

Genetic influences on core self-evaluations, job satisfaction, and work stress: A behavioral genetics mediated model

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ABSTRACT

In this study we investigated the mediated influence of core self-evaluations (CSE) on employee health problems via job satisfaction and work stress, and the degree to which genetic factors explain these mediated relationships. Based on data obtained from a sample of 594 Swedish twins (114 monozygotic twin pairs and 183 dizygotic twin pairs), conventional path analysis results supported the mediated effects of CSE on employee health via job satisfaction and work stress, after controlling for conscientiousness and extraversion. Behavioral genetic analyses showed significant heritability of all four variables. Moreover, we found that the mediated relationships via job satisfaction and work stress are explained by genetic factors, such that the genetic source of job satisfaction and work stress mediates the genetic influence of CSE on health problems. These results highlight the role played by genetic factors in better understanding the relationships between CSE, work attitudes, and health outcomes.

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Introduction

If general research areas can be evaluated based on the importance of their contributions, in the past quarter-century, arguably no area would rank ahead of behavioral genetics. An early finding from behavioral genetics research is now unsurprising: That enduring individual differences such as intelligence and personality are substantially (though not completely) heritable (Bouchard, 2004). From this base, researchers found that many presumably contextualized psychological variables are heritable to varying degrees, including outcomes both socially desirable [e.g., exercise participation (Bryan, Hutchison, Seals, & Allen, 2007), second language acquisition (Dale, Harlaar, Haworth, & Plomin, 2010), perceived social support (Bergeman, Neiderhiser, Pedersen, & Plomin, 2001), mental health (Keyes, Myers, & Kendler, 2010)] and undesirable [e.g., smoking (Boardman, Blalock, & Pampel, 2010), drug use (Haberstick et al., 2011), negative attitudes toward homosexuals (Verweij et al., 2008), psychiatric disorders (Khan, Jacobson, Gardner, Prescott, & Kendler, 2005)]. Indeed, genetic effects are so strong and pervasive that the proposition that *all human characteristics are heritable* has been labeled by Turkheimer (2000) as the First Law of Genetics. Taking account of the insights produced by behavioral genetics research, Johnson, Turkheimer,

Gottesman, and Bouchard (2009) concluded, “By now we have a fundamental understanding that genetic influences are involved in all aspects of psychology and behavior.”

Not surprisingly, organizational psychology and behavior has been affected by, and has contributed to, this body of research. Studies by Arvey, Bouchard, and colleagues identified genetic sources of central work criteria, including job satisfaction (Arvey, Bouchard, Segal, & Abraham, 1989; Arvey, McCall, Bouchard, Taubman, & Cavanaugh, 1994), work values (Keller, Bouchard, Arvey, Segal, & Dawis, 1992), job and occupational switching (McCall, Cavanaugh, Arvey & Taubman, 1997), entrepreneurship (Zhang et al., 2009), and leadership emergence (Arvey, Rotundo, Johnson, Zhang, & McGue, 2006). Other researchers have investigated the heritability of additional organizational concepts: perceptions of organizational climate (Hershberger, Lichtenstein, & Knox, 1994) and vocational interests (Lykken, Bouchard, McGue, & Tellegen, 1993). Cumulatively, these studies have dovetailed with the broader behavioral genetics literature in revealing that, to a substantial degree, organizational attitudes and behavior are heritable.

The contributions and significant impact of these studies notwithstanding, one important area for further development in the organizational behavior literature are models which may explain these genetic effects. As noted by Ilies, Arvey, and Bouchard (2006), “Progress in understanding the role of genetic differences has been rather slow-paced” (p. 126). Why is it so important to explain genetic sources of organizational behavior variables? Most

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fundamentally, such inquiry advances understanding of the real (vs. apparent) associations among organizational concepts. When a model among concepts is properly articulated and tested, it has the ability to test the degree to which apparently situational mediational relationships at the phenotypic level in fact result from underlying genetic and shared environmental influences.

Specifically, if we observe an association between a personality trait, a work attitude, and an outcome or criterion variable, it is possible that the interpretations we make about the nature and meaning of such a mediational relationship can only be properly understood once we consider the degree to which these relationships are due to genetic effects, environment effects, or both. If genetic effects predominantly explain the associations, it suggests a different causal association than typically assumed. In such a case, it is not that a work attitude or perception causes an outcome in the way most organizational behavior researchers assume, but, rather, that genetic differences lead individuals to hold the attitude and experience the outcome. As noted by O'Connor, Caspi, DeFries, and Plomin (2000), connections between individual differences in adjustment and many outcomes that were previously thought to be explained entirely by environmental differences are now thought to be substantially explained by genetic differences. Under these circumstances, as noted by Neiss, Rowe, and Rodgers (2002), “The apparent phenotypic mediation is spurious on other sources of individual differences” (p. 273).

The only such mediational efforts in organizational behavior research have been studies conducted by Ilies and colleagues. Relying on meta-analytic data, Ilies and Judge (2003) found that positive and negative affectivity better explained genetic sources of job satisfaction than the Big Five traits. Using a similar approach, Ilies, Gerhardt, and Le (2004) found that general mental ability and the Big Five traits explained some of the heritability of leadership emergence. While these studies contributed to our understanding of the degree to which genes underlie associations between personality and work outcomes, as the authors note, these studies were limited by the data on which they are based and in the assumptions they make. Ilies et al. (2006) note, “The limitations of the Ilies and Judge (2003) method can be avoided by using primary twin or familial data to investigate mediated genetic effects” (p. 133). They also note, “Specific operational models explaining the mechanisms through which genetics influence certain organizational outcomes can and should be developed and tested” (Ilies et al., 2006, p. 135).

Accordingly, the purpose of the present study is to develop and test a model linking a personality trait (core self-evaluations) to an important outcome (employee health problems) as mediated by two work variables—job satisfaction and work stress. While we test an overall model of the relationships among these variables, the heart of the intended contribution of this study is to shed light on the degree to which the relationships among the variables in the model are genetic in nature. Uncovering genetic bases for mediated relationships among perceptions of the work environment and outcomes provides support for the “nature of nurture” perspective (Butcher & Plomin, 2008; Plomin & Asbury, 2005), and suggests different theoretical and practical implications than those typically assumed. In the next section of the paper, we introduce the model, and then develop hypotheses for the core linkages within the model.

Model and hypotheses

The hypothesized path model appears in Fig. 1. Some links in the model, and some of the underlying sources of variance in the variables, are assumed rather than formally hypothesized. Because the link between job satisfaction and work stress may be reciprocal (Judge, Boudreau, & Bretz, 1994), we do not specify a causal

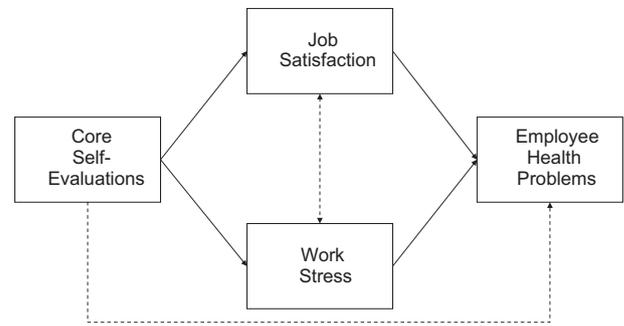


Fig. 1. Hypothesized path model.

direction, but instead assume and stipulate a non-causal link between the two variables. In addition, we do not formally hypothesize a genetic source of variance in the four variables in the path model, though we do test for heritability in subsequent behavioral genetics models given that it is a necessary condition for some hypotheses that follow. Concerning the heritability of CSE, though only one previous study showed heritability of a measure of CSE for a sample of female twins (Zhu & Arvey, 2006), several studies have supported the genetic basis of some of the individual core traits, namely neuroticism (Jang, Livesley, & Vernon, 1996) and self-esteem (Kendler, Gardner, & Prescott, 1998; Neiss, Sedikides, & Stevenson, 2006). As for job satisfaction, several studies by Arvey and colleagues (Arvey et al., 1989, 1994) have found measures of job satisfaction to be heritable. We are not aware of any evidence on the heritability of measures of job or work stress. However, there is ample reason to believe that work stress is heritable, too. Autonomic reactions to stressors – such as elevated heart rate, blood pressure, and galvanic skin response – are substantially heritable (Lensvelt-Mulders & Houtema, 2001), as are putative causes, such as stressful life events (Kendler & Baker, 2007). Moreover, Federenko et al. (2006) found significant heritability ($h^2 = .30$) for a measure of perceived stress. Thus, though direct evidence is lacking, evidence indirectly supports an expectation that work stress is heritable. Finally, it is of no surprise—given a voluminous body of research showing substantial heritabilities for nearly every health condition (Johnson & Krueger, 2005)—to expect that health problems are heritable.

Regular path modeling hypotheses

The hypothesized model, in its phenotypic (traditional path-analytic) form, is relatively straightforward. Each link in the model has been supported by past research. Judge and Bono's (2001) meta-analysis revealed that each of the core self-evaluations traits is positively related to job satisfaction, and that in all cases the confidence intervals overlapped – meaning that these positive relationships were indistinguishable, as predicted by the framework. Moreover, studies utilizing direct measures of core self-evaluations have shown equally consistent relationships with job satisfaction (Brown, Ferris, Heller, & Keeping, 2007; Judge, Erez, Bono, & Thoresen, 2003). Compared to job satisfaction, there is considerably less research on the relationship of core self-evaluations to work stress, but the literature suggests a significant, negative relationship. Brunborg (2008) and Kluemper (2008) found that core self-evaluations was negatively correlated with perceptions of job stress. Thus, the extant literature supports links of core self-evaluations with job satisfaction and with work stress.

Similarly, the associations of job satisfaction and work stress with health problems are well documented in the literature. In terms of work stress, numerous studies have found a positive

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