*Hypothesis 1:* Hardiness will be positively related to dispositions that provide resistance against the effects of stressors and adaptive responses to stressors (e.g., self-esteem, positive affectivity, optimism) and negatively related to dispositions that worsen the effects of stressors (e.g., neuroticism, negative affectivity).

## HARDINESS, STRESSORS, AND STRAINS

Stress researchers often make a distinction between “stressors” and “strains” (Jex, Beehr, & Roberts, 1992). Stressors are conditions in one’s life that require an adaptive response and have the potential to cause illness. Examples of stressors include major life events (e.g., getting a divorce) and daily hassles (e.g., having a minor argument with one’s spouse). Strains, on the other hand, are the negative health outcomes that one experiences as a result of being exposed to stressors. These health outcomes can include psychological illness (e.g., anxiety and depression) and physical illness (e.g., headaches, nausea). In addition, strain can include a decrease or lack of positive health outcomes (e.g., life satisfaction, positive state affect, health promoting behaviors).

There are strong theoretical bases to expect that hardiness will be negatively associated with both stressors and strains (Kobasa, 1979; Kobasa et al., 1982). Perceptual processes could explain the relationship between hardiness and stressors. That is, hardy individuals may be predisposed to perceive few stressors in their environment. Hardy employees, for example, who are expected to work long hours and fill several different roles, are likely to view these work stressors differently from employees low in hardiness. A high sense of commitment is likely to result in employees being actively engaged and scanning the environment for interesting and stimulating tasks. In other words, a hardy employee may be predisposed to focus on the “silver lining” of any situation, even when presented with an objectively unfavorable working environment. Perceptions of stressors are also associated with the challenge component of hardiness. More specifically, hardy employees are likely to be cognitively flexible which allows them to effectively appraise the demanding environment in relation to their fundamental life goals (Kobasa, 1979). In other words, evaluations of stressors are dependent upon the influence on the person’s overall life goals of growth and knowledge.

In addition to impacting one’s perception of stressors, hardiness may also impact the objective presence of stressors. That is, hardy individuals may actually be exposed to fewer stressors than are nonhardy individuals. Believing that one has control over the environment may cause one to proactively address potentially negative conditions before they become serious stressors. For example, a hardy employee may recognize that a job will include an excessive workload and consciously choose a different position before hiring. As a result, hardy individuals are likely to both perceive and experience fewer stressors by actively shaping their environment. Thus, hardiness is expected to be negatively associated with stressors.

*Hypothesis 2:* Hardiness will be negatively associated with stressors.

Hardiness is also expected to be negatively related to strains (Kobasa et al., 1982). First, hardiness may impact strains via effect on stressors. As discussed above, hardiness may affect both perceptions of and the objective presence of stressors. Stressors in turn are expected to produce strains (Jex, Beehr, & Roberts, 1992). Furthermore, hardiness is expected to be related to both social support and coping strategies (see the following sections for a discussion of the hypothesized effects of hardiness on social support and coping). These two categories of variables have been consistently linked with well-being (Cohen & Wills, 1985; Cooper et al., 2001).

Another possibility is that hardiness impacts whether exposure to stressors results in subsequent strains (Beehr & Bowling, 2005; Hull et al., 1987; Kobasa, 1979). That is, hardiness may buffer against the effects of stressors that causes them to experience low levels of strain regardless of the degree to which stressors are present. More specifically, each component of hardiness may lead to an increase in resources that can be used to combat the harmful effects of stressors. Highly committed people, for example, may pull emotional resources from their nonwork relationships to deal with an excessive workload. A sense of control in both the present and in future situations is also seen as a resource (Hobfoll, 1989). Finally, those high in challenge have already well explored their environment and know where to turn for resources to aid them when faced with stressors (Kobasa, 1979). In summary, hardiness is likely to be negatively associated with strains.

*Hypothesis 3:* Hardiness will be negatively associated with strains.

## **HARDINESS AND SOCIAL SUPPORT**

Social support is often considered a resource that can protect one from the effects of stress (Cohen & Wills, 1985). Indeed, research suggests that social support generally has main effects on stressors and strains and that it sometimes moderates or buffers the effects of stressors on strains (Viswesvaran, Sanchez, & Fisher, 1999). There are several reasons to expect that hardiness will be positively related to social support. First, hardiness involves deep commitment and involvement in several life domains, such as family, friends, work, and social activities. It is likely that involvement in these domains allows one to develop a rich network of social relationships that can be drawn upon when one needs support. Another possibility is that hardy individuals are generally more socially attractive and that this makes it easier for them to acquire support.

*Hypothesis 4:* Hardiness will be positively associated with social support and satisfaction with social support.

## HARDINESS AND COPING

Much attention has been given to the coping responses of people who are exposed to stressors. Broadly speaking, these responses can be categorized into two groups: active and regressive coping strategies (Florian, Mikulincer, & Taubman, 1995). Active, or transformational, coping strategies include healthy means of dealing with stressors by transforming high stress environments into benign experiences, such as engaging in problem-focus coping. Regressive coping strategies, on the other hand, include cognitive and behavioral withdrawal and denial, such as avoiding or ignoring the stressor, blaming others, and emotion-focused coping. Indeed, regressive strategies may increase emotional problems and maladjustment.

Hardiness is expected to be positively associated with active coping and negatively associated with regressive coping (Kobasa, 1982; Kobasa & Puccetti, 1983; Gentry & Kobasa, 1984). First, the perception of control common among hardy individuals may predispose them to make change and proactively address any stressors that arise. Thus, they are likely to engage in active coping and avoid regressive coping. Indeed, hardy individuals avoid regressive coping strategies when compared to nonhardy individuals (Maddi, 1999). Second, the sense of purpose shared by hardy individuals may give them incentive to engage in active coping while avoiding regressive coping. That is, they may feel that they owe it to themselves and to others around them “to put up a good fight” by coping in an active manner.

*Hypothesis 5:* Hardiness will be positively associated with the use of active coping strategies and negatively associated with the use of regressive coping strategies.

## HARDINESS AND PERFORMANCE

Hardiness may contribute to one's performance in a variety of domains (Maddi, Harvey, Khoshaba, Lu, Persico, & Brow, 2006). The performance benefits of hardiness may be particularly pronounced when performing tasks in stressful situations, such as at work and at school. That is, the presence of stressful conditions may interfere with successful performance for most people. Because hardy individuals are adept at dealing with stressful conditions, they may outperform nonhardy individuals across all levels of stressors. An alternative explanation is that high hardy individuals are likely to experience less harmful physical and psychological strain that could restrict a person's ability to perform (Zack, Raviv, & Inbar, 2007).

*Hypothesis 6:* Hardiness will be positively associated with school and job performance.

### INCREMENTAL EFFECTS OF HARDINESS

The importance of any variable rests in its ability to predict key criteria after the effects of other predictors are controlled. For example, evidence that hardiness predicts key criteria after more established personality traits (e.g., characteristics from the Five Factor Model; Costa & McCrae, 1992; Goldberg, 1990) would bolster claims about the importance of hardiness. We thus examined whether hardiness predicted select criteria after controlling for: (a) the Five Factor Model characteristics, (b) core self-evaluation (Judge, Locke, Durham, & Kluger, 1998), (c) negative affectivity (Watson, Clark, & Tellegen, 1988), and (d) optimism (Scheier & Carver, 1985). Although hardiness is expected to be associated with other stress relevant personality traits, hardiness is not believed to be completely redundant with any of them. For example, hardiness involves less complacency than does optimism when responding to stressors (Maddi, 1999). In addition, despite the similarity between hardiness and neuroticism measures, hardiness explains unique variance in health outcomes after controlling for neuroticism (Sinclair & Tetrick, 2000). As a result, we expect that hardiness will yield incremental validity controlling for these traits because hardiness is not redundant with any of them.

*Hypothesis 7:* Hardiness will be associated with stress-related criteria after controlling for other dispositions.

### INCREMENTAL EFFECTS OF COMMITMENT, CONTROL, AND CHALLENGE

Although hardiness is believed to be a valuable predictor of several important criteria, the conceptualization of hardiness is still being debated. Specifically, researchers have suggested that the challenge component of hardiness could be dropped from the conceptualization of hardiness because it does not contribute to the prediction of health outcomes (Florian et al., 1995; Funk & Houston, 1987; Hull et al., 1987). However, most researchers assess hardiness with a version of the Personal Views Survey III-R (e.g., Bergeron & Tylka, 2007; Heckman & Clay, 2005), which assesses all three facets of hardiness (Maddi & Koshaba, 2001). Exploratory analyses were conducted to examine the unique effects of each hardiness component. These

analyses will help identify the differences in the utility of each hardiness facet.<sup>1</sup>

## METHOD

We used meta-analysis (Hunter & Schmidt, 2004) to examine the hypothesized antecedents and consequences of hardiness and the interrelationships between hardiness and the hardiness components. Below we discuss the literature search strategies and the analytic method used to conduct the meta-analyses.

### Literature Search

We used the PsycINFO, EBSCO, MEDLINE, and Google Scholar computer databases to conduct our initial literature search with the key words “hardiness” and “resilience.” In addition, we searched for published studies that cited Kobasa’s seminal article (Kobasa, 1979). We identified additional relevant samples by reviewing the reference sections of the studies we found during the literature search. Combined, these search strategies yielded a total of 180 samples that were included in our analyses.

### Inclusion Criteria

Each of the studies included in the current meta-analysis were either individual assessments of each hardiness component or a composite scale of hardiness. The most common measures of hardiness included in the meta-analysis were the Personal Views Survey (Hardiness Institute, 1985), Personal Views Survey III-R (Maddi & Koshaba, 2001), Dispositional Resilience Scale (Bartone, Ursano, Wright, & Ingraham, 1989), Abridged Hardiness Scale (McNeil, Kozma, Stones, & Hannah, 1986), and Cognitive Hardiness Scale (Nowack, 1989). We excluded studies that assessed hardiness in the context of a specific domain or context, such as family hardiness (McCubbin, Thompson, & McCubbin, 1996) and health hardiness (Pollock & Duffy, 1990). In addition, assessments of sense of coherence (Antonovsky, 1993) were not included because the scale does not encompass all three

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<sup>1</sup> Given the breadth of research on hardiness, we are unable to discuss all potential relationships in the text. However, all meta-analyzed relationships are reported in the subsequent tables.

hardiness components (i.e., commitment, control, and challenge). Finally, only published studies were included in the analyses.

**Meta-Analytic Method**

We used Hunter and Schmidt’s (2004) method to conduct the meta-analyses. Specifically, we computed the sample-weighted mean corrected correlation for all relationships examined. We used artifact distributions to estimate missing reliability data. In addition, to detect the possibility of moderation, we computed the percentage of variance across studies attributable to artifacts. If the percentage of variance because of artifacts was less than 75%, potential moderating variables were considered. We computed 95% confidence intervals to test the significance of each uncorrected correlation. The relationship was deemed statistically significant when the confidence interval excluded zero. If a study did not report an overall hardiness-criterion relationship, we estimated the relationship using the interrelationships between each hardiness component and a criterion (Hunter & Schmidt, 2004).

**RESULTS**

**Interrelationships Among the Hardiness Components**

We conducted exploratory analyses examining the interrelationships between commitment, control, and challenge (see Table 1). As expected, the interrelationships were all significant and positive. Commitment and control were strongly related ( $p = .79, k = 51, N = 10,418$ ), whereas the commit-

**Table 1.** Meta-Analyses of the Interrelationships Between Commitment, Control, and Challenge

Interrelationship	<i>k</i>	<i>N</i>	<i>r</i>	<i>SD<sub>r</sub></i>	$\rho$	<i>SD<sub>ρ</sub></i>	% Var.	95% CI
Commitment								
Control	51	10,418	.55	.12	.79	.16	25.89	.51, .59
Commitment								
Challenge	49	10,238	.30	.19	.45	.27	11.77	.24, .36
Control								
Challenge	48	10,004	.27	.18	.43	.27	13.54	.22, .32

*Note.* *k* = number of samples; *N* = total sample size; *r* = average weighted correlation coefficient;  $\rho$  = average weighted correlation coefficient corrected for unreliability in both the predictor and criterion; % Var. = percentage of variance because of artifacts; CI = confidence interval.

ment—challenge ( $p = .45$ ,  $k = 49$ ,  $N = 10,238$ ) and control—challenge ( $p = .43$ ,  $k = 48$ ,  $N = 10,004$ ) relationships were moderate in strength.

### **Hardiness and Personality Correlates**

The results of the meta-analyses for overall hardiness, commitment, control, and challenge are reported in Tables 2, 3, 4, and 5, respectively. In general, hardiness, control, commitment, and challenge were positively associated with other dispositions that buffer against the effects of stressors (Hypothesis 1). For instance, hardiness was positively associated with self-esteem, optimism, extraversion, sense of coherence, and self-efficacy. In addition, hardiness was negatively associated with dispositions that exacerbate the effects of stressors, such as neuroticism, negative affectivity, trait anxiety, and trait anger. Of these relationships, hardiness was most strongly associated with sense of coherence ( $p = .63$ ,  $k = 4$ ,  $N = 1,147$ ), optimism ( $p = .58$ ,  $k = 7$ ,  $N = 1,290$ ), self-esteem ( $p = .53$ ,  $k = 14$ ,  $N = 2,610$ ), and negative affectivity ( $p = -.45$ ,  $k = 6$ ,  $N = 3,115$ ). Surprisingly, hardiness was not significantly related with conscientiousness ( $p = -.06$ ,  $k = 4$ ,  $N = 1,428$ ) and internal locus of control ( $p = .12$ ,  $k = 5$ ,  $N = 1,052$ ). We found similar results for commitment, control, and challenge. However, contrary to expectations, challenge was negatively associated with conscientiousness ( $p = -.37$ ,  $k = 2$ ,  $N = 427$ ) and not significantly associated with self-esteem ( $p = .13$ ,  $k = 8$ ,  $N = 1,034$ ).

### **Hardiness, Stressors, and Strains**

In support of Hypothesis 2, hardiness, control, commitment, and challenge were negatively associated with stressors. Hardiness was negatively related with life stressors, work stressors, coworker conflict, supervisor conflict, task uncertainty, role overload, role ambiguity, role conflict, work-family conflict, and interpersonal stressors. Of these relationships, hardiness was most strongly related with supervisor conflict ( $p = -.69$ ,  $k = 4$ ,  $N = 1,612$ ), role conflict ( $p = -.50$ ,  $k = 2$ ,  $N = 440$ ), and role ambiguity ( $p = -.47$ ,  $k = 2$ ,  $N = 412$ ). Contrary to our hypothesis, hardiness was not significantly related to billable work hours ( $p = .00$ ,  $k = 4$ ,  $N = 1,295$ ) or to family conflict ( $p = -.09$ ,  $k = 4$ ,  $N = 1,250$ ). Overall, similar results were found for commitment, control, and challenge.

In general, hardiness, commitment, control, and challenge were associated with strains (Hypothesis 3). As expected, hardiness was associated with psychological strain variables. Specifically, negative relationships were

**Table 2.** Meta-Analyses of Hardiness

Criterion	<i>k</i>	<i>N</i>	<i>r</i>	<i>SD<sub>r</sub></i>	$\rho$	<i>SD<sub><math>\rho</math></sub></i>	% Var.	95% CI
<b>Dispositions</b>								
Self-esteem	14	2,610	.43	.14	.53	.12	100.00	.35, .51
Type A	13	3,358	-.01	.11	-.01	.14	22.10	-.07, .05
Neuroticism	10	2,848	-.36	.07	-.44	.09	33.91	-.40, -.32
Optimism	7	1,290	.43	.08	.58	.10	37.27	.37, .49
Trait anxiety	7	917	-.32	.07	-.39	.08	53.97	-.37, -.27
Negative affectivity	6	3,115	-.37	.00	-.45	.00	100.00	-.37, -.37
Extraversion	5	2,190	.25	.09	.30	.10	20.20	.17, .33
Internal locus of control	5	1,052	.08	.34	.12	.42	3.79	-.22, .38
Conscientiousness	4	1,428	-.05	.09	-.06	.10	25.40	-.14, .04
Sense of coherence	4	1,147	.50	.00	.63	.00	100.00	.50, .50
Trait anger	4	378	-.34	.00	-.40	.00	100.00	-.34, -.34
Agreeableness	3	1,192	-.09	.07	-.11	.09	27.85	-.17, -.01
Openness	3	1,192	.35	.00	.42	.00	100.00	.35, .35
Emotional reactivity	3	666	-.33	.00	-.43	.00	100.00	-.33, -.33
Need for affiliation	2	445	-.16	.00	-.21	.00	100.00	-.16, -.16
Positive relations	2	294	.38	.00	.48	.00	100.00	.38, .38
Self-efficacy	2	206	.26	.24	.29	.27	12.42	-.07, .59
Strength of excitation	2	1,090	.12	.08	.14	.10	19.33	.01, .23
Strength of inhibition	2	1,090	.23	.06	.30	.08	28.59	.15, .31
<b>Stressors</b>								
Life stressors	41	9,828	-.25	.20	-.31	.25	9.01	-.31, -.19
Work stressors	17	3,788	-.26	.09	-.30	.10	32.08	-.30, -.22
Coworker conflict	4	1,612	-.24	.00	-.36	.00	100.00	-.24, -.24
Supervisor conflict	4	1,612	-.52	.20	-.69	.26	3.20	-.72, -.32
Billable work hours	4	1,295	.00	.11	.00	.12	20.18	-.11, .11
Family conflict	4	1,250	-.07	.09	-.09	.12	24.45	-.16, .02
Task uncertainty	3	674	-.27	.00	-.35	.00	100.00	-.27, -.27
Role overload	3	1,352	-.20	.13	-.25	.15	11.04	-.35, -.05
Role ambiguity	2	412	-.32	.00	-.47	.10	46.53	-.32, -.32
Role conflict	2	440	-.36	.03	-.50	.16	20.39	-.40, -.32
Work-family conflict	2	257	-.05	.00	-.07	.00	100.00	-.05, -.05
Interpersonal	2	1,025	-.22	.00	-.24	.00	100.00	-.22, -.22
<b>Strains</b>								
<b>Psychological strain</b>								
Psychological distress	33	9,103	-.39	.09	-.46	.10	29.98	-.42, -.36
Depression	19	3,050	-.41	.08	-.52	.00	100.00	-.45, -.37
Total burnout	14	4,097	-.42	.15	-.56	.18	22.14	-.50, -.34
Emotional exhaustion	12	4,638	-.33	.07	-.39	.08	29.52	-.37, -.29
Depersonalization	11	3,873	-.27	.13	-.34	.16	12.07	-.35, -.19
Personal accomplishment	11	3,873	.36	.09	.46	.11	20.80	.31, .41
State anxiety	11	1,648	-.35	.06	-.44	.06	71.61	-.39, -.31
Negative state affect	7	1,561	-.26	.06	-.31	.07	46.08	-.30, -.22
Posttraumatic stress disorder	6	1,850	-.47	.05	-.55	.05	64.58	-.51, -.43
Distress for parental drinking	5	687	-.06	.02	-.06	.03	89.37	-.08, -.04
Poor mental health	4	828	-.44	.10	-.53	.10	27.67	-.54, -.34
Psychological maladjustment	3	944	-.29	.11	-.35	.13	18.09	-.41, -.17
Dissociative symptoms	2	276	-.20	.04	-.28	.06	76.08	-.26, -.14
Frustration	2	820	-.25	.00	-.25	.00	100.00	-.25, -.25

(table continues)

Table 2. (Continued)

Criterion	<i>k</i>	<i>N</i>	<i>r</i>	<i>SD<sub>r</sub></i>	$\rho$	<i>SD<sub><math>\rho</math></sub></i>	% Var.	95% CI	
Psychological well-being									
Job satisfaction	10	2,609	.35	.08	.45	.08	53.60	.30	.40
Life satisfaction	6	1,070	.50	.14	.58	.16	18.14	.39	.61
Positive state affect	6	1,821	.34	.04	.42	.05	59.08	.31	.37
Personal growth	3	382	.40	.23	.45	.31	100.00	.14	.66
Engagement	2	359	.37	.00	.44	.00	100.00	.37	.37
Happiness	2	540	.28	.00	.35	.00	100.00	.28	.28
Quality of life	2	328	.32	.00	.38	.00	100.00	.32	.32
Physical strain									
Physical symptoms	44	8,677	-.26	.12	-.31	.15	23.10	-.30	-.22
Physical fitness	2	473	.17	.19	.18	.21	9.20	-.09	.43
Fatigue	2	578	-.26	.00	-.32	.00	100.00	-.26	-.26
Work absences because of illness	2	258	.10	.06	.11	.07	11.34	.02	.18
Health promoting behaviors									
Health promoting habits	11	3,204	.21	.09	.29	.12	36.29	.16	.26
Exercise	5	1,606	.06	.09	.07	.11	24.81	-.02	.14
Alcohol use	4	439	-.22	.14	-.29	.17	29.18	-.36	-.08
Drug use	3	370	-.10	.12	-.14	.18	34.81	-.24	.04
Tobacco use	2	180	-.17	.26	-.23	.33	13.04	-.53	.19
Support									
Social support	20	7,190	.29	.10	.35	.12	19.44	.25	.33
Supervisor support	6	1,674	.29	.05	.35	.05	55.49	.25	.33
Family support	6	1,964	.32	.08	.38	.10	27.19	.26	.38
Satisfaction with social support	6	1,722	.25	.02	.28	.02	89.65	.23	.27
Coworker support	3	1,276	.26	.03	.32	.04	62.37	.23	.29
Work social support	3	1,826	.30	.05	.37	.06	34.42	.24	.36
Friend support	2	230	.21	.11	.25	.14	100.00	.06	.36
Coping strategies									
Avoidance	12	3,681	-.14	.31	-.18	.38	3.27	-.32	.04
Problem focused	11	4,786	.28	.16	.36	.20	8.65	.19	.37
Approach	5	991	.38	.06	.44	.06	50.86	.33	.43
Support seeking	3	1,531	.04	.12	.06	.15	10.74	-.10	.18
Emotion focused	3	1,322	-.40	.02	-.48	.01	91.92	-.42	-.38
Humor	3	862	.14	.06	.20	.08	47.89	.07	.21
Negative intrusive thoughts	3	735	-.41	.00	-.53	.00	100.00	-.41	-.41
Positive intrusive thoughts	3	1,335	.43	.01	.58	.02	79.93	.42	.44
Wishful thinking	3	1,198	-.30	.00	-.35	.00	100.00	-.30	-.30
Regressive	2	1,367	-.50	.00	-.55	.00	100.00	-.50	-.50
Relative	2	130	.40	.00	.45	.00	100.00	.40	.40
Attitudinal, behavioral, interpersonal criteria									
Job performance	5	676	.17	.09	.26	.14	100.00	.09	.25
School performance (GPA)	3	623	.21	.00	.23	.00	100.00	.21	.21
Family cohesion	4	1,250	.25	.00	.31	.00	100.00	.25	.25
Family expressiveness	3	1,069	.32	.00	.39	.00	100.00	.32	.32
Group cohesion	2	247	.26	.00	.36	.00	100.00	.26	.26
Job involvement	2	227	.09	.09	.12	.12	47.43	-.03	.21
Turnover intention	2	805	-.16	.09	-.27	.15	21.77	-.28	-.04
Inadequate preparation	2	587	-.27	.05	-.35	.07	48.13	-.34	-.20

(table continues)

**Table 2.** (Continued)

Criterion	<i>k</i>	<i>N</i>	<i>r</i>	<i>SD<sub>r</sub></i>	$\rho$	<i>SD<sub><math>\rho</math></sub></i>	% Var.	95% CI	
Demographics									
Age	27	8,542	.05	.14	.06	.15	13.70	.00	.10
Education	11	3,058	.13	.12	.14	.13	18.79	.06	.20
Job level	9	2,536	.08	.10	.09	.11	100.00	.01	.15
Gender	7	2,088	.00	.06	.00	.07	43.85	-.04	.04
Marital status	6	1,372	.02	.11	.03	.12	24.99	-.07	.11
Career tenure	5	1,027	-.06	.04	-.06	.04	72.18	-.10	-.02
Children	3	1,211	-.08	.00	-.09	.00	100.00	-.08	-.08
Job tenure	3	879	.01	.05	.02	.06	49.40	-.05	.07
Employment status	2	131	.31	.00	.34	.00	100.00	.31	.31
Organizational tenure	2	425	.08	.00	.13	.00	100.00	.08	.08
Religiosity	2	278	.23	.20	.24	.21	13.60	-.05	.51

*Note.* *k* = number of samples; *N* = total sample size; *r* = average weighted correlation coefficient;  $\rho$  = average weighted correlation coefficient corrected for unreliability in both the predictor and criterion; % Var. = percentage of variance because of artifacts; CI = confidence interval.

found between hardiness and psychological distress, depression, burnout, state anxiety, negative state affect, posttraumatic stress disorder, distress for parental drinking, poor mental health, psychological maladjustment, dissociative symptoms, and frustration. Hardiness was also positively associated with psychological well-being variables such as job satisfaction, life satisfaction, positive state affect, personal growth, engagement, happiness, and quality of life. The strongest relationships included life satisfaction ( $p = .58$ ,  $k = 6$ ,  $N = 1,070$ ), total burnout ( $p = -.56$ ,  $k = 14$ ,  $N = 4,097$ ), and posttraumatic stress disorder ( $p = -.55$ ,  $k = 6$ ,  $N = 1,850$ ). In regards to physical strain, hardiness was associated with physical symptoms ( $p = -.31$ ,  $k = 44$ ,  $N = 8,677$ ), fatigue ( $p = -.32$ ,  $k = 2$ ,  $N = 578$ ), and absences because of illness ( $p = .11$ ,  $k = 2$ ,  $N = 258$ ), but not related to physical fitness ( $p = .18$ ,  $k = 2$ ,  $N = 473$ ). Finally, hardiness was only related to two health promoting behaviors. Specifically, it was related to health promoting habits ( $p = .29$ ,  $k = 11$ ,  $N = 3,204$ ) and alcohol use ( $p = -.29$ ,  $k = 4$ ,  $N = 439$ ), but not with exercise ( $p = .07$ ,  $k = 5$ ,  $N = 1,606$ ), drug use ( $p = -.14$ ,  $k = 3$ ,  $N = 370$ ), and tobacco use ( $p = -.23$ ,  $k = 2$ ,  $N = 180$ ). We found similar results for commitment, control, and challenge. However, contrary to expectations, we failed to find significant relationships between commitment and drug use ( $p = -.22$ ,  $k = 2$ ,  $N = 180$ ), control and alcohol use ( $p = -.10$ ,  $k = 3$ ,  $N = 249$ ), control and tobacco use ( $p = -.27$ ,  $k = 2$ ,  $N = 180$ ), and control and drug use ( $p = -.03$ ,  $k = 2$ ,  $N = 180$ ).

### Moderating Effect of Hardiness on the Stressor—Strain Relationship

In addition to examining the main effects of hardiness on stressors and strains, we examined the moderating effect of hardiness on the stressor—

**Table 3.** Meta-Analyses of the Commitment Component of Hardiness

Criterion	<i>k</i>	<i>N</i>	<i>r</i>	<i>SD<sub>r</sub></i>	$\rho$	<i>SD<sub><math>\rho</math></sub></i>	% Var.	95% CI	
<b>Dispositions</b>									
Self-esteem	8	1,034	.46	.10	.56	.12	29.18	.39, .53	
Type A	5	747	-.06	.11	-.09	.15	32.57	-.16, .04	
Trait anxiety	5	587	-.27	.07	-.34	.09	55.31	-.33, -.21	
Neuroticism	4	785	-.18	.00	-.23	.00	100.00	-.18, -.18	
Optimism	4	1,107	.44	.11	.53	.13	15.81	.33, .55	
Conscientiousness	3	586	.12	.10	.15	.12	31.79	.01, .23	
Trait anger	3	325	-.32	.00	-.42	.00	100.00	-.32, -.32	
Negative affectivity	2	489	-.36	.00	-.38	.00	100.00	-.36, -.36	
Extraversion	2	427	.23	.00	.28	.00	100.00	.23, .23	
Internal locus of control	2	323	.27	.15	.45	.20	24.71	.06, .48	
Agreeableness	2	427	.03	.12	.05	.16	23.73	-.14, .20	
Openness	2	427	.21	.00	.27	.00	100.00	.21, .21	
Positive relations	2	294	.41	.00	.50	.00	100.00	.41, .41	
Social interest	2	190	.37	.00	.37	.00	100.00	.37, .37	
<b>Stressors</b>									
Life stressors	13	2,805	-.12	.21	-.17	.29	8.93	-.23, -.01	
Work stressors	8	1,187	-.14	.20	-.18	.25	13.49	-.28, -.00	
Family conflict	3	1,069	-.03	.10	-.03	.13	21.47	-.14, .08	
Role ambiguity	2	412	-.29	.00	-.38	.00	100.00	-.29, -.29	
Role conflict	2	440	-.25	.00	-.34	.00	100.00	-.25, -.25	
<b>Strains</b>									
<b>Psychological strain</b>									
Psychological distress	18	3,517	-.36	.12	-.48	.16	25.35	-.42, -.30	
Depression	11	2,403	-.50	.18	-.64	.22	10.02	-.61, -.39	
State anxiety	7	1,103	-.34	.10	-.42	.12	34.43	-.41, -.27	
Distress for parental drinking	5	687	-.06	.00	-.08	.00	100.00	-.06, -.06	
Emotional exhaustion	3	368	-.40	.07	-.44	.07	53.86	-.48, -.32	
Depersonalization	3	368	-.35	.03	-.41	.04	79.75	-.38, -.32	
Personal accomplishment	3	368	.34	.07	.38	.07	56.11	.26, .42	
Poor mental health	3	728	-.41	.07	-.55	.05	58.97	-.49, -.33	
Total burnout	2	356	-.38	.00	-.56	.00	100.00	-.38, -.38	
Posttraumatic stress disorder	2	87	-.52	.14	-.60	.16	37.42	-.71, -.33	
<b>Psychological well-being</b>									
Job satisfaction	5	933	.28	.00	.42	.00	100.00	.28, .28	
Life satisfaction	3	456	.41	.06	.51	.08	48.44	.34, .48	
Personal growth	2	294	.45	.00	.56	.00	100.00	.45, .45	
<b>Physical strain</b>									
Physical symptoms	15	1,904	-.28	.09	-.36	.11	46.02	-.33, -.23	
<b>Health promoting behaviors</b>									
Alcohol use	3	249	-.20	.00	-.26	.00	100.00	-.20, -.20	
Health promoting habits	2	180	.30	.10	.53	.17	100.00	.16, .44	
Drug use	2	180	-.14	.00	-.22	.00	100.00	-.14, -.14	
Tobacco use	2	180	-.27	.13	-.33	.15	37.03	-.45, -.09	
<b>Support</b>									
Social support	8	1,609	.26	.00	.29	.00	100.00	.26, .26	
Satisfaction with social support	4	1,168	.27	.00	.30	.00	100.00	.27, .27	
Family support	2	1,358	.35	.04	.44	.06	32.59	.29, .41	

*(table continues)*

**Table 3.** (Continued)

Criterion	<i>k</i>	<i>N</i>	<i>r</i>	<i>SD<sub>r</sub></i>	$\rho$	<i>SD<sub>ρ</sub></i>	% Var.	95% CI
Coping strategies								
Avoidance	8	2,378	-.29	.11	-.37	.14	19.09	-.37, -.21
Problem focused	5	2,529	.38	.11	.55	.16	10.46	.28, .48
Approach	4	511	.39	.08	.44	.09	44.24	.31, .47
Support seeking	3	1,728	.10	.07	.14	.11	21.15	.02, .18
Emotion focused	2	557	-.40	.00	-.53	.00	100.00	-.40, -.40
Regressive	2	1,367	-.47	.00	-.56	.00	100.00	-.47, -.47
Relative	2	130	.35	.00	.38	.00	100.00	.35, .35
Blaming others	2	914	-.18	.02	-.20	.03	70.52	-.21, -.15
Attitudinal, behavioral, interpersonal criteria								
Job performance	4	451	.38	.00	.69	.00	100.00	.38, .38
School performance (GPA)	3	623	.22	.00	.26	.00	100.00	.22, .22
Family cohesion	3	1,069	.32	.00	.41	.00	100.00	.32, .32
Family expressiveness	3	1,069	.34	.00	.49	.00	100.00	.34, .34
Job involvement	2	227	.14	.14	.18	.17	29.45	-.05, .33
Demographics								
Age	5	1,725	.16	.06	.19	.07	40.04	.11, .21
Education	2	1,270	.17	.00	.21	.00	100.00	.17, .17

*Note.* *k* = number of samples; *N* = total sample size; *r* = average weighted correlation coefficient;  $\rho$  = average weighted correlation coefficient corrected for unreliability in both the predictor and criterion; % Var. = percentage of variance because of artifacts; CI = confidence interval.

strain relationship. As mentioned above, hardiness was conceptualized as an individual characteristic that would buffer against the effects stressors on strains (Kobasa, 1979). In addition, the moderating role of hardiness has been explored among relationships not involving stressors or strains (Luszczynska, 2005; Maddi, Brow, Khoshaba, & Vaitkus, 2006). Although previous findings support the notion of a moderating effect (Klag & Bradley, 2004; Waysman, Schwarzwald, & Solomon, 2001), several findings have failed to find a significant interaction (Heckman & Clay, 2005; Li-Ping Tang & Hammontree, 1992) or even a reverse buffering effect (Barling, 1986). As a result, no specific hypotheses were made and these analyses are exploratory.

To examine the moderating effect of hardiness on the stressor—strain relationship, we cumulated the incremental variance explained ( $\Delta R^2$ ) by the interaction term across studies. Because the meta-analytic accumulation of  $\Delta R^2$ s is not fully developed, we have followed the steps employed by Viswesvaran, Sanchez, and Fisher (1999). We computed a mean sample-weighted  $\Delta R^2$ , which is similar to conducting an uncorrected meta-analytic correlation. We excluded several studies that examined moderating effects using analysis of variance techniques (e.g., Kobasa & Puccetti, 1983), those that failed to report a  $\Delta R^2$  (e.g., Benard & Belinsky, 1993), and those that included hardiness as part of a 3-way interaction (e.g., Manning & Fusilier, 1999). Among the studies that we retained, the stressors included general life

**Table 4.** Meta-Analyses of the Control Component of Hardiness

Criterion	<i>k</i>	<i>N</i>	<i>r</i>	<i>SD<sub>r</sub></i>	$\rho$	<i>SD<sub><math>\rho</math></sub></i>	% Var.	95% CI	
<b>Dispositions</b>									
Self-esteem	8	1,034	.42	.13	.54	.16	24.02	.33, .51	
Type A	5	747	-.04	.12	-.05	.16	31.27	-.15, .07	
Trait anxiety	5	587	-.26	.07	-.33	.09	55.96	-.32, -.20	
Optimism	4	1,107	.42	.06	.51	.08	34.74	.36, .48	
Neuroticism	3	626	-.32	.02	-.43	.00	100.00	-.34, -.30	
Extraversion	3	586	.30	.00	.37	.00	100.00	.30, .30	
Conscientiousness	3	586	.15	.04	.20	.03	86.45	.10, .20	
Trait anger	3	325	-.26	.01	-.34	.02	96.70	-.26, -.25	
Agreeableness	3	586	.10	.05	.15	.05	73.30	.04, .16	
Negative affectivity	2	489	-.31	.00	-.34	.00	100.00	-.31, -.31	
Internal locus of control	2	323	.28	.10	.47	.07	67.84	.14, .42	
Positive relations	2	294	.36	.00	.48	.00	100.00	.36, .36	
Social interest	2	190	-.07	.00	-.07	.00	100.00	-.07, -.07	
<b>Stressors</b>									
Life stressors	12	2,738	-.14	.18	-.20	.27	11.31	-.24, -.04	
Work stressors	8	1,187	-.17	.14	-.23	.18	25.21	-.27, -.07	
Family conflict	3	1,069	-.09	.04	-.13	.06	54.66	-.14, -.04	
Role ambiguity	2	412	-.26	.00	-.33	.00	100.00	-.26, -.26	
Role conflict	2	440	-.27	.00	-.35	.00	100.00	-.27, -.27	
<b>Strains</b>									
Psychological strain									
Psychological distress	18	3,750	-.26	.21	-.35	.28	9.84	-.36, -.16	
Depression	10	1,689	-.30	.15	-.41	.20	17.68	-.39, -.21	
State anxiety	7	1,103	-.30	.06	-.41	.08	63.04	-.34, -.26	
Distress for parental drinking	5	687	-.05	.00	-.07	.00	100.00	-.05, -.05	
Emotional exhaustion	3	368	-.22	.12	-.28	.15	33.54	-.36, -.08	
Depersonalization	3	368	-.22	.01	-.29	.01	97.61	-.23, -.21	
Personal accomplishment	3	368	.27	.05	.35	.07	67.11	.21, .33	
Poor mental health	3	728	-.41	.05	-.54	.08	44.17	-.47, -.35	
Total burnout	2	356	-.03	.00	-.05	.00	100.00	-.03, -.03	
Posttraumatic stress disorder	2	87	-.46	.27	-.53	.31	15.86	-.83, -.09	
Psychological well-being									
Job satisfaction	5	933	.10	.06	.15	.10	54.89	.05, .15	
Life satisfaction	3	456	.38	.00	.52	.00	100.00	.38, .38	
Personal growth	2	294	.42	.00	.57	.00	100.00	.42, .42	
Physical strain									
Physical symptoms	15	1,904	-.25	.08	-.32	.10	52.23	-.29, -.21	
Health promoting behaviors									
Alcohol use	3	249	-.08	.14	-.10	.19	35.21	-.24, .08	
Health promoting habits	2	180	.26	.00	.47	.00	100.00	.26, .26	
Drug use	2	180	-.01	.06	-.03	.09	74.94	-.09, .07	
Tobacco use	2	180	-.20	.26	-.27	.32	13.04	-.56, .16	
<b>Support</b>									
Social support	7	1,331	.18	.00	.20	.00	100.00	.18, .18	
Satisfaction with social support	4	1,168	.24	.05	.26	.05	50.87	.19, .29	
Family support	2	1,358	.28	.06	.39	.08	23.79	.20, .36	

*(table continues)*

**Table 4.** (Continued)

Criterion	<i>k</i>	<i>N</i>	<i>r</i>	<i>SD<sub>r</sub></i>	$\rho$	<i>SD<sub><math>\rho</math></sub></i>	% Var.	95% CI
Coping strategies								
Avoidance	8	2,378	-.27	.12	-.39	.17	21.99	-.35, -.19
Problem focused	5	2,529	.33	.04	.48	.05	64.19	.29, .37
Approach	4	511	.37	.07	.54	.10	52.11	.30, .44
Emotion focused	2	557	-.34	.06	-.44	.05	62.96	-.42, -.26
Regressive	2	1,367	-.41	.00	-.54	.00	100.00	-.41, -.41
Relative	2	130	.33	.00	.46	.00	100.00	.33, .33
Blaming others	2	914	-.17	.00	-.19	.00	100.00	-.17, -.17
Attitudinal, behavioral, interpersonal criteria								
Job performance	4	591	.19	.00	.34	.00	100.00	.19, .19
School performance (GPA)	3	623	.15	.00	.19	.00	100.00	.15, .15
Family cohesion	3	1,069	.23	.00	.33	.00	100.00	.23, .23
Family expressiveness	3	1,069	.27	.00	.43	.00	100.00	.27, .27
Job involvement	2	227	.06	.00	.08	.00	100.00	.06, .06
Demographics								
Age	5	1,725	.06	.05	.08	.07	45.89	.02, .10
Education	2	1,270	.07	.00	.09	.00	100.00	.07, .07

*Note.* *k* = number of samples; *N* = total sample size; *r* = average weighted correlation coefficient;  $\rho$  = average weighted correlation coefficient corrected for unreliability in both the predictor and criterion; % Var. = percentage of variance because of artifacts; CI = confidence interval.

stressors (e.g., Li-Ping Tang & Hammontree, 1992), specific stressors (i.e., conflict; Barling, 1986), and major life events (e.g., abuse; Heckman & Clay, 2005). Strains included changes in attitudes (Waysman et al., 2001), physical and psychological strain (e.g., Klag & Bradley, 2004), and marital adjustment (e.g., Barling, 1986). The frequency-weighted  $\Delta R^2$  was .045 (*k* = 8, *N* = 1,099). In other words, the interaction of hardiness and stress in predicting strain explains an additional 4.5% of the variance. Given that an  $\Delta R^2$  of .045 is relatively large (Aguinis, 2002), we consider the moderating effect to be practically significant.

### Hardiness and Sources of Support

Support was found for Hypothesis 4 in which hardiness, commitment, control, and challenge were positively associated with all sources of support and satisfaction with social support. Specifically, hardiness was associated with social support, supervisor support, family support, coworker support, work social support, and friend support, with the strongest relationship being between hardiness and family support (*p* = .38, *k* = 6, *N* = 1,964).

**Table 5.** Meta-Analyses of the Challenge Component of Hardiness

Criterion	<i>k</i>	<i>N</i>	<i>r</i>	<i>SD<sub>r</sub></i>	$\rho$	<i>SD<sub><math>\rho</math></sub></i>	% Var.	95% CI
<b>Dispositions</b>								
Self-esteem	8	1,034	.10	.16	.13	.22	21.20	-.01, .21
Trait anxiety	5	587	-.22	.08	-.28	.10	53.58	-.29, -.15
Type A	5	747	-.03	.05	-.05	.07	72.94	-.07, .01
Neuroticism	4	785	-.25	.04	-.33	.05	100.00	-.29, -.21
Optimism	4	1,107	.30	.23	.36	.27	100.00	.07, .53
Internal locus of control	3	323	.10	.00	.17	.00	100.00	.10, .10
Trait anger	3	325	-.22	.00	-.28	.00	100.00	-.22, -.22
Agreeableness	2	427	-.10	.06	-.14	.08	53.06	-.18, -.02
Conscientiousness	2	427	-.29	.11	-.37	.13	24.59	-.44, -.14
Extraversion	2	427	.28	.03	.34	.04	76.22	.24, .32
Negative affectivity	2	489	-.20	.02	-.21	.02	84.32	-.23, -.17
Positive relations	2	294	.11	.00	.15	.00	100.00	.11, .11
Social interest	2	190	.18	.00	.18	.00	100.00	.18, .18
<b>Stressors</b>								
Life stressors	12	2,738	-.05	.18	-.07	.25	11.91	-.15, .05
Work stressors	8	1,187	-.12	.10	-.16	.13	38.78	-.19, -.05
Family conflict	3	1,069	.00	.00	.01	.00	100.00	.00, .00
Role ambiguity	2	412	-.09	.00	-.13	.00	100.00	-.09, -.09
Role conflict	2	440	-.22	.00	-.33	.00	100.00	-.22, -.22
<b>Strains</b>								
Psychological strain								
Psychological distress	15	3,270	-.24	.10	-.31	.12	31.09	-.29, -.19
Depression	9	1,490	-.19	.05	-.26	.06	69.28	-.22, -.16
State anxiety	7	1,103	-.17	.00	-.24	.00	100.00	-.17, -.17
Distress for parental drinking	5	687	-.02	.00	-.03	.00	100.00	-.02, -.02
Poor mental health	3	728	-.12	.05	-.16	.07	59.15	-.18, -.06
Personal accomplishment	3	368	.22	.00	.30	.00	100.00	.22, .22
Emotional exhaustion	3	368	-.26	.00	-.34	.00	100.00	-.26, -.26
Depersonalization	3	368	-.13	.06	-.19	.08	67.06	-.20, -.06
Total burnout	2	356	-.03	.00	-.05	.00	100.00	-.03, -.03
Posttraumatic stress disorder	2	87	-.37	.00	-.44	.00	100.00	-.37, -.37
Psychological well-being								
Job satisfaction	5	933	.06	.06	.10	.10	54.85	.01, .11
Life satisfaction	3	456	.09	.00	.13	.00	100.00	.09, .09
Personal growth	2	294	.36	.06	.49	.09	52.43	.28, .44
Physiological strain								
Physical symptoms	15	1,904	-.14	.10	-.18	.13	40.93	-.19, -.09
<b>Support</b>								
Social support	7	1,476	.11	.02	.12	.03	84.06	.10, .12
Satisfaction with social support	4	1,168	.08	.00	.09	.00	100.00	.08, .08
Family support	2	1,358	.21	.02	.26	.02	69.98	.18, .24
<b>Coping strategies</b>								
Avoidance	8	2,378	-.14	.07	-.19	.09	38.69	-.19, -.09
Problem focused	5	2,529	.21	.11	.31	.16	11.59	.11, .31
Approach	4	511	.20	.04	.26	.05	78.70	.16, .24
Blaming others	2	914	-.02	.00	-.02	.00	100.00	-.02, -.02
Emotion focused	2	557	-.34	.00	-.47	.00	100.00	-.34, -.34
Regressive	2	1,367	-.32	.00	-.38	.00	100.00	-.32, -.32

*(table continues)*

**Table 5.** (Continued)

Criterion	<i>k</i>	<i>N</i>	<i>r</i>	<i>SD<sub>r</sub></i>	$\rho$	<i>SD<sub><math>\rho</math></sub></i>	% Var.	95% CI
Attitudinal, behavioral, interpersonal criteria								
Job performance	4	451	.05	.13	.10	.24	33.57	-.08, .18
School performance (GPA)	3	623	.11	.08	.14	.11	36.87	.02, .20
Family expressiveness	3	1,069	.14	.00	.23	.00	100.00	.14, .14
Job involvement	2	227	.02	.00	.02	.00	100.00	.02, .02
Demographics								
Age	5	1,725	.15	.06	.19	.06	47.94	.10, .20
Education	2	1,270	.20	.00	.24	.00	100.00	.20, .20

*Note.* *k* = number of samples; *N* = total sample size; *r* = average weighted correlation coefficient;  $\rho$  = average weighted correlation coefficient corrected for unreliability in both the predictor and criterion; % Var. = percentage of variance because of artifacts; CI = confidence interval.

### Hardiness and Coping

Partial support was found for Hypothesis 5 in which hardiness, commitment, control, and challenge were expected to be positively associated with active coping strategies and negatively associated with regressive coping strategies. Specifically, hardiness was positively related to problem focused, approach, and positive intrusive thoughts and negatively related to emotion focused and negative intrusive thoughts. Of these relationships, hardiness had the strongest associations with positive intrusive thoughts ( $p = .58, k = 3, N = 1,335$ ) and negative intrusive thoughts ( $p = -.53, k = 3, N = 735$ ). Contrary to expectation, hardiness was not associated with avoidance ( $p = -.18, k = 12, N = 3,681$ ) and support seeking ( $p = .06, k = 3, N = 1,531$ ).

### Hardiness and Performance

In general, hardiness, commitment, control, and challenge were positively associated with performance. Hardiness was positively associated with job ( $p = .26, k = 5, N = 676$ ) and school performance ( $p = .23, k = 3, N = 623$ ). Although similar results are found with commitment and control, challenge was not significantly associated with job performance ( $p = .10, k = 4, N = 451$ ). Overall, partial support is found for Hypothesis 6.

### Incremental Effects of Hardiness

To examine the incremental effects of hardiness we conducted regression analyses using meta-analytic data. To complete the correlation matrix we used the corrected relationships reported in Table 2 and relied on previously

conducted meta-analyses (Alarcon, Eschleman, & Bowling, 2009; Barrick & Mount, 1991; Bowling, Eschleman, & Wang, in press; Bowling, Eschleman, Wang, Kirkendal, & Alarcon, 2010; Judge & Bono, 2001; Ng, Sorensen, & Eby, 2006; Ones, 1993) for relationships that did not include hardiness. In addition, we computed the sample size with the harmonic mean (Viswesvaran & Ones, 1995).

Consistent with Hypothesis 7 (see Table 6), while controlling for either Five Factor Model traits, core-self evaluation traits, negative affectivity, or optimism, hardiness explained unique variance in role ambiguity, role conflict, role overload, job stressors, emotional exhaustion, personal accomplishment, depersonalization, depression, poor mental health, job satisfaction, life satisfaction, physical symptoms, supervisor support, coworker support, social support, problem focused coping, emotion focused coping, job performance, academic performance, turnover intention, and job involvement. In only one case did hardiness fail to explain unique variance: hardiness-work-family conflict relationship while controlling for locus of control.

### **Incremental Effects of Commitment, Control, and Challenge**

Following the same steps to conduct the previous regression analyses, we examined the unique effects of commitment, control, and challenge (see Table 7). Of the 32 relationships examined, commitment had a significant unique effect in 28 analyses, control had a significant unique effect in 25 analyses, and challenge had a significant unique effect in 20 analyses. In addition, commitment had the strongest unique effect in 24 analyses, whereas control was the strongest in 7 analyses and challenge was the strongest in only 1 analysis.

## **DISCUSSION**

The current meta-analysis found support for the utility of hardiness in personality and health research. Overall, we found at least partial support for all hypotheses. In addition, several exploratory analyses were conducted that indicate that hardiness should not be considered a unitary phenomenon, but rather assessed at the facet level (Hull et al., 1987).

### **Interrelationships Among Hardiness Components**

We examined the interrelationships between each hardiness component. The moderate to strong interrelationships support the notion that the three

**Table 6.** Regression Analyses Examining the Unique Effects of Hardiness

Criteria	Five factor model traits			Core self-evaluation traits			Negative affectivity			Optimism		
		$\beta$	<i>N</i>		$\beta$	<i>N</i>		$\beta$	<i>N</i>		$\beta$	<i>N</i>
Stressors												
Role ambiguity				Hardiness	-.58**	1,232						
				Self-esteem <sup>d</sup>	.26**							
				Locus of control <sup>b</sup>	-.29**							
Role conflict				Hardiness	-.79**	1,260						
				Self-esteem <sup>d</sup>	.68**							
				Locus of control <sup>b</sup>	-.62**							
Role overload				Hardiness	-.16**	1,542						
				Self-esteem <sup>d</sup>	-.18**							
				Locus of control <sup>b</sup>	.05							
Job stressors				Hardiness	-.23**	2,378						
				Self-esteem <sup>d</sup>	-.10**							
				Locus of control <sup>b</sup>	-.16**							
Work-family conflict				Hardiness	-.06	575						
				Locus of control <sup>b</sup>	-.06							
Strains												
Emotional exhaustion	Hardiness	.04**	5,242	Hardiness	-.28**	1,422	Hardiness	-.21**	4,634	Hardiness	-.66**	2,197
	Openness <sup>e</sup>	-.08**		Self-esteem <sup>e</sup>	.21**		NA <sup>e</sup>	.39**		Optimism <sup>e</sup>	-.61**	
	Conscientiousness <sup>e</sup>	-.36**		Locus of control <sup>e</sup>	-.08**							
	Extraversion <sup>e</sup>	-.37**		Self-efficacy <sup>e</sup>	-.08							
	Agreeableness <sup>e</sup>	-.18**		Neuroticism <sup>e</sup>	.42**							
	Neuroticism <sup>e</sup>	.74**										
Personal accomplishment	Hardiness	.11**	4,705	Hardiness	.42**	1,377	Hardiness	.45**	3,988	Hardiness	.71**	1,587
	Openness <sup>e</sup>	.18**		Self-esteem <sup>e</sup>	.17**		NA <sup>e</sup>	-.02		Optimism <sup>e</sup>	.55**	
	Conscientiousness <sup>e</sup>	.31**		Locus of control <sup>e</sup>	.31**							
	Extraversion <sup>e</sup>	.35**		Self-efficacy <sup>e</sup>	-.36**							
	Agreeableness <sup>e</sup>	.20**		Neuroticism <sup>e</sup>	-.05							
	Neuroticism <sup>e</sup>	-.47**										

(table continues)

**Table 6.** (Continued)

Criteria	Five factor model traits	$\beta$	<i>N</i>	Core self-evaluation traits	$\beta$	<i>N</i>	Negative affectivity	$\beta$	<i>N</i>	Optimism	$\beta$	<i>N</i>
Depression				Hardiness	-.34**	3,776						
Poor mental health				Self-esteem <sup>b</sup>	-.34**							
				Hardiness	-.49**	1,350						
				Locus of control <sup>d</sup>	-.30**							
Job satisfaction	Hardiness	.37**	5,391	Hardiness	.72**	1,482	Hardiness	.38**	3,905			
	Openness <sup>h</sup>	-.13**		Self-esteem <sup>b</sup>	-1.09**		NA <sup>f</sup>	-.15**				
	Conscientiousness <sup>h</sup>	.29**		Locus of control <sup>a</sup>	.24**							
	Extraversion <sup>h</sup>	.18**		Self-efficacy <sup>a</sup>	1.04**							
	Agreeableness <sup>h</sup>	.18**		Neuroticism <sup>h</sup>	.05							
	Neuroticism <sup>h</sup>	-.26**										
Life satisfaction				Hardiness	.55**	1,483						
				Locus of control <sup>d</sup>	.30**							
Physical symptoms				Hardiness	-.38**	2,920						
				Self-esteem <sup>b</sup>	.22**							
				Locus of control <sup>d</sup>	-.40**							
Support												
Supervisor support				Hardiness	.30**	1,521						
				Self-esteem <sup>b</sup>	.09**							
Coworker support				Hardiness	.22**	1,055						
				Self-esteem <sup>b</sup>	.20**							
Social support				Hardiness	.33**	2,144						
				Locus of control <sup>d</sup>	.09**							
Coping												
Problem focused				Hardiness	.34**	2,265						
				Locus of control <sup>d</sup>	.18**							
Emotion focused				Hardiness	-.48**	1,596						
				Locus of control <sup>d</sup>	-.04							

(table continues)

Table 6. (Continued)

Criteria	Five factor model traits			Core self-evaluation traits			Negative affectivity			Optimism			
		$\beta$	<i>N</i>		$\beta$	<i>N</i>		$\beta$	<i>N</i>				
Attitudes and behaviors													
Job performance	Hardiness	.25**	4,332	Hardiness	.41**	1,204							
	Openness <sup>c</sup>	-.06**		Self-esteem <sup>b</sup>	-.42**								
	Conscientiousness <sup>c</sup>	.28**		Locus of control <sup>a</sup>	.25**								
	Extraversion <sup>c</sup>	.08**		Self-efficacy <sup>a</sup>	.42**								
	Agreeableness <sup>c</sup>	.05**		Neuroticism <sup>c</sup>	.19**								
	Neuroticism <sup>c</sup>	-.07**											
Academic performance													
Academic performance	Hardiness	.32**	4,145										
	Openness <sup>c</sup>	.00											
	Conscientiousness <sup>c</sup>	.20**											
	Extraversion <sup>c</sup>	-.13**											
	Agreeableness <sup>c</sup>	.05**											
	Neuroticism <sup>c</sup>	.08**											
Turnover intention													
Turnover intention				Hardiness	-.26**	1,750							
				Self-esteem <sup>b</sup>	.02								
				Locus of control <sup>d</sup>	-.15**								
Job involvement													
Job involvement				Hardiness	.14**	2,218							
				Self-esteem <sup>b</sup>	-.10**								
				Locus of control <sup>d</sup>	.26**								

Note.  $\beta$  = standardized regression coefficient. *N* was computed with the harmonic mean (Viswesvaran & Ones, 1995). Relationship between FFM traits reported in Ones (1993). Relationship between core self-evaluation traits reported in Judge and Bono (2001).

<sup>a</sup> Personality-criterion relationship reported in Judge and Bono (2001). <sup>b</sup> Personality-criterion relationship reported in Bowling et al. (2010). <sup>c</sup> Personality-criterion relationship reported in Barrick and Mount (1991). <sup>d</sup> Personality-criterion relationship reported in Ng et al. (2006). <sup>e</sup> Personality-criterion relationship reported in Alarcon et al. (2009). <sup>f</sup> Personality-criterion relationship reported in Bowling et al. (in press).

\*  $p < .05$ . \*\*  $p < .01$ .

**Table 7.** Regression Analyses Examining the Unique Effects of Commitment, Control, and Challenge

Criterion	<i>N</i>	Commitment $\beta$	Control $\beta$	Challenge $\beta$
<b>Stressors</b>				
Life stressors	4,345	-.04	-.18**	.03
Work stressors	2,126	.03	-.22*	-.08*
Family conflict	1,935	.18**	-.29**	.06*
Role ambiguity	792	-.34**	-.09	.06
Role conflict	843	-.11*	-.18**	-.21**
<b>Psychological strain</b>				
Psychological distress	5,215	-.50**	.10**	-.13**
Depression	3,041	-.84**	.25**	.01
State anxiety	1,991	-.24**	-.20**	-.05*
Distress for parental drinking	1,287	-.07	-.02	.01
Poor mental health	1,359	-.37**	-.31**	.14**
Personal accomplishment	710	.23**	.10	.15**
Emotional exhaustion	710	-.52**	.22**	-.20**
Depersonalization	710	-.48**	.09	-.02
Total burnout	688	-1.43**	1.01**	.16**
Posttraumatic stress disorder	172	.42**	.11	-.20**
<b>Psychological well-being</b>				
Job satisfaction	1,709	.82**	-.47**	-.07**
Life satisfaction	873	.31**	.34**	-.16**
Personal growth	571	.21**	.29**	.27**
<b>Physical strain</b>				
Physical symptoms	3,209	-.28**	-.09**	-.01
<b>Support</b>				
Social support	2,559	.35**	-.08*	-.01
Satisfaction with social support	2,096	.27**	.07*	-.06**
Family support	2,397	.33**	.10**	.07**
<b>Coping strategies</b>				
Avoidance	3,858	-.16**	-.26**	-.01
Problem focused	4,054	.43**	.11**	.07**
Approach	973	.03	.51**	.03
Blaming others	1,677	-.16**	-.10**	.10**
Emotion focused	1,056	-.40**	.00	-.29**
Regressive	2,411	-.31**	-.23**	-.14**
<b>Attitudinal, behavioral, interpersonal criteria</b>				
Job performance	863	1.19**	-.50**	-.22**
School performance (GPA)	1,174	.28**	-.05	.03
Family expressiveness	1,935	.40**	.11**	.00
Job involvement	444	.33**	-.15*	-.06

Note.  $\beta$  = standardized regression coefficient. *N* was computed with the harmonic mean (Viswesvaran & Ones, 1995).

\*  $p < .05$ . \*\*  $p < .01$ .

constructs are conceptually linked (Kobasa, 1979), but distinct, nonetheless. Although commitment, control, and challenge were interrelated, discrepancies in these relationships were found. The lack of overlap of confidence intervals indicates that the commitment—challenge and control—challenge relationships were significantly weaker than the commitment—control relationship. It is interesting to note that these differences in strength were still

present after correcting for measurement error. These differences support the notion that challenge is the most unique of the three hardiness components. Indeed, researchers have argued that the challenge component could be dropped from the conceptualization of hardiness because only commitment and control have adequate psychometric properties and are systematically related to health criteria (Florian et al., 1995; Funk & Houston, 1987; Hull et al., 1987). Although the psychometric properties of challenge items have been improved (Maddi et al., 2006b), we estimate the main effects of hardiness and each component with correlates and health criteria. These estimates not only confirm the theoretical underpinnings of hardiness, but reveal some of the similarities and discrepancies among commitment, control, and challenge.

### **Hardiness, Personality, Stressors, and Strains**

Hardiness, commitment, control, and challenge were generally positively associated with dispositions that have been shown to buffer against the effects of stressors (e.g., optimism), and negatively associated with dispositions that have been shown to worsen the effects of stressors (e.g., neuroticism). Additionally, we found that hardiness and the components were generally related to stressors and strains. These effects are likely because hardy individuals perceive fewer stressors and proactively address negative conditions. The fewer perceived and objective stressors, in turn, lead to less strain.

To understand the effect of hardiness on stressors and strains, we estimated the moderating effect of hardiness. Hardiness was found to interact with stressors in predicting strain. We should note that the  $\Delta R^2$  did include one case in which a reverse buffering effect was found between interrole conflict and marital adjustment (Barling, 1986). The removal of this study, however, did not significantly change the magnitude of the  $R^2$ . Thus, hardiness is likely to buffer the effect of stressors on strains. In other words, hardy individuals are less likely experience less strain in the presence of a stressor than low hardiness individuals.

### **Hardiness, Social Support, Coping, and Performance**

As expected, hardiness and the hardiness components were positively associated with social support. In addition to seeking out support resources, the positive relationships may occur because support is given to those individuals who are committed to many life domains and thus have a large

social circle or it may result from hardy individuals being more socially attractive. Hardy individuals are also likely to have a repertoire of coping strategies that are more proactive than regressive. That is, a greater sense of control and commitment to an environment is likely to predispose an individual to address stressors rather than engage in withdrawal behaviors.

Given that hardy individuals will receive greater support and cope more effectively, in addition to experience fewer stressors and strains, it was expected that hardy individuals would perform better in school and on the job. In general, hardiness and the hardiness components generally led to higher ratings of school and work performance. These relationships, however, tend to be weaker compared to the health criterion. The weaker relationships may be because hardiness is a proximal cause of health, but a distal cause of performance that may be mediated via health.

### **Incremental Effect of Hardiness**

In addition to estimating the main effects of hardiness on the aforementioned criteria, we examined the incremental effect of hardiness after controlling for other dispositions. Hardiness explained unique variance over other common dispositions in all but one case. In addition, hardiness was the strongest predictor in 21 of the 30 analyses. Given that we controlled for all five factor model traits or core self-evaluation traits in several regression equations, the incremental effect of hardiness is impressive and empirically demonstrates the utility of hardiness over other personality variables.

### **Incremental Effects of Commitment, Control, and Challenge**

Although the interrelationships of the components indicate that challenge is the most unique component of hardiness, regression analyses indicate that commitment is likely the most valuable component in predicting criteria. Commitment explained unique variance and provided the strongest unique effect in most criteria. The regression analyses also address the notion that the challenge component should be dropped from the conceptualization of hardiness because it does not systematically affect health criteria (Florian et al., 1995; Funk & Houston, 1987; Hull et al., 1987). Commitment, control, and challenge consistently explained unique variance in criteria, a clear indication that all three components are valuable in the conceptualization of the hardiness construct. This notion has been previously expressed because of the potential interactive effects of subdimensions on criteria (Carver, 1989). In sum, each of the three components is important to the conceptualization of

hardiness, but the utility of each component may vary depending upon the criteria being examined.

### **Implications and Future Research**

A major implication of the current findings is the utility of hardiness in predicting criteria after controlling for the core-self evaluation traits, the five-factor model traits, optimism, or affectivity. An early concern regarding hardiness was that it is too similar to neuroticism and unlikely to explain unique variance in health criteria (Funk & Houston, 1987; Hull et al., 1987). In the current meta-analysis, hardiness consistently explained unique variance in criteria after controlling for not only neuroticism, but also several other common dispositions.

In addition, by comparing the relationships to other health oriented dispositions (e.g., self-esteem or locus of control; Bowling et al., 2010; Wang et al., 2010), hardiness is arguably one of the best dispositional predictors of well-being. Given that hardiness was originally conceptualized as a characteristic that develops, rather than inborn (Maddi & Kobasa, 1984), efforts to increase hardiness should be considered. Indeed, the development of hardiness training programs has been under way for some time (Maddi, 1987; Maddi, Khoshaba, Persico, Harvey, & Bleeker, 2002).

When designing a hardiness training session, researchers and practitioners should consider the findings regarding the unique effects of each hardiness component. Given that commitment generally explains the most unique variance in criteria, the hardiness training sessions should emphasize the need to increase a person's commitment to various life domains over the other hardiness components. It should be noted, however, that all three components consistently explained unique variance in criteria and efforts to improve hardiness should not completely ignore the control and challenge components. In fact, we recommend that researchers assess hardiness at the facet level to better identify the varying effects on criteria.

### **Limitations**

We should note the limitations in the current study. First, most of the primary studies included in our meta-analysis relied entirely on self-report data. Thus, our results may have been influenced by common-method variance. We should note, however, that some researchers have recently suggested that common-method variance may not be as serious a problem as generally assumed (Spector, 2006). Indeed, self-reports may be the most

accurate means of assessing hardiness because it involves internal psychological processes. Second, it is impossible to draw definitive conclusions regarding causal relationships because most of the primary studies used cross-sectional data. Thus, longitudinal research is especially needed. Finally, we had a small number of samples for many of the relationships. For this reason, caution should be used when interpreting these findings.

## CONCLUSION

Overall we found evidence that hardiness is consistently associated with stress mitigating variables. In addition to the significant relationships with psychological and physiological strain, the positive relationships between hardiness and stress resistant personality traits, active coping strategies, and social support indicate that a hardy person will either have or obtain the resources needed to handle stressors. These beneficial characteristics of a hardy person are primarily driven by a sense of commitment to various life domains. To a lesser degree, but nonetheless valuable, a sense of control and a tendency to perceive obstacles as challenges are important aspects of hardiness. In short, hardiness is a valuable predictor of strain and explains unique variance in outcomes after controlling for other stress mitigating dispositions.

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