Social Networks 44 (2016) 74–84

Contents lists available at ScienceDirect

Social Networks

journal homepage: www.elsevier.com/locate/socnet

Sex and network recall accuracy

Matthew E. Brashears [c,*], Emily Hoagland [a], Eric Quintane [b]

[a] Cornell University, Department of Sociology, United States
[b] University of Los Andes, School of Management, Colombia
[c] University of South Carolina, Department of Sociology, United States

ARTICLE INFO

Keywords:
Sex
Situational cognition
Compression heuristics
Personality
Memory

ABSTRACT

How does an individual's sex influence their recall of social relations? Extensive research has shown that social networks differ by sex and has attempted to explain these differences either through structural availability or individual preferences. Addressing the limitations of these explanations, we build on an increasing body of research emphasizing the role of cognition in the formation and maintenance of networks to argue that males and females may exhibit different strategies for encoding and recalling social information in memory. Further, because activating sex roles can alter cognitive performance, we propose that differences in recall may only or primarily appear when respondents are made aware of their sex. We explore differences in male and female network memory using a laboratory experiment asking respondents to memorize and recall a novel social network after receiving either a sex prime or a control prime. We find that sex significantly impacts social network recall, however being made aware of one's sex does not. Our results provide evidence that differences in male and female networks may be partly due to sex-based differences in network cognition.

1. Introduction

How does sex influence the ability to encode and recall social relations? Males and females have long been known to differ in their network structures (Brashears, 2008a; Ibarra, 1992; Marsden, 1987; Moore, 1990; Smith-Lovin and McPherson, 1993), with these differences usually ascribed to structural constraints (e.g., McPherson and Smith-Lovin, 1987; Moore, 1990), dispositions/preferences (e.g., Eder and Hallinan, 1978; Feshbach and Sones, 1971; Ibarra, 1992, 1997), or combinations thereof (e.g., Brashears, 2008b; McGuire, 2002; Munch et al., 1997). However, there is growing evidence that social networks depend on the structure of the brain (e.g., Bickart et al., 2011; Dunbar, 1992, 1993, 1995; Goncalves et al., 2011; Meyer et al., 2012; Sallet et al., 2011; Stiller and Dunbar, 2007; Zahn et al., 2007), on cognitive development (e.g., Leinhardt, 1973; Schaefer et al., 2010) and on the use of schemata (e.g., Brashears, 2013; Brewer and Garrett, 2001; De Soto, 1960; Freeman, 1992; Killworth and Bernard, 1982). Thus, do male and female networks vary because men and women encode and recall those networks differently?

If males and females encode and recall networks differently, then variations in network structure, net of constraints, may not reflect differences in preferences, but instead simply result from differences in cognition. Moreover existing research on situational cognition (e.g., LaFrance et al., 2003; Lightdale and Prentice, 1994; Spencer et al., 1999) demonstrates that some sex differences in cognitive performance and behavior are only evident when context makes one's sex salient. Sex is a master status and therefore relevant to a wide variety of circumstances (Ridgeway and Correll, 2004; Ridgeway and Smith-Lovin, 1999), suggesting that it is often activated in the interactions that give rise to social networks. Yet existing research has not primed or activated sex and is thus unable to detect such effects if they do exist.

We use a randomized laboratory experiment to explore how sex and sex role activation, impact the encoding and recall of a novel social network. We find that females exhibit noticeably superior network recall relative to males, and that this advantage does not appear to depend on differential skill with "compression heuristics," which are useful for simplifying social networks, on personality differences, or on variation in cognitive flexibility, and exhibits no interaction with sex role salience.

2. Background

2.1. Networks and gender differences

The social networks of men are different from those of women. Female networks are often larger than male networks (e.g., Moore, 1990) and include a higher proportion of kin (Marsden, 1987),

* Corresponding author at: Department of Sociology, University of South Carolina, Sloan College, Room 321, 911 Pickens Street, Columbia, SC 29208, United States.
E-mail address: Meb299@cornell.edu (M.E. Brashears).

http://dx.doi.org/10.1016/j.socnet.2015.06.002

although this tendency may be weakening over time (McPherson et al., 2006, 2008; But see also Fischer, 2009; McPherson et al., 2009). While males and females predominantly associate with similar others (Marsden, 1988; McPherson et al., 2001), males make fewer distinctions between alters on the basis of religion, and more on the basis of age, than females (Brashears, 2008a). Sex also helps determine whether individuals name their spouses as discussion partners (Liao and Stevens, 1994) and influences the topics of discussion that arise with alters (Bearman and Parigi, 2004; Brashears, 2014; Small, 2013). Finally, females often provide more interpersonal support than males (Wellman and Wortley, 1990). In short, it is clear that networks differ in a number of ways by sex.

Two broad classes of explanation have been advanced for sex-based differences in networks: structuralist perspectives and preference-based perspectives. Structuralist perspectives argue that network structure and composition are primarily determined by the availability of others for association (e.g., Blau, 1977; Feld, 1981; McPherson and Smith-Lovin, 1982, 1987; Moore, 1990; Munch et al., 1997). Preference-based perspectives argue that males and females have different networks because they prefer, or select for, different types of alters and structures (e.g., Brashears, 2008b; Eder and Hallinan, 1978; Feshbach and Sones, 1971; Ibarra, 1992; Lewis et al., 2008). Research also suggests that individuals prefer to exhibit different behavior toward alters depending on the alter's sex (McDonald et al., 2009; McGuire, 2002).

Controlling for structural factors often reduces, but does not eliminate, the differences between male and female networks (e.g., Moore, 1990). Moreover, cross-national research reveals patterns of male and female network difference similar to the U.S. (Bastani, 2007). As such, structural accounts are insufficient. Preference based explanations help to compensate for the limitations of structural explanations, but typically assume that opportunities for contact are roughly similar, which is rarely the case (e.g., McPherson and Smith-Lovin, 1982, 1987). Moreover, few studies directly assess preferences and instead infer them from realized relationships. However, both structural and preference based accounts run afoul of a problematic assumption: that males and females understand networks and their features in the same way. Individuals respond to perceptions of the network rather than its reality (e.g., Kilduff and Krackhardt, 2008, Ch. 3) and if males and females perceive networks differently, then they could develop very different networks even while preferring the same outcomes and enjoying the same opportunities. This represents a serious oversight given the growing literature showing that cognition is essential to social networks.

2.2. Cognition, memory and social networks

There is growing evidence that cognition plays a key role in social networks. Research using both human and animal models has shown that brain structure is associated with network size and structure (Barton, 1996; Bickart et al., 2011; Dunbar, 1992, 1993, 1995; Goncalves et al., 2011; Kudo and Dunbar, 2001; Meyer et al., 2012; Sallet et al., 2011; Stiller and Dunbar, 2007; Zahn et al., 2007). Likewise, human social networks have been shown to resemble those of many non-human species, further confirming the roots of human sociability in our biological endowments (Faust and Skvoretz, 2002; Skvoretz and Faust, 2002). Social abilities increase during early childhood as individuals learn to model the intentions of others (Karniol and Ross, 1979), and to manage triadic relations (Hallinan and Kubitschek, 1988; Leinhardt, 1973; Schaefer et al., 2010, But see also Daniel et al., 2013), suggesting that social networks depend on the maturation of critical brain regions. Moreover, recent studies (Janicik and Larrick, 2005; Simpson et al., 2011a) have shown that memory for social structure taps a fundamentally different set of skills than does memory for non-social stimuli.

Research also indicates that the manner in which social information is processed influences learning speed and overall recall success (For a review see Brashears and Quintane, 2015). De Soto (1960) found that networks were learned more rapidly when they were built from the expected type of relation and concluded that his subjects possessed schemata (1960: 420), or pre-existing frameworks for understanding information, that allowed them to organize the learning experience and complete it more rapidly (Bartlett, 1932; Neisser, 1967). Schemata are integral to memory for many types of information (e.g., Brewer and Treyens, 1981; Martin, 1993), and so their relevance to social domains is logical. Schemata pertaining to affective balance (Cartright and Harary, 1956) and triadic closure appear to play an especially significant role in aiding recall (Fischer, 1968; Freeman, 1992; Janicik and Larrick, 2005; Picek et al., 1975; Sentis and Burnstein, 1979; Walker, 1976). Recent research by Brashears (2013) finds that schemata not only accelerate the learning of social networks but also function as "compression heuristics," allowing larger numbers of relations to be recalled more accurately. The types of mistakes made also depended on the compression heuristics that were activated.

The preceding studies indicate that encoding (i.e., inserting information into memory) and recalling (i.e., accessing information from memory) networks relies on stable cognitive attributes and strategies, but the quality of network recall also depends on transient qualities of cognition. For example, recognition of alters from a list is compromised by negative moods (Hlebec and Ferligoj, 2001). More central persons in a network tend to have more accurate perceptions of its structure (Krackhardt, 1987, 1990), as do actors with low structural power (e.g., Simpson and Borch, 2005), but network perception can also be improved merely by priming respondents with a sense of low power (Simpson et al., 2011a). These final results are important because sex roles can prime respondents in ways that alter their cognitive performance and therefore, may also influence the cognitive processing of social networks.

2.3. Sex and situational cognition

The notion that males and females think differently is so old that the original citation was likely published on a clay tablet. Yet, there is increasing evidence that sex-based differences in cognition and behavior are situational rather than durable. Neurological evidence shows that the density of dendritic spines in the hippocampus, which is implicated in learning, varies as a function of sex, blood estrogen level, and stress condition (Shors et al., 2001). In other words, the biological readiness of the brain to learn is shaped by its context (i.e., exposure to stress and, if female, phase of its menstrual cycle) as well as by an organism's sex. Behaviorally, Lightdale and Prentice (1994) showed that when sex roles were deactivated females were equal to males, if not greater, in their aggressive behavior. This indicates that rather than males being inherently more aggressive than females, it is likely that females limit their aggressiveness in order to conform to sex expectations (see also Eagly and Steffen, 1986). Similarly, Anderson and Leaper (1998) found that while males were more prone to intrusively interrupt in conversation, these differences were substantially reduced in dyads, relative to larger groups. This result is consistent with a greater reliance on sex expectations in interactions that are less tailored to specific individuals and their relationship. LaFrance et al. (2003) found an international tendency for females to smile more than males, but the extent of the difference nonetheless varies by nation. They also found a greater female advantage in smiling in situations characterized by social rather than task-related tension, and evidence that activation of sex norms directly increases the disparity in male/female smiling. These results show that