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Research paper

A genetically informative analysis of the association between dyadic adjustment, depressive symptoms, and anxiety symptoms

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ABSTRACT

Background: Prior research has found a reliable and robust association between poor dyadic (e.g., marital) adjustment and depression and anxiety. However, it is possible that this association may be due, at least in part, to confounding variables (i.e., variables that are causally associated both with marital adjustment and psychopathology and could account for their covariation). The present study was conducted using a genetically informative sample of twins to examine the association between dyadic adjustment and symptoms of depression and anxiety, accounting for unmeasured genetic and shared environmental confounds.

Methods: A Swedish sample of monozygotic and dizygotic twins (218 female twin pairs and 321 male twin pairs) and their spouse or long-term partner completed self-report measures of dyadic adjustment, depressive symptoms, and anxiety symptoms.

Results: Results suggest that dyadic adjustment was significantly and negatively associated with depressive symptoms and anxiety symptoms in twins, and nonshared environmental influences largely accounted for this association. Furthermore, results obtained from partners' reports of dyadic adjustment were largely consistent with those obtained from twins' reports, suggesting that results were not a function of shared method variance.

Limitations: Longitudinal research in genetically informative samples would provide a stronger test of the causal association between dyadic adjustment and psychopathology.

Conclusions: The pattern of findings suggest that common nonshared environmental influences, such as partners' characteristics, may lead to poorer dyadic adjustment and depression and anxiety. Therefore, couple-based interventions that improve dyadic adjustment may be effective in preventing and treating psychopathology in relationship partners.

1. Introduction

Poor marital adjustment is associated with mood, anxiety, and substance use disorders in population samples (McShall and Johnson, 2015; Whisman, 1999, 2007). Many of these studies have examined how marital adjustment contributes to subsequent psychopathology, while acknowledging that psychopathology may also impact relationship adjustment (Whisman and Uebelacker, 2009). This study was conducted to examine genetic and environmental influences on the covariation between marital adjustment and symptoms of depression and anxiety in a sample of male and female twins and their spouse or long-term partner.

Much of the research on intimate relationships and psychopathology has focused on depression (Beach and Whisman, 2012; Whisman and Baucom, 2012). Cross-sectional studies suggest that poor marital adjustment is associated with higher levels of depressive symptoms (Proulx et al., 2007; Whisman, 2001) and prevalence of major depression (McShall and Johnson, 2015; Whisman, 1999, 2007). Longitudinal studies suggest poor marital adjustment is associated with increases in depressive symptoms (Beach et al., 2003; Whisman and

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Uebelacker, 2009) and incidence of depressive disorders (Overbeek et al., 2006; Whisman and Bruce, 1999) in two-wave studies, and bi-directional associations between poor marital adjustment and depressive symptoms in multi-wave studies (Davila et al., 2003; Kouros et al., 2008; Whitton et al., 2008).

These results are consistent with the perspective that poor dyadic adjustment may be causally related to depression (Beach et al., 1990). However, stronger inferences regarding potential causal associations can be made if it is shown that these associations are not due to shared variance with other variables that could be causally associated both with poor dyadic adjustment and depression (McNamee, 2003). Studies have tried to rule out potential rival explanations by statistically adjusting for potential confounding variables, including personality traits (Cao et al., 2017; Vento and Cobb, 2011; Whisman et al., 2006), quality of participants' relationships with their relatives and friends (Whisman et al., 2018, 2000), and self-esteem and stressful life events (Cao et al., 2017). Although these studies are important, they are typically limited because of measurement error in the assessment of confounding variables. Furthermore, as researchers must select which variables to control, and generally can only select a few variables, the assessment of confounding variables is not comprehensive (i.e., there are other unmeasured variables that could account for the association) (Irons et al., 2015).

One alternative to statistical control of potential confounds is to leverage genetically informative twin studies to account for unmeasured confounding variables and better understand potential causal associations between variables (Rutter, 2007). Because monozygotic (MZ) twins share 100% of their genes, whereas dizygotic (DZ) twins share only 50% of their segregating genes on average, and because twins reared together are raised in the same families at the same time, twin studies allow researchers to control for unmeasured genetic and shared environmental factors (i.e., environmental factors that lead siblings raised in the same family to be similar). If observed (i.e., phenotypic) associations between variables remain statistically significant after taking genetic and shared environmental confounds into account, then findings are consistent with a causal relationship; such phenotypic associations have been described as *quasi-causal* (Turkheimer and Harden, 2014). However, this approach cannot provide definitive evidence of a causal relationship, as the association may be explained by nonshared environmental influences, such as stressful life events, that lead to both poor marital adjustment and depression in one twin.

Research suggests there are genetic influences on dyadic adjustment (Spotts et al., 2004b, 2006) and psychopathology (Burmeister et al., 2008), and researchers have begun to use genetically informative samples to account for genetic confounds that may explain the association between dyadic adjustment and psychopathology (for a review, see Whisman and South, 2017). In a study of female twins, there were shared genetic influences on the covariation between wives' self-reported dyadic adjustment and depressive symptoms (Spotts et al., 2004a). Further evidence for shared genetic effects came from husband-reported dyadic adjustment, suggesting that a wife's genetically influenced characteristics may impact her own and her husband's dyadic adjustment. There was also evidence of non-shared environmental influences on the covariation between husbands' report of dyadic adjustment and wives' depressive symptoms, which may reflect the influence of partners' characteristics (i.e., twins being married to different partners). Also, in a sample of male and female twins, the association between marital support and depressive symptoms was statistically significant after adjusting for genetic effects of marital support on depressive symptoms, suggesting that the association between marital support and depressive symptoms was not an artifact of selection (Beam et al., 2011).

Dyadic adjustment has also been found to covary with anxiety. For example, poor marital adjustment is associated with symptoms of anxiety (Leach et al., 2013) and anxiety disorders (McLeod, 1994; Pankiewicz et al., 2012; Whisman, 1999, 2007). Furthermore, poor marital adjustment at baseline was associated with increased risk for incidence of the broad category of anxiety disorders (and the specific diagnosis of social phobia) two to three years later (Overbeek et al., 2006). However, we are not aware of any twin studies that have evaluated genetic and environmental influences on the covariation between dyadic adjustment and anxiety.

This study was conducted to examine the association between dyadic adjustment and symptoms of depression and anxiety in a sample of Swedish twins and their spouse or long-term partner.[1] Both male and female twins and their partners were included, which allowed us to evaluate gender and respondent differences in genetic and environmental influences on the associations between variables. In addition, this is the first study known to us to examine genetic and environmental influences on the covariation between dyadic adjustment and anxiety symptoms. Consistent with the perspective that poor marital adjustment increases risk for psychopathology (Beach et al., 1990), we predicted that dyadic adjustment would be negatively associated with depressive and anxiety symptoms for both female and male twins, and that nonshared environmental influences would primarily account for these associations.

2. Method

2.1. Participants

Participants were drawn from Cohort 2 of the Twin and Offspring Study in Sweden (TOSS; Neiderhiser and Lichtenstein, 2008), which consists of same-sex twin pairs born between 1944–1971, identified through The Swedish Twin Registry. To be eligible, each member of the twin pair (a) had to be involved in a long-term (i.e., ≥5-year) relationship with a partner residing in the same home; and (b) have an 11- to 22-year-old adolescent child who was the same sex as the co-twin's child with no more than a 4-year age difference between cousins. The TOSS was reviewed by the Institutional Review Board in Sweden and the United States. We included a subset of twin pairs for whom data were complete for both partners. The sample consisted of 218 female twin pairs and 321 male twin pairs and their spouse or partner. On average, female twins were 43.2 years old (SD = 4.7) and their partners were 45.5 years old (SD = 6.1), whereas male twins were 46.9 years old (SD = 4.7) and their partners were 44.7 years old (SD = 4.8).

2.2. Measures

2.2.1. Dyadic adjustment

Dyadic adjustment was measured with the 32-item Dyadic Adjustment Scale (DAS; Spanier, 1976, 1989). Except for Item 31, which was answered on a 7-point scale, items were answered using a 6-point scale. Furthermore, response options for Item 16 to Item 30 ranged from *Never* to *Always*, which differs from the traditional response options. A summary score is computed by reverse scoring the negative items and computing the sum of the items, with higher scores indicating greater adjustment. Because the number of and labels for response options for several items differs from how it is usually scored, the resulting scores are not directly comparable to those obtained using traditional scoring.

2.2.2. Depressive symptoms

Depressive symptoms were assessed with the 20-item Center for Epidemiologic Studies Depression Scale (CES-D; Radloff, 1977). Items are rated on a 4-point scale for the frequency of occurrence during the past week. A summary score is computed by reverse scoring the positive

[1] The current sample is completely independent of the sample used by Spotts et al. (2004a).