



Associations between social capital and depression: A study of adult twins



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ABSTRACT

Social capital is associated with depression independently of individual-level risk factors. We used a sample of 1586 same-sex twin pairs to test the association between seven measures of social capital and two related measures of neighborhood characteristics with depressive symptoms accounting for uncontrolled selection factors (i.e., genetics and shared environment). All measures of cognitive social capital and neighborhood characteristics were associated with less depressive symptoms in between-twin analysis. However, only measures of cognitive social capital were significantly associated with less depressive symptoms within-pairs. These results demonstrate that cognitive social capital is associated with depressive symptoms free of confounding from genetic and environmental factors shared within twins.

1. Introduction

Depression is predicted to be among the top three contributors to the global burden of disease by 2020 (Murray and Lopez, 1997). During 2009–2012, roughly 8% of Americans aged 12 and over had moderate or severe depressive symptoms in the past 2 weeks (Pratt and Brody, 2014). Furthermore, between 1995 and 2005, outpatient visits for depression increased by 48% (Middleton et al., 2007). Identifying risk factors for depression has thus become increasingly important in public health.

One measure that has been studied extensively in the public health literature over the past twenty years is social capital (Moore and Kawachi, 2017), broadly defined as the emotional, economic, and informational resources available to individuals and groups through their social networks. However, the use of social capital in research poses methodological challenges for several reasons; chief among them is that it has no universally accepted definition. Rather, it is a broad concept that is composed of several domains which can be measured at either the individual- or group-level. This poses problems when trying to compare results across studies. Further, although social capital has been linked to various health outcomes (Fujiwara and Kawachi, 2008b,

2008a; Kawachi et al., 1997; Kouvonen et al., 2008; Sundquist et al., 2006), there is little consensus on which domains are most essential for health (Murayama et al., 2012).

Presently, social capital is often divided into cognitive and structural domains. Cognitive social capital refers to perceptions, such as the sense of belonging to a community, while structural social capital refers to behaviors and activities, such as participation in organizations and volunteerism (Harpham et al., 2002; Uphoff et al., 2013). Social capital can additionally be divided into bonding, bridging, and linking capital (Szreter and Woolcock, 2004). Bonding social capital connects people of similar attributes or social identities, bridging social capital connects people that differ in their characteristics, and linking social capital connects people along an explicitly vertical power structure (Putnam, 2004; Szreter and Woolcock, 2004; Whitley and McKenzie, 2005).

Although findings are mixed, there is greater evidence for an association between depression and cognitive, as compared to structural, social capital. A 2005 literature review found that seven of eleven studies investigating associations between individual-level cognitive social capital – including neighborhood attachment, sense of community, and trust – and common mental disorders such as depression and anxiety found significant inverse associations, while the remaining four

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had null results (De Silva et al., 2005). The same review found more varied results among individual-level structural social capital; of the 11 studies included, three showed significant inverse associations (primarily with social participation), seven showed null associations, and one showed a positive association (with group membership). Further, none of the studies included measures of bridging or linking social capital, and less research has been devoted to understanding the differences in the bonding, bridging, and linking domains (De Silva et al., 2005).

Despite the observed associations between social capital and depression in the literature, causal inferences from these studies are limited because the reported relationships may be confounded by genetic and shared environmental factors that affect both social capital and depression. It might be, for example, that genetic predispositions to greater social capital also effect depression, inducing a statistical association in the absence of a causal effect. Similarly, shared environmental variables such as social support and peer groups could affect both social capital and depression.

Twin designs address these limitations by inherently controlling for confounding due to genetic and childhood environment factors shared between twins within a pair (Turkheimer and Harden, 2014). However, only one previous study has used a twin design to overcome the above limitations in exploring the association between social capital and depression, and its findings were mixed (Fujiwara and Kawachi, 2008b). In that study, an inverse association between depression and sense of belonging, social trust, and community participation was reported among fraternal but not identical twins, whereas there was no association between volunteerism and depression.

This study addresses these gaps in the literature by examining the association between different domains of social capital and depressive symptoms, controlling for confounding due to genetic and childhood environment factors shared between twins within a pair. We hypothesize that higher levels of social capital will be associated with less depressive symptoms both between and within-pairs of twins.

2. Materials and methods

2.1. Study population

We conducted a cross-sectional analysis using data from a community-based registry of adult twins raised together. Construction of the registry is described elsewhere (Strachan et al., 2013). Briefly, twins are initially identified by the [Washington State Department of Licensing], and are then sent a recruitment (and subsequently follow-up) survey providing information on socio-demographics, lifestyle behaviors, and health outcomes. All twins in the present study were from same-sex pairs. Twins were categorized as either identical (monozygotic, MZ) or fraternal (dizygotic, DZ) using standard questions about childhood similarity that have been shown to have greater than 90% accuracy at identifying zygosity when compared to DNA-based methods (Eisen et al., 1989; Spitz et al., 1996).

Twins enrolled in the registry received electronic or paper surveys asking about their social capital and the presence of depressive symptoms in 2015. Twins contacted electronically received three email reminders about the study; twins contacted by mail received one follow-up mailing. Because respondents were included in the analysis only if both twins in the pair completed the survey, non-responders whose co-twin had completed the survey may have also received a follow-up phone call. Of the 8130 individuals contacted, 2561 (31.5%) completed and returned the survey; 1586 (19.5%) were members of a complete pair.

Monozygotic twins comprised approximately 76% of the analytic sample. Most twins lived in Washington State (68%); however, twins lived in the District of Columbia and 44 other states. All procedures were reviewed and approved by the local institutional review board.

2.2. Measures

2.2.1. Exposures

We measured several domains of social capital in this study; all domains were derived from self-report and conceptualized at the individual-level.

2.2.2. Social capital

2.2.2.1. Cognitive social capital. We included four domains of cognitive social capital: sense of belonging, neighborhood social cohesion, workplace connections, and trust. These domains are described individually below with supporting citations. For sense of belonging, neighborhood social cohesion, and vertical workplace connections, respondents were asked to rate their agreement (1 Strongly disagree; 2 Disagree; 3 Neutral; 4 Agree; 5 Strongly agree) with several statements. For each domain, responses to the statements were averaged to create an overall score; the internal consistency of each scale was measured by Cronbach's α .

Sense of belonging was assessed through three statements: I don't feel I belong to anything I'd call a community; I feel close to other people in my community; My community is a source of comfort. The response to the first statement was reverse-coded before averaging. This measure has been previously used in studies linking sense of belonging to depression (Fujiwara and Kawachi, 2008b, 2008a; Lochner et al., 1999). The internal consistency (Cronbach's α) of the scale in our sample was 0.84.

Neighborhood social cohesion used the following five statements (Sampson et al., 1997): People in this neighborhood can be trusted; This is a close-knit neighborhood; People around here are willing to help their neighbors; People in this neighborhood generally don't get along with each other; People in this neighborhood do not share the same values. The last two statements were reverse-coded before averaging. This is one of the most commonly used measures of social cohesion in public health research (Harpham et al., 2002). The Cronbach's α for the scale in our sample was 0.83.

The vertical workplace connections domain was assessed by the following three statements: We can trust our supervisor; Our supervisor treats us with kindness and consideration; Our supervisor shows concern for our rights as employees. We include this as a measure of cognitive social capital and not structural social capital because it refers to an individual's perceptions of their work relationships. These questions have been linked to depression and antidepressant use in previous research (Kouvonen et al., 2008; Oksanen et al., 2010). The Cronbach's α for the scale in our sample was 0.93.

We used two individual measures to conceptualize the broad category of trust; a question about general trust (What percentage of people can be trusted?) and a question about political or governmental trust (To what degree do you trust the local/city government?) (Engstrom et al., 2008). For governmental trust, respondents could indicate five options: very high, high, not particularly high, and not at all.

Because communities and neighborhoods are often homogenous in terms of residents' characteristics, sense of belonging and neighborhood social cohesion are thought to capture measures of bonding social capital (Szreter and Woolcock, 2004). In contrast, the vertical workplace connections domain explicitly asks about relations in a hierarchical power structure, making it a measure of linking social capital (Kouvonen et al., 2008; Oksanen et al., 2010). General trust is not easily placed into a bonding or bridging category, while governmental trust captures linking social capital by asking about the respondent's perception of a political hierarchy.

2.2.2.2. Structural social capital. Structural social capital was measured through questions about volunteerism, community

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