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Neuroticism and extraversion share genetic and environmental effects with negative and positive mood spillover in a nationally representative sample ☆

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ABSTRACT

Work-family spillover research focuses on how negative and positive moods in one life domain carry over to another. Domain-specific etiologies (e.g., family conflict) are often emphasized to explain spillover. Yet, strong correlations exist between spillover variables of the same emotional valence but originating from different domains, suggesting individual differences in the tendencies to prolong mood-states. The current study (N = 1143 individuals) examined whether these general tendencies are associated with neuroticism and extraversion and how genetic and environmental effects contribute to these associations. Findings revealed that neuroticism and extraversion are related to these tendencies through both genetic and environmental pathways.

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1. Introduction

Research suggests that the metaphor describing how one "kicks the dog" after a stressful day at work holds some truth. Both negative and positive moods arising at work can carry over to the home environment (Greenhaus & Beutell, 1985). For example, work strain can translate into irritability at home. Negative and positive moods can also spill over from home to work (Crouter, 1984). For example, a relaxing evening at home can foster positive moods that translate into a more satisfying day at work. These phenomena refer to work-family spillover and include: negative work-to-family (NWF), negative family-to-work (NFW), positive work-to-family (PWF), and positive family-to-work spillover (PFW).

Researchers have emphasized predictors unique to the work or home environment to describe spillover phenomena (Greenhaus & Beutell, 1985). For example, an inflexible work environment predicts NWF, whereas marital satisfaction predicts PFW (Crouter, 1984; Greenhaus & Beutell, 1985). If domain-specific antecedents were entirely responsible for spillover, the strongest correlations would arise between constructs sharing an environmental origin (e.g., NFW and PFW). Yet, studies have shown that the strongest associations exist between spillover variables of similar emotional valence (e.g., NWF and NFW; e.g., Grzywacz & Marks, 2000), suggesting general tendencies to prolong these mood-states.

The current study assessed the extent to which neuroticism and extraversion, both related to emotional experiences, are associated with tendencies to prolong negative (measured as the correlation between NWF and NFW) or positive (correlation between PWF and PFW) mood-states across work and family domains. Furthermore, we examined how genetic and environmental effects account for these associations.

Two models describe reasons for these prolonged mood-states (Edwards & Rothbard, 2000). The indirect-spillover model contends that individuals' emotional and cognitive reactions are mechanisms through which experiences from one domain impact experiences in another domain (Lambert, 1990). For example, marital conflict may evoke anxiety that could cause the individual to ruminate about this problem at work. To the extent that people have predictable responses across different environmental domains, this model suggests that trait-like qualities create similar reactivity and carryover tendencies regardless of the environmental source. The congruence model posits that similar mood-states at work and home arise from common causes with heritable individual differences such as personality traits (Edwards & Rothbard, 2000). These common causes are often attributed to neuroticism and extraversion because they are related to stable negative or positive moods across life domains (Frone, Russell, & Cooper, 1994).

Neuroticism and extraversion may be associated with prolonged emotional states at work and home because they involve predictable emotional experiences (Costa & McCrae, 1992).

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Neuroticism is related to negative reactivity to daily events, general emotional distress (Mroczek & Almeida, 2004; Suls & Martin, 2005), negative work-family spillover (Grzywacz & Marks, 2000), and conflict or interference between work and family domains (Boyar & Mosley, 2007; Rantanen, Pulkkinen, & Kinnunen, 2005; Wayne, Musisca, & Fleeson, 2004). In contrast, extraversion is associated with positive reactivity to daily experiences, positive emotions (Larsen & Ketelaar, 1991), positive work-family spillover (Grzywacz & Marks, 2000) and facilitation between work and family domains (Wayne et al., 2004). Furthermore, genetic and unique environmental (individual-specific experiences) variance components influence neuroticism and extraversion (e.g., Bouchard & McGue, 2003). It is possible that neuroticism and extraversion share these influences with prolonged mood-states.

The current study investigated reasons for the association between NWF and NFW and between PWF and PFW by examining whether neuroticism and extraversion are related to these tendencies. We hypothesized that higher neuroticism and lower extraversion are related to greater NWF and NFW and to lower PWF and PFW. Behavioral genetic analyses then modeled the degree to which genetic and environmental variance components explain the associations between spillover constructs of the same mood valence and these personality traits.

2. Method

2.1. Participants

The sample was derived from the Midlife in the United States (MIDUS) study, consisting of 998 nationally representative adult twin pairs (for detailed description, see Kessler, Gilman, Thornton, & Kendler, 2004). Members of twin pairs were randomly designated as either Twin1 or Twin2. In the current analyses, twin pairs were excluded if they belonged to opposite-sex pairs ($n = 263$), had unknown/missing zygosity ($n = 16$), or if both twins failed to complete the questionnaire ($n = 24$). Seventeen additional pairs from families contributing two or more pairs were excluded to ensure that only one pair represented each family.

To examine spillover involving work-related activities, we included members from twin pairs who endorsed any of the following: full/part-time work, volunteer-time (15^{+}hours-a-week), and full/part-time student. Sixty-eight pairs were excluded where neither twin reported any such activities. When pairs included only one working sibling, spillover and personality information was included, if available, for the working twin and only the personality information, if available, for the non-working twin. Because family can include larger networks of siblings, parents and other relatives, we did not exclude participants on the basis of marital/parental status (Grzywacz & Marks, 2000).

After these exclusions, the present study included 533 twin pairs ($n = 1066$ individuals) and 77 individuals whose co-twin did not participate (totaling 1143 participants). From pairs where both twins provided information, 335 pairs had complete spillover and personality data for both twins, including 191 monozygotic (MZ) pairs and 144 dizygotic (DZ) intact pairs (for zygosity determination, see Kessler et al., 2004; Nichols & Bilbro, 1966). The remaining 198 pairs had partial data (e.g., spillover and personality data for one twin and only personality information for the co-twin).

The sample included slightly more women (56%) than men (44%) and ranged from 25-to-73 years-old ($M = 43.89$, $SD = 11.42$). The ethnic breakdown included Caucasian = 92.0%, African–American = 4.5%, Native-American/Eskimo = .8%, multiracial = .3%, other = 1.0%, and unreported = 1.6%. The majority of the sample reported at least one work-related activity (89.5%) and was married (74.7%).

2.2. Measures

2.2.1. Spillover

Spillover variables were assessed from a scale developed for the MIDUS survey that has been used successfully in prior research and that captures four distinct spillover domains: NWF, NFW, PWF and PFW (Grzywacz & Marks, 2000). Respondents reported on a 5-item scale from 1 (*all of the time*) to 5 (*never*) how often they experienced each of the 16 items in the past year. Items were reverse-scored, such that higher scores indicated higher spillover values, and averaged to form four overall spillover scores. Individuals missing three of the four items did not receive a score.

NWF items included: (a) job reduces the effort you can give to activities at home; (b) stress at work makes you irritable at home; (c) your job makes you feel too tired to do the things that need attention at home; (d) job worries/problems distract you when you are at home ($\alpha = .81$).

NFW items included: (a) responsibilities at home reduce the effort you can devote to your job; (b) personal/family worries and problems distract you when you are at work; (c) activities and chores at home prevent you from getting the amount of sleep you need to do your job well; (d) stress at home makes you irritable at work ($\alpha = .78$).

PWF items included: (a) things you do at work help you deal with personal and practical issues at home; (b) things you do at work make you a more interesting person at home; (c) having a good day on your job makes you a better companion when you get home; (d) skills you use on your job are useful for things you have to do at home ($\alpha = .73$). Based on analyses establishing the psychometric properties of this spillover scale (Grzywacz & Marks, 2000), we eliminated item c based on its poor discriminate ability from the other spillover factors.

PFW items included: (a) talking with someone at home helps you deal with problems at work; (b) providing for what is needed at home makes you work harder at your job; (c) love and respect you get at home makes you feel confident about yourself at work; and (d) home life helps you relax and feel ready for the next day's work ($\alpha = .66$[1]). Item b was excluded based on the scale construction established by Grzywacz and Marks (2000).

2.2.2. Personality

Neuroticism and extraversion were assessed by the Midlife Development Inventory Big Five Personality Scale (for validity description see Brim, Ryff, & Kessler, 2004) used successfully in prior research (e.g., Weiss, Bates, & Luciano, 2008). Participants reported on a 4-point scale from 1 (*a lot*) to 4 (*not at all*) how well each of the personality items described them, and items were averaged together to form two overall personality scores. For each scale, items were reverse-scored such that higher scores indicated higher levels of each personality trait. Neuroticism-items included: moody, worrying, nervous, calm-*reverse-scored* ($\alpha = .78$). Extraversion-items included: outgoing, friendly, lively, active, talkative ($\alpha = .76$).

2.3. Analytical approach

Univariate behavioral genetic analyses were used to estimate simultaneously the relative additive genetic (A), shared environmental (C), and unique environmental (E) variance components

[1] The PWF $\alpha = .72$ when item c was included with the other three items, and $\alpha = .65$ when item b was included with the other three items. Univariate and multivariate models yielded similar parameter estimates and fit statistics, regardless of whether these items were included/omitted from PWF and PFW. Although .66 for PFW is below the acceptable standard, $\alpha = .70$ when using a larger non-twin MIDUS sample (Grzywacz & Marks, 2000).