

2015

# Effects of Psychological Capital on Mental Health and Substance Abuse

Dina V. Krasikova

*University of Texas at San Antonio, dina.krasikova@utsa.edu*

Paul B. Lester

*Research Facilitation Laboratory, Army Analytics Group, Monterey, CA, paul.b.lester.mil@mail.mil*

Peter D. Harms

*University of Nebraska - Lincoln, pharms@gmail.com*

Follow this and additional works at: <http://digitalcommons.unl.edu/pdharms>

 Part of the [Business Administration, Management, and Operations Commons](#), [Human Resources Management Commons](#), and the [Organizational Behavior and Theory Commons](#)

---

Krasikova, Dina V.; Lester, Paul B.; and Harms, Peter D., "Effects of Psychological Capital on Mental Health and Substance Abuse" (2015). *P. D. Harms Publications*. 9.

<http://digitalcommons.unl.edu/pdharms/9>

This Article is brought to you for free and open access by the Management Department at DigitalCommons@University of Nebraska - Lincoln. It has been accepted for inclusion in P. D. Harms Publications by an authorized administrator of DigitalCommons@University of Nebraska - Lincoln.

# Effects of Psychological Capital on Mental Health and Substance Abuse

Journal of Leadership & Organizational Studies  
2015, Vol. 22(3) 280–291  
© The Authors 2015  
Reprints and permissions:  
sagepub.com/journalsPermissions.nav  
DOI: 10.1177/1548051815585853  
jlo.sagepub.com



Dina V. Krasikova<sup>1</sup>, Paul B. Lester<sup>2</sup>, and P. D. Harms<sup>3</sup>

## Abstract

Luthans, Youssef, Sweetman, and Harms proposed a holistic approach to psychological capital that involves examining psychological capital and its effects across multiple life domains, including work, relationships, and health. This article focuses on the effects of psychological capital on objective health outcomes. Using data from a sample of 1,889 U.S. Army soldiers, we demonstrate that soldiers with higher levels of psychological capital prior to deployment were less likely to receive diagnoses for mental health problems and substance abuse postdeployment. In addition, the effects of psychological capital on mental health diagnoses were mediated by soldiers' overall health perceptions.

## Keywords

PsyCap, psychological capital, mental health, substance abuse

In a large body of literature, the construct of psychological capital (PsyCap) has been shown to predict a wide range of work-related behavioral and attitudinal outcomes. Specifically, PsyCap has been related to increased job performance (across various measures of performance and sources of performance ratings), job satisfaction, organizational commitment, organizational citizenship behaviors (Avey, Reichard, Luthans, & Mhatre, 2011), mastery orientation and innovation (Luthans, Youssef, & Rawski, 2011), perceived employability (Chen & Lim, 2012), psychological well-being (Avey, Luthans, Smith, & Palmer, 2010), and happiness (Culbertson, Fullagar, & Mills, 2010). In addition, PsyCap has been found to be negatively related to undesirable phenomena, from the organizational perspective, such as cynicism, turnover intentions, job stress, anxiety, deviance (Avey et al., 2011), job search behaviors (Avey, Luthans, & Jensen, 2009), dimensions of burnout—emotional exhaustion, depersonalization, and personal accomplishment (Cheung, So-kum Tang, & Tang, 2011), incivility (Roberts, Scherer, & Bowyer, 2011), and counterproductive work behaviors (Avey, Luthans, & Youssef, 2010).

Recently, Luthans, Youssef, Sweetman, and Harms (2013) suggested that PsyCap may also have important implications for life domains such as personal relationships and health that are outside the work context. Accordingly, they extended the conceptual model of work-based PsyCap to a broader, more comprehensive model capturing the origins and effects of PsyCap both within and across different life domains. They argued that domain-specific (work, relationships, or health) PsyCap contributes to the domain-specific satisfaction, which in turn contributes to the overall well-being and higher

levels of PsyCap over time. Their proposed model opens multiple avenues for further research on PsyCap that can focus on the following four areas: (a) the interconnectedness and mutual effects of the domain-specific aspects of PsyCap (e.g., the relationships between work-related PsyCap and health-related PsyCap); (b) their bottom-up effects on overall well-being (e.g., the effects of work-related PsyCap, relationship-related PsyCap, and health-related PsyCap on well-being); (c) their within-domain effects on domain-specific outcomes (e.g., the effects of work-related PsyCap on task performance and job satisfaction); and (d) their between-domain effects (e.g., the effects of work-related PsyCap on relationship satisfaction).

In the current study, we examine one aspect on this complex network of relationships—the cross-domain effects of the work-related PsyCap on employee health. Thus, this study intends to make the following contributions. First, it is one of the first studies examining health-related implications of employee PsyCap (which is one of the new directions for PsyCap research identified by Luthans et al., 2013) with the focus on objective health outcomes (mental health diagnoses and alcohol and drug abuse diagnoses). Second, this study examines the relationship between PsyCap and psychological health outcomes using a sample of deployed

<sup>1</sup>University of Texas at San Antonio, San Antonio, TX, USA

<sup>2</sup>Research Facilitation Laboratory, Monterey, CA, USA

<sup>3</sup>University of Nebraska—Lincoln, Lincoln, NE, USA

## Corresponding Author:

Dina V. Krasikova, Department of Management, University of Texas at San Antonio, One UTSA Circle, San Antonio, TX, 78249, USA.  
Email: dina.krasikova@utsa.edu

soldiers. Given that soldier psychological health problems is one of the major sources of concern for the U.S. Army (Bliese, Wright, Adler, Thomas, & Hoge, 2007; Hoge et al., 2004), this study has potential to provide insights into factors that could help boost soldier psychological health. The development of PsyCap (Luthans, Avey, Avolio, Norman, & Combs, 2006; Luthans, Avey, Avolio, & Peterson, 2010; Luthans, Avey, & Patera, 2008) is of critical importance in this regard: Establishing the effects of soldier PsyCap on their health may serve as a basis for designing training programs aimed at increasing soldier PsyCap with the long-term goal of reducing the rates of psychological problems among soldiers (cf. Quick, 1999).

### **Psychological Capital, Health Perceptions, and Mental Health and Substance Abuse**

Drawing from the positive organizational behavior approach to understanding and modifying behaviors of employees in organizations, Luthans, Youssef, and Avolio (2007) proposed the construct of PsyCap as a framework for understanding the psychological resources that individuals use to overcome obstacles and setbacks in their life. This construct of PsyCap embodies the core idea underlying the positive organizational behavior approach, which emphasizes capitalizing on employees' strengths and virtues rather than weaknesses and negative dispositional and behavioral tendencies, and developing those strengths to achieve desired changes in employee behaviors, emotions, and cognitions. In addition, PsyCap is conceptualized and empirically studied as a higher order core construct that is related to criteria above and beyond the effects of its individual components: self-efficacy, optimism, hope, and resiliency (Luthans, Avolio, Avey, & Norman, 2007). Therefore, in the current study, we focus on this higher order construct of PsyCap and propose it has a positive impact on soldiers' psychological health by reducing the likelihood of receiving diagnoses for mental health (posttraumatic stress disorder, or PTSD, anxiety, and depression) and substance (alcohol and drug) abuse problems.

#### ***PsyCap and Mental Health and Substance Abuse***

There are a number of potential pathways via which PsyCap can potentially affect mental health and substance abuse behaviors. First, prior research has shown that PsyCap may be used to effectively cope with stress (Avey et al., 2009), which is one of the powerful predictors of psychological health problems. Specifically, stress in its acute form is a major source of PTSD (Boscarino, 1995; Brewin, Andrews, & Valentine, 2000). Similarly, anxiety and depression have been shown to be affected by stress (Boscarino, 1995;

Lincoln, Peter, Schäfer, & Moritz, 2009). Stress is also considered one of the factors predicting use of alcohol and drugs (Frone, 1999, 2008).

Furthermore, previous studies have demonstrated that positive states (e.g., happiness—Roysamb, Tawls, Reichborn-Kjennerud, Neale, & Harris, 2003; positive emotions—Tugade, Fredrickson, & Feldman Barrett, 2004) are related to better psychological health. In addition, the negative effects of PsyCap components on stress are also discussed in theory and demonstrated in empirical studies (Bandura, 2008; Bartone, 2006; Chang, Rand, & Strunk, 2000; Snyder, 2000). Moreover, Luthans et al. (2013) argued that PsyCap components may counteract the potential dysfunctional health-related effects of other components. For example, the maladaptive effects of overoptimism regarding one's health (e.g., skipping checkups and failing to exercise) may be counteracted by hope, which is likely to provide a more realistic understanding of the steps needed to maintain or improve health. Finally, the protective role of overall PsyCap against stress has been established empirically. In a recent meta-analysis, Avey et al. (2011) reported that the relationship between PsyCap and stress was negative and moderately strong (corrected  $r = -.29$ ).

Second, previous research on the effects of psychological states on mental and physical health has proposed one additional mechanism that could account for the effect of PsyCap on health. This mechanism involves the link between positive states and engagement in health-promoting behaviors. Specifically, it has been argued that individuals with higher levels of optimism and confidence and a stronger sense of self-worth are likely to devote more attention to their health in terms of prevention strategies and therefore are less likely to experience health problems (Taylor, Kemeny, Reed, Bower, & Gruenewald, 2000). Such individuals are more likely to engage in health-promoting behaviors (e.g., visit doctors regularly, lead a healthier lifestyle, be more knowledgeable of potential risks of certain behaviors and proactively make efforts to reduce such risks), which are likely to contribute to their better psychological health (Carver, Scheier, & Segerstrom, 2010; Luthans et al., 2013; Taylor et al., 2000) and help cope with substance abuse (Bandura, 1999). Specifically, exercising has been negatively related to the development of symptoms of anxiety (De Moor, Beem, Stubbe, Boomsma, & De Geus, 2006; Manger & Motta, 2005; Petruzzello, Landers, Hatfield, Kubitz, & Salazar, 1991), depression (Babyak et al., 2000; Camacho, Roberts, Lazarus, Kaplan, & Cohen, 1991; De Moor et al., 2006; Manger & Motta, 2005), and posttraumatic stress (Berninger et al., 2010; Manger & Motta, 2005) as well as alcohol abuse (Medina et al., 2011; Murphy, Pagano, & Marlatt, 1986) and drug abuse (Roessler, 2010; Smith & Lynch, 2011). Furthermore, having regular doctor visits

could help detect earlier signs of negative psychological states and prevent the development of more serious psychological problems later on.

A third mechanism potentially linking PsyCap to psychological health is social in nature. Specifically, previous research has demonstrated that more positively oriented individuals tend to develop better social relationships and spend more time socializing (e.g., Carver et al., 2010; Taylor et al., 2000; Watson, 1988). Well-developed interpersonal relationships are likely to provide individuals with a sense of belonging (Berkman, 1995; Ryan & Deci, 2001), help them feel more efficacious (Berkman, 1995), and promote emotional sharing (Ryff & Singer, 2000), including sharing negative experiences (Pennebaker, 1993), which in turn is likely to serve as a source of social support and protect individuals from the negative effects of stressors. The protective effect of social support (cf. Cohen & Wills, 1985) and constructive interpersonal relationships has been theorized and empirically demonstrated in studies examining predictors of PTSD (Boscarino, 1995; Brewin et al., 2000), anxiety (Beehr & McGrath, 1992; Boscarino, 1995), and depression (Boscarino, 1995; Peirce, Frone, Russell, Cooper, & Mudar, 2000) as well as alcohol abuse (Groh, Jason, Davis, Olson, & Ferrari, 2007; Steptoe, Wardle, Pollard, Canaan, & Davies, 1996) and drug abuse (Hawkins, Catalano, & Miller, 1992).

Based on the above-cited literature, we expect that soldiers who have higher levels of PsyCap are less likely to receive diagnoses for mental health and substance abuse problems. Thus, we propose the following:

**Hypothesis 1a:** Psychological capital is negatively related to diagnoses for mental health problems (PTSD, anxiety, and depression).

**Hypothesis 1b:** Psychological capital is negatively related to diagnoses for substance abuse (alcohol and drug use).

Furthermore, we expect that this negative effect of PsyCap on dysfunctional health outcomes might be mediated by health perceptions. We now summarize evidence in support of this expectation.

### *Mediating Role of Health Perceptions in the Relationships Between PsyCap and Diagnoses for Mental Health and Substance Abuse Problems*

*PsyCap as a Positive Predictor of Health Perceptions.* Luthans et al. (2013) argued that PsyCap is likely to be positively related to health appraisals because it involves viewing one's life events and circumstances in a positive light and therefore is likely to predispose individuals to evaluate their health more favorably. In line with this prediction, Avey,

Luthans, Smith, et al. (2010) empirically demonstrated that PsyCap was a positive predictor of self-reported health appraisals.

In addition, Luthans et al. (2013) emphasized the agentic nature of PsyCap and discussed how its components acting in concert are likely to promote engagement in proactive self-directed health-management behaviors (e.g., exercising regularly, having a healthy diet, maintaining regular doctor visits). Specifically, they argued that confidence in one's ability to achieve desired outcomes (self-efficacy), positive outcome expectancies (optimism), search for alternative paths to goals (hope), and ability to bounce back from negative experiences (resiliency) taken together are likely to contribute to the overall goal of maintaining and improving one's health and motivate engagement in behaviors helping achieve that goal. They concluded that because of its agentic nature, PsyCap is likely to "contribute to intentional strong motivation and desire for better health and relief from illness" (Luthans et al., 2013, p. 121). Thus, having a goal to maintain or improve one's health, which can be triggered by the agentic positive approach captured by the construct of PsyCap (Luthans et al., 2013), is likely to be an important factor promoting adaptive health-related behaviors (e.g., exercising, having a healthy diet). Engaging in such behaviors is likely to positively influence one's health, which will be reflected in one's general health assessments. Based on the above, we expect that PsyCap will be positively related to overall health perceptions.

*Positive Health Perceptions as a Negative Predictor of Mental Health and Substance Abuse Problems.* There are a number of reasons to expect that health perceptions may affect mental health and substance abuse. The most obvious reason is that negative health perceptions may serve as precursors or early signs of actual health problems that are detected later on in the course of medical examinations. The association between health perception scores and mental health has been demonstrated previously (e.g., Kaplan, Roberts, Camacho, & Coyne, 1987), suggesting that unfavorable health perceptions may serve as indicators of future psychological health problems. In addition, individuals with lower self-rated health have been shown to visit doctors more frequently (Fylkesnes, 1993), even when the effects of physical symptoms on health care utilization were accounted for (Connelly, Philbrick, Smith, Kaiser, & Wymer, 1989). Thus, psychological health problems of individuals with less favorable health perceptions are more likely to be detected by health care providers and are more likely to receive diagnoses than those who have more positive health perceptions.

However, general health beliefs do not have to be accurate to affect future health. For example, research on health anxiety (which may be reflected in low self-assessed health) has demonstrated that health-anxious individuals in both clinical and nonclinical samples are more likely to hold

negatively biased beliefs about their health and engage in catastrophic interpretations of their bodily processes (Marcus, Gurley, Marchi, & Bauer, 2007). Furthermore, it has been argued that such health-anxious individuals are prone to developing more severe mental health problems (Williams, 2004).

Also, there is some evidence that even unrealistic positive perceptions of one's health (e.g., unsubstantiated positive expectations regarding future improvements in health, a feeling of personal control over the course of disease) may be related to better mental and physical health (Taylor & Brown, 1988; Taylor et al., 2000). For example, Taylor et al. (1992) demonstrated that HIV-seropositive men who held unrealistically optimistic beliefs regarding their disease were likely to cope with their condition more effectively. Similarly, Reed, Kemeny, Taylor, Wang, and Visscher (1994) found that individuals with AIDS who had lower scores on the realistic acceptance items (i.e., those who did not accept their mortality) had longer life expectancies than those who realistically accepted their own death. Similar findings have been obtained by researchers studying cancer patients. For example, Greer, Morris, and Pettingale (1979) demonstrated that cancer patients who initially reacted to their diagnoses with less realistic responses—denial (active rejection of any evidence regarding diagnosis) or fighting spirit (planning on doing anything it takes to get better)—demonstrated more favorable outcomes (i.e., recurrence free survival) 5 years following surgery than those who reacted to the diagnosis with more realistic responses—stoic acceptance (ignoring the disease and carrying on the normal life) and helplessness/hopelessness.

In addition, there is evidence that positive illusions may play an important role in promoting mental health. In their review of research on the adaptive functions of illusions, Taylor and Brown (1988) demonstrated that unrealistically positive beliefs about oneself and various aspects of one's life are likely to be associated with increased positive mood, improved social functioning and bonding with others, higher motivation, persistence, performance, and, ultimately, greater success. These factors—positive mood, social bonds, and ability to succeed through doing productive work—serve as reserves that allow coping with negative experiences more effectively and act as factors that protect against mental health and substance abuse problems (Taylor et al., 2000).

Finally, it has been argued that perceived good health is likely to be related to well-being because it frees up resources for the pursuit of important personal goals and living a meaningful life (Luthans et al., 2013). Being able to pursue personal goals is shown to be an important influence on one's well-being (Cantor & Sanderson, 2003) and having meaning in life is shown to be related to better mental health (Taylor et al., 2000) and decreased use of alcohol and drugs (Harlow, Newcomb, & Bentler, 1986). Furthermore, satisfaction with

one's health is likely to promote approach-oriented health-related goals (e.g., to remain healthy) and promote behaviors that are necessary for the achievement of those goals (e.g., to exercise regularly, have a healthy diet; Luthans et al., 2013), which is likely to have a positive impact on one's mental health (e.g., De Moor et al., 2006) and a negative impact on substance abuse (e.g., Medina et al., 2011; Roessler, 2010). In line with these arguments, Luthans et al. (2013) empirically demonstrated that satisfaction with one's health is related to overall well-being as rated by the individual. Thus, given that mental health and substance abuse problems can be considered indicators of well-being (cf. Goldberg & Hillier, 1979), it is reasonable to expect that positive health perceptions will be negatively related to diagnoses for mental health and substance abuse problems.

Taken together, the above-cited findings with respect to the adaptive effects of positive beliefs regarding one's health demonstrate that such beliefs, even if unrealistic, may result in more favorable health outcomes. Based on this evidence, we expect that more positive assessment of one's health will be related to lower risk of receiving a diagnosis for mental health and substance abuse problems.

In sum, our arguments suggest that the relationship between PsyCap and diagnoses for mental health and substance abuse problems will be mediated by positive health perceptions, such that individuals with higher levels of PsyCap will have more positive health perceptions and therefore will be less likely to receive diagnoses for mental health and substance abuse problems. However, given that PsyCap may affect mental health and substance abuse through other routes (e.g., by providing resources to cope with stress, leading to a healthier lifestyle, and strengthening social bonds), we predict that the mediating effect of health perceptions in the negative relationship between PsyCap and mental health and substance abuse will be partial. Thus, we propose the following hypotheses:

**Hypothesis 2a:** The negative effect of psychological capital on diagnoses for mental health problems is partially mediated by the overall perceptions of health.

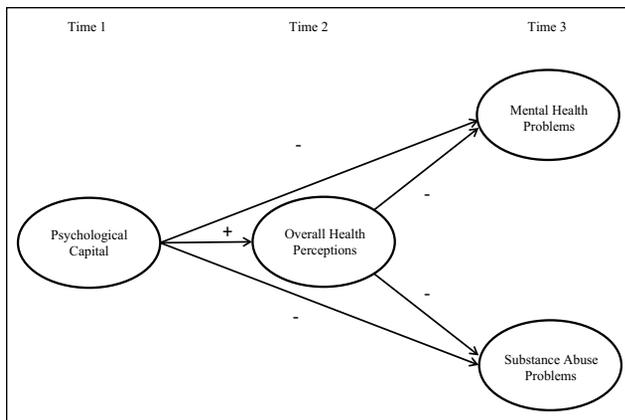
**Hypothesis 2b:** The negative effect of psychological capital on diagnoses for substance abuse problems is partially mediated by the overall perceptions of health.

The proposed relationships among PsyCap, health perceptions, and diagnoses for mental health and substance abuse problems are summarized in Figure 1.

## Method

### Sample and Procedures

Data used in the current study were obtained from three sources. PsyCap scores and demographic variables were



**Figure 1.** Conceptual model depicting relationships between PsyCap (psychological capital), health perceptions, and diagnoses.

obtained from the database of soldiers' responses to the Global Assessment Tool Plus, health assessment data were obtained from the Post-Deployment Health Questionnaire completed by soldiers on return from deployment, and diagnosis data were obtained from the U.S. Army Medical Department's Patient Administration Systems and Biostatistics Activity. To ensure that the predictor, mediator, and outcome variables were measured at three separate time points, only cases with PsyCap data measured at Time 1 (at the predeployment stage), health assessment data measured at Time 2 (immediately after deployment), and diagnosis data obtained within 120 days on return from deployment (cf. Bliese et al., 2007) were used in the current study.

The sample used in this study included 1,889 soldiers who completed a full deployment cycle. All soldiers' responses to survey questions and diagnosis data were de-identified and used in this study only if respondents provided consent that their responses can be used for research purposes. Average age of respondents was 25.5 years; 90.4% of the respondents were male, 39.2% reported experiencing combat during deployment, 4.0% received a diagnosis for mental health problems, and 1.5% received a substance abuse diagnosis postdeployment. These 1,889 soldiers were nested in 131 army units.

## Measures

**PsyCap.** Psychological capital was measured using the PCQ-12 (Luthans, Youssef, et al., 2007) worded to refer to the Army-specific context. Sample items are: "I am confident in representing this unit" (self-efficacy), "I always look on the bright side of things regarding being a member of this unit" (optimism), "If I should find myself in a jam in this unit, I could think of many ways to get out of it" (hope), and "I can get through difficult times in this unit because I've experienced difficulty before" (resilience). Response options ranged from 1 (*strongly disagree*) to 6 (*strongly*

*agree*). Internal consistency reliability for the scale was .96. Given that PsyCap is conceptualized as a higher order core construct (Luthans, Youssef, et al., 2007) and that we obtained high (ranging from .76 to .84 in magnitude) correlations among its dimensions, we averaged the items measuring self-efficacy, optimism, hope, and resilience to compute the overall PsyCap variable that was used as a predictor in all analyses reported below.

**Health Assessment.** Soldiers' health was assessed using one item—"Overall, how would you rate your health during the past month?"—referring to the last month of the deployment period. Response options ranged from 1 (*poor*) to 5 (*excellent*).

**Diagnoses.** Both outcome variables—mental health diagnoses and substance abuse diagnoses—were computed using the International Statistical Classification of Diseases and Related Health Problems codes for anxiety, depression, PTSD, alcohol-related diagnoses, and drug-related diagnoses. Specifically, soldiers received a score of 1 on the mental health diagnosis variable if they were diagnosed by a medical professional with PTSD, anxiety, or depression within 120 days on return from deployment, and received a score of 0 if they received no diagnosis for PTSD, anxiety, or depression during that period. Similarly, soldiers received a score of 1 on the substance abuse diagnosis variable if they were diagnosed by a medical professional with alcohol or drug abuse within 120 days on return from deployment and received a score of 0 if they received no diagnosis for alcohol or drug abuse during that period.

**Control Variables.** In the analyses reported below, we controlled for soldier age and gender. One additional control variable used in the analyses was combat exposure, a dichotomous variable indicating whether a soldier experienced at least one of the following events during deployment—discharged a weapon, saw dead bodies, or felt like he or she was in danger of being killed.

## Results

Correlations among study variables are presented in Table 1. Given the hierarchical structure of the data, study hypotheses were tested using hierarchical generalized linear modeling with the outcome variable following Bernoulli distribution (Raudenbush, Bryk, Cheong, Congdon, & du Toit, 2011). Prior to conducting the analyses, we computed intraclass correlation coefficients (ICC[1]s) to examine the degree of nonindependence in mediator and outcome scores within Level 2 units. ICC(1)s were computed using equations provided by Raudenbush and Bryk (2002) for continuous variables (the mediator used in the current study was continuous) and Ridout, Demetrio, and Firth (1999) for

**Table 1.** Correlations Among Study Variables.

Variable	<i>M</i>	<i>SD</i>	1	2	3	4	5	6
1 Age	25.46	6.40						
2 Gender	0.10	—	-.02					
3 Combat	0.39	—	.06**	-.08**				
4 PsyCap	4.53	0.97	.03	-.08**	.01			
5 Health assessment	3.76	0.95	-.09***	-.09***	-.19***	.19***		
6 Mental health	0.04	—	.07**	.02	.08***	-.04	-.12***	
7 Substance abuse	0.01	—	-.04	-.01	.00	-.07**	-.01	.13***

Note. *N* = 1,889. Gender is coded as 1 = female, 0 = male. Combat is coded as 1 = exposed to combat, 0 = not exposed to combat. Mental health and substance abuse diagnoses are coded as 1 = received a diagnosis, 0 = did not receive a diagnosis. PsyCap = psychological capital.

\*\**p* < .01. \*\*\**p* < .001.

dichotomous variables (both outcome variables used in the current study were dichotomous). The preliminary examination of the ICC(1)s revealed that there was some nonindependence in soldiers' scores on the mediator (health assessment, ICC[1] = .03) and outcome variables (ICC[1] for mental health diagnoses = .02, ICC[1] for substance abuse diagnoses = .001). Although the ICC(1)s were very low, suggesting that nonindependence in low-level mediator and outcome scores due to unit membership was almost negligible, we tested our hypotheses using multilevel modeling instead of single-level regression to avoid inflated Type I error that may occur even in cases with low nonindependence (cf. Kreft & de Leeuw, 1998). The multilevel mediation analyses were performed using HLM 7 (Raudenbush, Bryk, & Congdon, 2011).

The results of the mediation analysis are presented in Table 2. As seen in this table, PsyCap was a negative and significant predictor of both mental health and substance abuse diagnoses (Step 1 of the mediation analysis), suggesting that soldiers with higher levels of PsyCap prior to deployment were less likely to be diagnosed with mental health and substance abuse problems postdeployment. This finding yields support for both Hypotheses 1a and 1b that predicted a negative effect of PsyCap on diagnoses for mental health problems and substance abuse problems, respectively. Furthermore, PsyCap was a positive and significant predictor of health assessment (Step 2 of the mediation analysis), suggesting that soldiers with higher levels of PsyCap prior to deployment were more likely to report having better health during deployment.

Furthermore, when both PsyCap and health assessment were in the model with diagnoses for mental health problems as an outcome (Step 3 of the mediation analysis), health assessment was a negative and significant predictor of these diagnoses and PsyCap became a nonsignificant predictor of these diagnoses suggesting that health assessment fully mediated the effect of PsyCap on diagnoses for mental health problems. The indirect effect of PsyCap on mental health diagnoses via health assessment was  $-.08$  (95%

CI =  $-.12$  to  $-.04$ ), computed using the asymmetric confidence limits approach that accounts for the nonnormality of the product term representing the indirect effect (MacKinnon, Fritz, Williams, & Lockwood, 2007; MacKinnon, Lockwood, & Williams, 2004). Taken together, these results indicate that the effect of PsyCap on mental health diagnoses was fully mediated by health assessment, which yielded partial support for Hypothesis 2a predicting that the effect of PsyCap on the diagnoses for mental health problems would be partially mediated by health assessment.

Finally, when both PsyCap and health assessment were in the model with diagnoses for substance abuse problems as an outcome (Step 3 of the mediation analysis), health assessment was a nonsignificant predictor of these diagnoses and PsyCap remained a negative and significant predictor of these diagnoses. These results indicate that PsyCap had a direct negative effect on diagnoses for substance abuse problems, providing no support for Hypothesis 2b, which predicted that PsyCap would affect substance abuse diagnoses both directly and indirectly (via improving health assessment).

## Discussion

This study builds off Luthans et al.'s (2013) recent work on health-related effects of PsyCap. In the current study, we examined the effects of work-related PsyCap on health outcomes using a sample of deployed soldiers. In support of our predictions, we obtained evidence regarding the positive effects of PsyCap on psychological health. Specifically, we found that soldiers with higher self-rated levels of PsyCap prior to deployment were less likely to be diagnosed with mental health problems (PTSD, anxiety, and depression) and substance abuse problems (alcohol and drug abuse) than soldiers with lower levels of PsyCap. In addition, we obtained evidence that the negative effect of PsyCap on mental health diagnoses was accounted for by soldiers' health perceptions. Specifically, soldiers with higher PsyCap were likely to report better health and, as a

**Table 2.** Testing for the Mediating Effect of Health Assessment.

Predictor	Mediation (steps)													
	Step 1				Step 2				Step 3					
	Mental health		Substance abuse		Health assessment		Mental health		Substance abuse		Health assessment			
	$\gamma$ (SE)	OR (CI)	$\gamma$ (SE)	OR (CI)	$\gamma$ (SE)	OR (CI)	$\gamma$ (SE)	OR (CI)	$\gamma$ (SE)	OR (CI)	$\gamma$ (SE)	OR (CI)		
(Intercept)	-3.66***	(0.18)	0.03 (0.02, 0.04)	-3.89***	(0.20)	0.02 (0.01, 0.03)	3.94***	(0.03)	-3.48***	(0.16)	0.03 (0.02, 0.04)	-3.46***	(0.16)	0.03 (0.02, 0.04)
Age	0.04**	(0.02)	1.04 (1.01, 1.08)	-0.05 (0.03)	0.95 (0.90, 1.00)	-0.01***	(0.00)	0.04**	(0.01)	1.04 (1.01, 1.07)	-0.04*	(0.02)	0.96 (0.93, 0.998)	
Gender	0.45 (0.34)		1.56 (0.80, 3.04)	-0.51 (0.56)	0.60 (0.20, 1.81)	-0.31***	(0.07)	0.30 (0.32)		1.35 (0.73, 2.52)	-0.36 (0.42)		0.70 (0.31, 1.59)	
Combat	0.81***	(0.23)	2.25 (1.44, 3.51)	0.01 (0.29)	1.01 (0.58, 1.77)	-0.38***	(0.05)	0.56**	(0.21)	1.75 (1.16, 2.64)	0.01 (0.23)		1.01 (0.64, 1.58)	
PsyCap	-0.28*	(0.11)	0.76 (0.61, 0.94)	-0.29*	(0.13)	0.75 (0.58, 0.96)	0.18***	(0.02)	-0.16 (0.10)	0.86 (0.70, 1.05)	-0.25*	(0.11)	0.78 (0.62, 0.98)	
Health assessment							0.18***	(0.02)	-0.43***	(0.11)	0.65 (0.52, 0.81)	-0.04 (0.12)		0.96 (0.75, 1.23)

Note.  $N = 1,889$ . Gender is coded as 1 = female, 0 = male. Combat is coded as 1 = exposed to combat; 0 = not exposed to combat. Mental health and substance abuse diagnoses are coded as 1 = received a diagnosis; 0 = did not receive a diagnosis.  $\gamma$  = gamma coefficient obtained in the multilevel analysis; OR = odds ratio; CI = 95% confidence interval; PsyCap = psychological capital.

\* $p < .05$ . \*\* $p < .01$ . \*\*\* $p < .001$ .

consequence, less likely to receive a diagnosis for mental health problems. Although we predicted that mediation in this model would be partial (because other mediators of the link between PsyCap and mental health diagnoses are possible), we obtained evidence that the effect of PsyCap on mental health problems was fully mediated by health perceptions. This discrepancy between what we predicted and what we found suggests that the relationship between PsyCap and mental health may be described in terms of a slightly different, more complex, mediation mechanism that involves multiple sequential mediators (e.g., additional mediators of the link between PsyCap and health perceptions and/or the link between health perceptions and diagnoses). For example, it is possible that effective coping, health-promoting behaviors, and interpersonal relationship serve as mediators of the relationships between PsyCap and health perceptions and/or between health perceptions and diagnoses rather than between PsyCap and diagnoses as we initially expected.

Finally, contrary to our prediction, the effect of PsyCap on substance abuse problems was not mediated by health perceptions. It is possible that the agentic nature of PsyCap (Luthans et al., 2013) drives its direct effect on alcohol and drug abuse, and personal self-regulatory agency has been shown to play a critical role in preventing and coping with substance abuse (Bandura, 1999).

Finally, one might argue that there are alternative explanations for the negative relationships between health perceptions and diagnoses. One such explanation is the possibility that soldiers with more positive perceptions of their health did not visit doctors within the study time frame, and therefore, were unlikely to receive a diagnosis for psychological problems. The specifics of our sample, however, render this explanation unlikely. All soldiers are expected to go through health assessment immediately after deployment and a few months on return from deployment. So, there is no reason to expect that their health perceptions affect the likelihood that they did not visit doctors within the study period.

The findings obtained in the current study are important from both theoretical and practical perspectives. From the theoretical perspective, this study is among the first studies examining health-related implications of PsyCap, and thus, has a potential to contribute to the extended conceptual model of PsyCap that accounts for the effects of PsyCap across different life domains (Luthans et al., 2013). The numerous positive work-related effects of PsyCap have been theorized and empirically demonstrated with regard to a wide range of attitudinal and behavioral outcomes. However, as argued by Luthans et al. (2013), PsyCap is likely to have important implications in other life domains, such as health and relationships. Their extended model of PsyCap includes multiple forms of PsyCap—work-related, health-related, and relationship-related PsyCap—and

suggests that their effects on outcomes within and across life domains are examined in future research. In our study, we elaborate on one set of relationships that fit within this holistic model of PsyCap and its outcomes—the cross-domain effects of work-related PsyCap on objective health outcomes.

From the practical standpoint, the results of this study are important for the purposes of training and development in organizations. Our findings provide some preliminary evidence that interventions aimed at improving PsyCap (Luthans et al., 2008; Luthans et al., 2010; Luthans, Youssef, et al., 2007) are likely to have some health-related benefits that have not been considered before. It is possible that in addition to improving work-related outcomes (e.g., job performance, Luthans et al., 2010), such interventions could also help reduce the rates of mental health and substance abuse problems among employees. Such problems are a serious concern for both civilian (Danna & Griffin, 1999; Goetzel et al., 2004; Kessler et al., 1999) and military organizations (Bliese et al., 2007; Hoge et al., 2004) and can be somewhat alleviated by developing employee PsyCap.

### *Strengths and Limitations*

Our study has a number of strengths. First, we used data from multiple sources—soldiers provided ratings of their PsyCap and general health, whereas doctors provided the diagnoses. In addition, study variables were measured at three different points in time. These study design features helped alleviate a problem of common source bias (although both PsyCap and health perceptions were self-report measures, they were temporally separated from each other) and conduct a proper test of mediation with predictor, mediator, and outcome variables measured in a temporal sequence. Another strength of our study is that it used a substantial sample size, which enabled us to detect the small effects that are typical in low-base-rate medical outcomes. Finally, we were also able to control for the workplace context, in this case combat exposure, that could mask the effects of PsyCap on the health outcomes.

However, we would also like to acknowledge some study limitations. First, we examined the relationships between PsyCap and health in the context of a highly stressful occupation using a sample of deployed U.S. Army soldiers who are at high risk of developing mental health problems and substance abuse problems given the amounts and severity of stressors associated with deployments and involvement in combat. Because of the specifics of the sample, the generalizability of the study findings needs to be established using nonmilitary samples and samples of employees in other high-risk occupations.

Second, we examined only one mechanism linking PsyCap and psychological health—the effects of PsyCap on psychological health through positive health perceptions.

Other mechanisms, such as use of effective coping, leading healthier lifestyles, and having strong social ties (cf. Taylor et al., 2000), are also possible and should be examined in future research.

Finally, we used only a self-report measure of general health perceptions. Although its relationships with PsyCap and mental health and substance abuse diagnoses is an important finding in itself given that cognitions may have an effect on health (especially mental health) independent of actual health (cf. Luthans et al., 2013), we do not know the extent to which those self-ratings of health are accurate. Thus, comparing self-ratings with some other-rated health outcomes (e.g., rated by doctors or family members) may help assess the potential distorting role of inaccurately positive or negative health perceptions in the development of psychological health problems. It should also be noted that the measure of health perceptions consisted of one item, which creates concerns regarding its validity. Given the nature of our data that were obtained from the existing databases, alternative multi-item measures of health were not available to us. Thus, we encourage future research to replicate our study using multi-item measures of health assessment.

### *Directions for Future Research*

A number of directions for future research emerge out of this study that would be useful for not only studying the effect of PsyCap on health but also PsyCap research in general. The first and most obvious future direction is that the present study did not assess physical health. Although the diagnoses in the current study were provided for by medical professionals, they did not address the physical health of the participants. Although the relationship between other positive psychological constructs and physical health has been established in prior research, this relationship remains only speculative for PsyCap.

Three other important directions for future PsyCap research surround the measurement of the construct. First, there are well-known issues surrounding the widely used 12-item measure of PsyCap. The first is that the lack of content breadth and depth in the measure that resulted from attempts to shorten it almost certainly resulted in underestimates of the contribution of PsyCap in multivariate models (see, Credé, Harms, Nierhorster, & Gaye-Valentine, 2012). A better approach in future scale construction would be to use item-response theory to retain items at different levels of difficulty to maximize the range covered by a limited number of items.

Second, because the measure is typically given with instructions to reflect an individual's feelings at that very moment, the current PsyCap measure will tend to overestimate effects in the short term and underestimate them in the long term. This is because the responses will

be contaminated by momentary thoughts and feelings in addition to the underlying psychological trait that drives long-term, cross-situation behaviors. Although it could be argued that any self-report measure suffers from this issue, the PsyCap measure may exaggerate this effect by emphasizing fleeting psychological phenomenon at the expense of more enduring, yet still malleable characteristics. That said, the current measure could also be used more appropriately by using in a multiwave study where the stable element of PsyCap could be modeled as a latent trait across several waves while the "state" aspect was treated as time-specific errors (see, Kenny & Zautra, 2001). It is possible that this approach would yield more "authentic" results than either a trait-like measure of PsyCap or a single wave of the current measure.

Finally, the third direction for future research on the measurement of PsyCap follows from the same desire for assessing authentic psychological phenomena. Instead of assessing PsyCap with a face-valid self-report instrument (and the many documented shortcomings that accompany that approach), Harms and Luthans (2012) have demonstrated that implicit measures of PsyCap are easily administered, equally predictive to self-report measures, and resistant to social desirability and faking issues. Although this approach is relatively new, the results are very encouraging and the use of such instruments would also address many of the measurement issues already raised. Future research on PsyCap should endeavor to further validate this implicit measurement approach.

### **Conclusions**

The present study aimed to extend the work of Luthans et al. (2013) in bringing the concept of PsyCap to the health domain. Using a multiwave, multilevel, multisource sample, we did not only show that PsyCap was predictive of important health outcomes but also established a psychological mechanism that explained this relationship. Specifically, we demonstrated that the effects of PsyCap on health were mediated by health perceptions. We believe that this represents a major step forward in terms of understanding not only the importance of PsyCap for health outcomes but also the process thereof.

### **Declaration of Conflicting Interests**

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

### **Funding**

The author(s) disclosed receipt of the following financial support for the research, authorship, and/or publication of this article: This research was funded by the U.S. Army under contract D10PC20006.

## References

- Avey, J. B., Luthans, F., & Jensen, S. M. (2009). Psychological capital: A positive resource for combating employee stress and turnover. *Human Resource Management, 48*, 677-693. doi:10.1002/hrm.20294
- Avey, J. B., Luthans, F., Smith, R. M., & Palmer, N. F. (2010). Impact of positive psychological capital on employee well-being over time. *Journal of Occupational Health Psychology, 15*, 17-28. doi:10.1037/a0016998
- Avey, J. B., Luthans, F., & Youssef, C. M. (2010). The additive value of positive psychological capital in predicting work attitudes and behaviors. *Journal of Management, 36*, 430-452. doi:10.1177/0149206308329961
- Avey, J. B., Reichard, R. J., Luthans, F., & Mhatre, K. H. (2011). Meta-analysis of the impact of positive psychological capital on employee attitudes, behaviors, and performance. *Human Resource Development Quarterly, 22*, 127-152. doi:10.1002/hrdq.20070
- Babyak, M., Blumenthal, J. A., Herman, S., Khatri, P., Doraiswamy, M., Moore, K., . . . Krishnan, K. R. (2000). Exercise treatment for major depression: Maintenance of therapeutic benefit at 10 months. *Psychosomatic Medicine, 62*, 633-638.
- Bandura, A. (1999). A sociocognitive analysis of substance abuse: An agentic perspective. *Psychological Science, 10*, 214-217. doi:10.1111/1467-9280.00138
- Bandura, A. (2008). An agentic perspective on positive psychology. In S. J. Lopez (Ed.), *Positive psychology: Exploring the best in people* (Vol. 1, pp. 167-196). Westport, CT: Greenwood.
- Bartone, P. T. (2006). Resilience under military operational stress: Can leaders influence hardiness? *Military Psychology, 18*, 131-148. doi:10.1207/s15327876mp1803s\_10
- Beehr, T. A., & McGrath, J. E. (1992). Social support, occupational stress and anxiety. *Anxiety, Stress, and Coping, 5*, 7-19. doi:10.1080/10615809208250484
- Berkman, L. F. (1995). The role of social relations in health promotion. *Psychosomatic Medicine, 57*, 245-254.
- Berninger, A., Webber, M. P., Cohen, H. W., Gustave, J., Lee, R., Niles, J. K., . . . Prezant, D. J. (2010). Trends of elevated PTSD risk in firefighters exposed to the World Trade Center disaster: 2001-2005. *Public Health Reports, 125*, 556-566.
- Bliese, P. D., Wright, K. M., Adler, A. B., Thomas, J. L., & Hoge, C. W. (2007). Timing of postcombat mental health assessments. *Psychological Services, 4*, 141-148. doi:10.1037/1541-1559.4.3.141
- Boscarino, J. A. (1995). Post-traumatic stress and associated disorders among Vietnam veterans: The significance of combat exposure and social support. *Journal of Traumatic Stress, 8*, 317-336. doi:10.1002/jts.2490080211
- Brewin, C. R., Andrews, B., & Valentine, J. D. (2000). Meta-analysis of risk factors for post-traumatic stress disorder in trauma-exposed adults. *Journal of Consulting and Clinical Psychology, 68*, 748-766. doi:10.1037//0022-006X.68.5.748
- Camacho, T. C., Roberts, R. E., Lazarus, N. B., Kaplan, G. A., & Cohen, R. D. (1991). Physical activity and depression: Evidence from the Alameda County Study. *American Journal of Epidemiology, 134*, 220-231.
- Cantor, N., & Sanderson, C. A. (2003). Life task participation and well-being: The importance of taking part in daily life. In D. Kahneman, E. Diener, & N. Schwarz (Eds.), *Well-being: The foundations of hedonic psychology* (pp. 230-243). New York, NY: Russell Sage Foundation.
- Carver, C. S., Scheier, M. F., & Segerstrom, S. C. (2010). Optimism. *Clinical Psychology Review, 30*, 879-889. doi:10.1016/j.cpr.2010.01.006
- Chang, E. C., Rand, K. L., & Strunk, D. R. (2000). Optimism and risk for job burnout among working college students: Stress as a mediator. *Personality and Individual Differences, 29*, 255-263. doi:10.1016/S0191-8869(99)00191-9
- Chen, D. J., & Lim, V. K. (2012). Strength in adversity: The influence of psychological capital on job search. *Journal of Organizational Behavior, 33*, 811-839. doi:10.1002/job.1814
- Cheung, F., So-kum Tang, C., & Tang, S. (2011). Psychological capital as a moderator between emotional labor, burnout, and job satisfaction among school teachers in China. *International Journal of Stress Management, 18*, 348. doi:10.1037/a0025787
- Cohen, S., & Wills, T. A. (1985). Stress, social support, and the buffering hypothesis. *Psychological Bulletin, 98*, 310-357. doi:10.1037/0033-2909.98.2.310
- Connelly, J. E., Philbrick, J. T., Smith, G. R., Jr., Kaiser, D. L., & Wymer, A. (1989). Health perceptions of primary care patients and the influence on health care utilization. *Medical Care, 27*, 99-109. doi:10.1097/00005650-198903001-00009
- Credé, M., Harms, P. D., Nierhorster, S., & Gaye-Valentine, A. (2012). An evaluation of the consequences of using short measures of the Big Five personality traits. *Journal of Personality and Social Psychology, 102*, 874-888. doi:10.1037/a0027403
- Culbertson, S. S., Fullagar, C. J., & Mills, M. J. (2010). Feeling good and doing great: The relationship between psychological capital and well-being. *Journal of Occupational Health Psychology, 15*, 421-433. doi:10.1037/a0020720
- Danna, K., & Griffin, R. W. (1999). Health and well-being in the workplace: A review and synthesis of the literature. *Journal of Management, 25*, 357-384. doi:10.1177/014920639902500305
- De Moor, M. H. M., Beem, A. L., Stubbe, J. H., Boomsma, D. I., & De Geus, E. J. C. (2006). Regular exercise, anxiety, depression and personality: A population-based study. *Preventive Medicine, 42*, 273-279. doi:10.1016/j.ypmed.2005.12.002
- Frone, M. R. (1999). Work stress and alcohol use. *Alcohol Research and Health, 23*, 284-291.
- Frone, M. R. (2008). Are work stressors related to employee substance use? The importance of temporal context assessments of alcohol and illicit drug use. *Journal of Applied Psychology, 93*, 199-206. doi:10.1037/0021-9010.93.1.199
- Fylkesnes, K. (1993). Determinants of health care utilization—Visits and referrals. *Scandinavian Journal of Public Health, 21*, 40-50. doi:10.1177/140349489302100107
- Goetzel, R. Z., Long, S. R., Ozminkowski, R. J., Hawkins, K., Wang, S., & Lynch, W. (2004). Health, absence, disability, and presenteeism cost estimates of certain physical and mental health conditions affecting US employers. *Journal of Occupational and Environmental Medicine, 46*, 398-412. doi:10.1097/01.jom.0000121151.40413.bd

- Goldberg, D. P., & Hillier, V. F. (1979). A scaled version of the General Health Questionnaire. *Psychological Medicine, 9*, 139-145. doi:10.1017/S0033291700021644
- Greer, S., Morris, T., & Pettingale, K. W. (1979). Psychological response to breast cancer: Effect on outcome. *Lancet, 314*, 785-787. doi:10.1016/S0140-6736(79)92127-5
- Groh, D. R., Jason, L. A., Davis, M. I., Olson, B. D., & Ferrari, J. R. (2007). Friends, family, and alcohol abuse: An examination of general and alcohol-specific social support. *American Journal on Addictions, 16*, 49-55. doi:10.1080/10550490601080084
- Harlow, L. L., Newcomb, M. D., & Bentler, P. M. (1986). Depression, self-derogation, substance use, and suicide ideation: Lack of purpose in life as a mediational factor. *Journal of Clinical Psychology, 42*, 5-21. doi:10.1002/1097-4679(198601)42:1<5::AID-JCLP2270420102>3.0.CO;2-9
- Harms, P. D., & Luthans, F. (2012). Measuring implicit psychological constructs in organizational behavior: An example using psychological capital. *Journal of Organizational Behavior, 33*, 589-594. doi:10.1002/job.1785
- Hawkins, J. D., Catalano, R. F., & Miller, J. Y. (1992). Risk and protective factors for alcohol and other drug problems in adolescence and early adulthood: Implications for substance abuse prevention. *Psychological Bulletin, 112*, 64-105. doi:10.1037//0033-2909.112.1.64
- Hoge, C. W., Castro, C. A., Messer, S. C., McGurk, D., Cotting, D. I., & Koffman, R. L. (2004). Combat duty in Iraq and Afghanistan, mental health problems, and barriers to care. *New England Journal of Medicine, 351*, 13-22. doi:10.1056/NEJMoa040603
- Kaplan, G. A., Roberts, R. E., Camacho, T. C., & Coyne, J. C. (1987). Psychosocial predictors of depression prospective evidence from the human population laboratory studies. *American Journal of Epidemiology, 125*, 206-220.
- Kenny, D. A., & Zautra, A. (2001). Trait-state models for longitudinal data. In L. M. Collins & A. G. Sayer (Eds.), *New methods for the analysis of change* (pp. 243-263). Washington, DC: American Psychological Association.
- Kessler, R. C., Barber, C., Birnbaum, H. G., Frank, R. G., Greenberg, P. E., Rose, R. M., . . . Wang, P. (1999). Depression in the workplace: Effects on short-term disability. *Health Affairs, 18*, 163-171. doi:10.1377/hlthaff.18.5.163
- Kreft, I., & de Leeuw, J. (1998). *Introducing multilevel modeling*. Thousand Oaks, CA: Sage.
- Lincoln, T. M., Peter, N., Schäfer, M., & Moritz, S. (2009). Impact of stress on paranoia: An experimental investigation of moderators and mediators. *Psychological Medicine, 39*, 1129-1139. doi:10.1017/S0033291708004613
- Luthans, F., Avey, J. B., Avolio, B. J., Norman, S. M., & Combs, G. M. (2006). Psychological capital development: Toward a micro-intervention. *Journal of Organizational Behavior, 27*, 387-393. doi:10.1002/job.373
- Luthans, F., Avey, J. B., Avolio, B. J., & Peterson, S. J. (2010). The development and resulting performance impact of positive psychological capital. *Human Resource Development Quarterly, 21*, 41-67. doi:10.1002/hrdq.20034
- Luthans, F., Avey, J. B., & Patera, J. L. (2008). Experimental analysis of a web-based training intervention to develop positive psychological capital. *Academy of Management Learning & Education, 7*, 209-221. doi:10.5465/AMLE.2008.32712618
- Luthans, F., Avolio, B. J., Avey, J. B., & Norman, S. M. (2007). Positive psychological capital: Measurement and relationship with performance and satisfaction. *Personnel Psychology, 60*, 541-572. doi:10.1111/j.1744-6570.2007.00083.x
- Luthans, F., Youssef, C. M., & Avolio, B. J. (2007). *Psychological capital: Developing the human competitive edge*. New York, NY: Oxford University Press.
- Luthans, F., Youssef, C. M., & Rawski, S. L. (2011). A tale of two paradigms: The impact of psychological capital and reinforcing feedback on problem solving and innovation. *Journal of Organizational Behavior Management, 31*, 333-350. doi:10.1080/01608061.2011.619421
- Luthans, F., Youssef, C. M., Sweetman, D. S., & Harms, P. D. (2013). Meeting the leadership challenge of employee well-being through relationship PsyCap and health PsyCap. *Journal of Leadership & Organizational Studies, 20*, 118-133. doi:10.1177/1548051812465893
- MacKinnon, D. P., Fritz, M. S., Williams, J., & Lockwood, C. M. (2007). Distribution of the product confidence limits for the indirect effect: Program PRODCLIN. *Behavior Research Methods, 39*, 384-389. doi:10.3758/BF03193007
- MacKinnon, D. P., Lockwood, C. M., & Williams, J. (2004). Confidence limits for the indirect effect: Distribution of the product and resampling methods. *Multivariate Behavioral Research, 39*, 99-128. doi:10.1207/s15327906mbr3901\_4
- Manger, T. A., & Motta, R. W. (2005). The impact of an exercise program on posttraumatic stress disorder, anxiety, and depression. *International Journal of Emergency Mental Health, 7*, 49-57.
- Marcus, D. K., Gurley, J. R., Marchi, M. M., & Bauer, C. (2007). Cognitive and perceptual variables in hypochondriasis and health anxiety: A systematic review. *Clinical Psychology Review, 27*, 127-139. doi:10.1016/j.cpr.2006.09.003
- Medina, J. L., Vujanovic, A. A., Smits, J. A., Irons, J. G., Zvolensky, M. J., & Bonn-Miller, M. O. (2011). Exercise and coping-oriented alcohol use among a trauma-exposed sample. *Addictive Behaviors, 36*, 274-277. doi:10.1016/j.addbeh.2010.11.008
- Murphy, T. J., Pagano, R. R., & Marlatt, G. A. (1986). Lifestyle modification with heavy alcohol drinkers: Effects of aerobic exercise and meditation. *Addictive Behaviors, 11*, 175-186. doi:10.1016/0306-4603(86)90043-2
- Peirce, R. S., Frone, M. R., Russell, M., Cooper, M. L., & Mudar, P. (2000). A longitudinal model of social contact, social support, depression, and alcohol use. *Health Psychology, 19*, 28-38. doi:10.1037//0278-6133.19.1.28
- Pennebaker, J. W. (1993). Putting stress into words: Health, linguistic, and therapeutic implications. *Behaviour Research and Therapy, 31*, 539-548. doi:10.1016/0005-7967(93)90105-4
- Petruzzello, S. J., Landers, D. M., Hatfield, B. D., Kubitz, K. A., & Salazar, W. (1991). A meta-analysis on the anxiety-reducing effects of acute and chronic exercise. *Sports Medicine, 11*, 143-182. doi:10.2165/00007256-199111030-00002
- Quick, J. C. (1999). Occupational health psychology: The convergence of health and clinical psychology with public health and preventive medicine in an organizational context. *Professional Psychology: Research and Practice, 30*, 123-128. doi:10.1037/0735-7028.30.2.123
- Raudenbush, S. W., & Bryk, A. S. (2002). *Hierarchical linear models* (2nd ed.). Thousand Oaks, CA: Sage.

- Raudenbush, S. W., Bryk, A. S., Cheong, Y. F., Congdon, R., & du Toit, M. (2011). *HLM 7: Linear and nonlinear modeling*. Lincolnwood, IL: Scientific Software International.
- Raudenbush, S. W., Bryk, A. S., & Congdon, R. (2011). HLM: Hierarchical linear and nonlinear modeling (Version 7.0) [Computer software]. Lincolnwood, IL: Scientific Software International.
- Reed, G. M., Kemeny, M. E., Taylor, S. E., Wang, H. Y. J., & Visscher, B. R. (1994). Realistic acceptance as a predictor of decreased survival time in gay men with AIDS. *Health Psychology, 13*, 299-299. doi:10.1037//0278-6133.13.4.299
- Ridout, M. S., Demetrio, C. G. B., & Firth, D. (1999). Estimating intraclass correlation for binary data. *Biometrics, 55*, 137-148. doi:10.1111/j.0006-341X.1999.00137.x
- Roberts, S. J., Scherer, L. L., & Bowyer, C. J. (2011). Job stress and incivility: What role does psychological capital play? *Journal of Leadership & Organizational Studies, 18*, 449-458. doi:10.1177/1548051811409044
- Roessler, K. K. (2010). Exercise treatment for drug abuse: A Danish pilot study. *Scandinavian Journal of Public Health, 38*, 664-669. doi:10.1177/1403494810371249
- Roysamb, E., Tawls, K., Reichborn-Kjennerud, T., Neale, M. C., & Harris, J. R. (2003). Happiness and health. *Journal of Personality and Social Psychology, 85*, 1136-1146. doi:10.1037/0022-3514.85.6.1136
- Ryan, R. M., & Deci, E. L. (2001). On happiness and human potentials: A review of research on hedonic and eudaimonic well-being. *Annual Review of Psychology, 52*, 141-166. doi:10.1146/annurev.psych.52.1.141
- Ryff, C. D., & Singer, B. (2000). Interpersonal flourishing: A positive health agenda for the new millennium. *Personality and Social Psychology Review, 4*, 30-44. doi:10.1207/S15327957PSPR0401\_4
- Smith, M. A., & Lynch, W. J. (2011). Exercise as a potential treatment for drug abuse: Evidence from preclinical studies. *Frontiers in Psychiatry, 2*, 82. doi:10.3389/fpsy.2011.00082
- Snyder, C. R. (2000). *Handbook of hope: Theory, measures, and applications*. San Diego, CA: Academic Press.
- Steptoe, A., Wardle, J., Pollard, T. M., Cnaan, L., & Davies, G. J. (1996). Stress, social support and health-related behavior: A study of smoking, alcohol consumption and physical exercise. *Journal of Psychosomatic Research, 41*, 171-180. doi:10.1016/0022-3999(96)00095-5
- Taylor, S. E., & Brown, J. D. (1988). Illusion and well-being: A social psychological perspective on mental health. *Psychological Bulletin, 103*, 193-210.
- Taylor, S. E., Kemeny, M. E., Aspinwall, L. G., Schneider, S. G., Rodriguez, R., & Herbert, M. (1992). Optimism, coping, psychological distress, and high-risk sexual behavior among men at risk for acquired immunodeficiency syndrome (AIDS). *Journal of Personality and Social Psychology, 63*, 460-473. doi:10.1037//0033-2909.103.2.193
- Taylor, S. E., Kemeny, M. E., Reed, G. M., Bower, J. E., & Gruenewald, T. L. (2000). Psychological resources, positive illusions, and health. *American Psychologist, 55*, 99-109. doi:10.1037//0003-066X.55.1.99
- Tugade, M. M., Fredrickson, B. L., & Feldman Barrett, L. (2004). Psychological resilience and positive emotional granularity: Examining the benefits of positive emotions on coping and health. *Journal of Personality, 72*, 1161-1190. doi:10.1111/j.1467-6494.2004.00294.x
- Watson, D. (1988). Intraindividual and interindividual analyses of positive and negative affect: Their relation to health complaints, perceived stress, and daily activities. *Journal of Personality and Social Psychology, 54*, 1020-1030. doi:10.1037//0022-3514.54.6.1020
- Williams, P. G. (2004). The psychopathology of self-assessed health: A cognitive approach to health anxiety and hypochondriasis. *Cognitive Therapy and Research, 28*, 629-644. doi:10.1023/B:COTR.0000045569.25096.44

### Author Biographies

**Dina V. Krasikova** is an assistant professor of management at the University of Texas at San Antonio. She received her PhD in industrial/organizational psychology from Purdue University. Her research interests include leadership, employee health and well-being, and statistical methods.

**Paul B. Lester** is a U.S. Army officer and serves as the director of the Research Facilitation Laboratory. He received his doctorate from the University of Nebraska–Lincoln's College of Business Administration in 2006.

**P. D. Harms** is an assistant professor of management at the University of Nebraska–Lincoln. He received his PhD in personality psychology from the University of Illinois at Urbana-Champaign. His research involves the assessment and development of personality, leadership, and well-being.