

## Empowerment Mitigates Gender Differences in Tertius Iungens Brokering

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### ABSTRACT

Tertius iungens brokering that brings together people who might not otherwise meet is crucial for organizational effectiveness. But we know little about whether and why women and men differ in their propensity to engage in this brokering. Our paper focuses on the origins and mitigation of gender differences in the propensity to bring people together. In Study 1, we showed that the Totterdell et al. (2008) propensity-to-join-others scale that we used in Study 2 and the Obstfeld (2005) tertius iungens scale overlapped not only conceptually but also empirically; and that these measures of tertius iungens were distinct from mediation and separation brokering propensities (Grosser et al. 2019). In Study 2, we used a natural experiment to examine the tertius iungens brokering propensities of 876 identical and 625 fraternal same-sex twins. We found that brokering propensity was lower for women than for men although the propensity toward sociability in terms of making friends and acquaintances was lower for men. We also found that for women, relative to men, tertius iungens brokering propensity was largely affected by environmental influences, such as the experience of stereotyping and discrimination, rather than representing an inherited disposition. Moreover, the differences between men and women with respect to brokering were mitigated for empowered samples, such as well-educated or entrepreneurial individuals. Our research asks new questions about how environmental pressures and empowerment affect social networking. Gender differences in brokering may be amenable to mitigation through empowering practices that include education and entrepreneurial experience.

## Introduction

The process of connecting people in one's social network who might not otherwise meet but who can benefit from each other's knowledge is a critical aspect of organizational and societal functioning (Stovel and Shaw 2012). This brokering process is of increasing importance in the complex and dynamic social settings characteristic of modern organizations (Obstfeld et al. 2014) and of interorganizational alliance management (Davis and Eisenhardt 2011, Oczan and Eisenhardt 2008). The behavioral propensity toward connecting people in one's social network is known as *tertius iungens* brokering and is defined as "a strategic behavioral orientation toward...either introducing disconnected individuals or facilitating new coordination between connected individuals" (Obstfeld 2005, p. 100). *Tertius iungens* brokering helps coordinate activities and integrate ideas in the service of project completion (Long Lingo and O'Mahony 2010) and innovation (Obstfeld 2005). Considerable research shows the importance of this brokering process for a range of actors including managers (Shi et al. 2009), knowledge workers (Quintane and Carnabuci 2016), creative workers (Kauppila et al. 2018), and biomedical scientists (Llopis et al. 2021; see Obstfeld 2017 for a review). Yet important questions remain concerning variation across individuals of this brokering propensity.

Specifically, we don't know whether *tertius iungens* brokering propensity is more evident for men relative to women. And if *tertius iungens* brokering propensity does differ between the sexes, we don't know the extent to which environmental versus inherited effects are responsible. Evidence suggests that the rewards for brokering tend to flow to men rather than to women (Burt 1998, Fang et al. 2020) despite evidence that women form networks that are more diverse than those of men (e.g., Diaz-Faes et al. 2020). But much of the research on differences in social networks between men and women relates to differences in the structure of their social networks rather than possible differences in their propensities to engage in brokering. Prior research has tended to conflate brokerage *structure* with the *process* of brokering (Obstfeld et al. 2014). Thus, although it may be the case that men's networks, relative to women's, exhibit

more opportunities for brokering in the form of disconnects between people, this tells us little about whether men, relative to women, are more prone to engage in brokering processes; nor whether differences between women and men in brokering propensity are due to environmental or inherited effects.

Further, we know little about whether, if women, relative to men, do exhibit a lower propensity toward tertius iungens brokering, this difference can be mitigated. Gender inequality with respect to different aspects of social capital exacerbates women's disadvantages across a range of contexts and outcomes (Silvey and Elmhirst 2003). Given the vital role of tertius iungens brokering for performance in organizations (Obstfeld 2017), it is important to discover whether and how women are disadvantaged with respect to this brokering orientation, and what possibilities exist for the amelioration of this disadvantage.

The explanations for gender differences with respect to brokering tend to invoke environmental influences. These include the experience of interdependence (e.g., Halevy and Kalish 2021), company culture (e.g., Burt 1992), stereotypes (e.g., Brands and Kilduff 2014), and a range of other factors such as early life experiences, societal norms, schooling, exclusionary practices, and discrimination (Fitzsimmons and Callan 2016). These environmental influences are exhibited in differences in the social networks of women and men (e.g., Brands and Mehra 2019, Ibarra 1997). Women, relative to men, face exclusionary pressures that limit their access to network positions (Mehra et al. 1998) and face discrimination in their efforts to engage in workplace brokering related to promotions and success (Burt 1992). What remains unanswered is whether these environmental influences on propensities to broker, relative to genetic influences, are different for women relative to men.

Our paper, therefore, addresses the neglected issue of the environmental versus inherited determinants of differences in tertius iungens brokering propensity between women and men. Women tend to cluster with people who are already connected among themselves rather than engaging in brokering connections between people, and this is true for both affective relationships such as friendship, as well as instrumental relationships such as advice (Fang et al. 2020). Our results show that, for women,

relative to men, it is the environment that predominately shapes the brokering propensity to bring people together. Given this, we show that the empowerment of women through education or through entrepreneurship can mitigate differences in the propensity to broker between people.

Our paper makes several interlinked theoretical contributions to the understanding of the brokering propensities of women and men. First, unlike prior research, we provide theory concerning the environmental versus the inherited influences on brokering propensities for women and men. Empirical research has begun to examine possible inherited influences on social networking positions (e.g., Fowler et al. 2009) but this work neglects to theorize concerning gender differences and focuses on network positions rather than networking propensities.

Second, we theorize concerning how networking disadvantage can be mitigated. Much research points to the difficulties that women face in brokerage in organizations (see Fang et al. 2020 for a review) but theory and evidence are scarce concerning what can be done to ameliorate current conditions. We provide theory and evidence concerning the importance of mitigating factors that women can engage in. Our theorizing integrates work that separately examines gender differences in brokering (Fang et al. 2020), the importance of empowerment for networking (e.g. Zimmerman 1995; Landis et al. 2018) and the heritability of social networking (Fowler et al. 2009).

Third, our theorizing bridges the gap between genetic approaches to social outcomes and those of social science, responding to the growing demand for such rapprochement (e.g., Freese and Shostak, 2009, Schnittker, 2008). Social scientists may have steered clear of this engagement in the fear that existing inequalities might be reinforced rather than mitigated by theory and research on genetic origins of behaviors. But this research can be valuable in alerting people to the much larger role of socially-induced causes of outcomes and the smaller role played by genetics.

Finally, we contribute to theory and research concerning brokerage concepts by consolidating prior work that separately discusses similar sounding propensities. Researchers have long been interested in brokerage that brings people together. But this brokerage has gone under different names including catalyst brokerage (Stovel and Shaw 2012), bridging ties (Totterdell et al. 2008) and tertius iungens

(joining) orientation (Obstfeld 2005). Our research clarifies there is a common conceptual orientation toward bringing people together that is tapped by different approaches. The bridging tie approach (Totterdell et al. 2008) and the tertius iungens (joining others) approach (Obstfeld 2005) overlap and differ from networking in general and from brokerage that keeps people apart or that involves mediating between people (Grosser et al 2019).

### **Theory and Hypotheses**

Brokering activity that brings people together, typically referred to as tertius iungens brokering (Obstfeld 2005) but also as catalyst brokerage (Stovel and Shaw 2012), benefits the organizations in which the brokers are active (e.g., Xiao and Tsui 2007). These brokers are valuable to organizations because they bridge gaps in social structure and facilitate the movement of goods, information, opportunities, and knowledge across these gaps (Stovel and Shaw 2012). Evidence suggests that brokering in general requires constant effort and activity: over the course of a single year in one large organization, 90 percent of previously brokered dyads became directly connected (Burt 2002).

Brokering that brings people together who might not otherwise meet is important for facilitating the coordination of activity across societies and within organizations (Obstfeld 2005, Stovel et al. 2011). The tertius iungens approach focuses attention on the process of brokering rather than on the structure of individuals' networks (Obstfeld et al. 2014). The emphasis is on the propensity to engage in brokering behavior rather than on the extent to which people occupy brokering positions between separated others (Grosser et al. 2019). And the tertius iungens approach also recognizes that people differ in their propensities to engage in the process of bringing people together (Obstfeld 2005). Recent research on tertius iungens emphasizes the managerial coordination of people on new organizational projects who may be already acquainted and already working together on other projects (Obstfeld 2017). In our research, we complement this managerial emphasis by examining the antecedents of the tertius iungens propensity to connect people irrespective of whether the broker is a manager or whether there is a mandate from the formal organization for projects to be completed among members of a workgroup.

### **Environmental Influences on the Gendering of Brokering Propensity**

Social science is familiar with the idea that the environment shapes our attitudes and behaviors. We are born into a world that is structured by those who came before us. Our efforts to create our own histories are constrained by this structuring. As Marx (1897) observed “People make their own history, but they do not make it as they please... but under circumstances existing already, given and transmitted from the past.” The influence of prior structuring encompasses the physical architecture and geography of the world but also the language we speak, the social norms we experience, the laws that govern us, and the other institutions that define our culture. Our interaction with this pre-existing environment is not merely a passive acceptance but also an active engagement that reproduces and, in some cases, changes the structures of everyday life.

Research (e.g. Eagly 1987) suggests that, if there are gender differences in brokering propensity, they arise, in part, because the environments into which individuals are born, and in which they learn and interact, socialize people into different gender roles and reinforce these differences through stereotypes, discrimination and other practices that restrict brokering propensities for women relative to men. Stereotypes are socially shared beliefs concerning attributes and characteristics of members of a social group (Fiske and Taylor 1991). With respect to gender, stereotypes delineate what is considered appropriate for males in terms of agency (i.e., being purposive in pursuit of one’s aims) and for women in terms of communality (i.e., being sociable and friendly in service of others) given sex-typical work roles. Social networks reflect stereotyped beliefs that men’s networks are likely to incorporate interaction with a heterogeneous selection of people including those who are in conflict or who are disconnected, whereas women’s networks are likely to incorporate dense connections among similar others (Ridgeway and Smith-Lovin 1999) given women’s tendency (relative to men’s) toward cohesion, affiliation and harmony (e.g., Baumeister and Sommer 1997, Eckel and Grossman 1998, Geary 2009).

Prior research suggests that women’s brokering in general conflicts with stereotypes concerning women’s expected gender roles (Brands and Kilduff 2014). In popular accounts, women are depicted as

lacking agency, as “uncomfortable using their work friendships to land a deal or join a team,” whereas men are depicted as able to “leverage the power” of their relationships to get ahead (Korkki 2011, p. MM9). These popular expectations arise in part because men traditionally occupy action roles such as soldier and firefighter (Glick et al. 1995); and because men, relative to women, have often been expected to occupy roles that involve formal authority, control over resources (Kanter 1977), and leadership (Eagly et al. 1992). Stereotypical expectations are that women should offer support and collaboration to others (Miller 2012). Women are stereotypically seen as social rather than task specialists (Meeker and Weitzel-O’Neill 1977, Nebenzahl et al. 1993). The agentic role of brokering is, apparently, associated with men who are seen as active brokers who roam the free spaces of the network looking for opportunities (Brands and Kilduff 2014, p. 1535).

Thus, from the perspective of gender roles, any difference between women and men in brokering propensity is likely to be influenced in part by stereotypes (often associated with the societal division of labor between men and women – Eagly 1987) that inform how men and women construct themselves and are constructed by others in their daily activities inside and outside organizations. Recent research (Hentschel et al. 2019) shows that despite societal changes, traditional gender stereotypes endure. Both men and women see men as being more assertive than women, and also see women as more communal than men (Hentschel et al. 2019). But which gender is more likely to exhibit effects of stereotypes active in the environment related to tertius iungens brokering? In general, evidence shows that stereotypes affect women more than men across a range of outcomes. As recent research summarizes (Brands and Fernandez-Mateo 2017, p. 409), women encounter negative stereotypes about their leadership abilities with respect to executive jobs. Femininity is viewed as being irrelevant to or incompatible with the qualities desired of leaders (Eagly 2007) with employers often defining ideal executive candidates in explicitly masculine terms (Acker 1990, Merilainen et al. 2015). Stereotypes affect women through bias in employment decisions and through women’s enactment of self-limiting behaviors (Heilman 1983). Women are more affected by stereotyping than men in part because in many work situations involving



agency (e.g., brokering), women are vulnerable to stronger stereotyping given that their minority status makes gender more self-salient (Cadinu and Galdi 2012).

Stereotypes are not the only environmental influence restricting women's propensity to engage in tertius iungens brokering. Women experience organizational barriers in their efforts to engage in brokering (Burt 1992) and institutional barriers in their attempts to forge strong working relationships (Groysberg 2010). The relative marginalization of women in social networks is less a result of their own choices and more a result of their exclusion by men (Mehra et al. 1998). Women tend to feel excluded from networks in organizations because men prefer to network with each other, networking events often conflict with women's responsibilities toward their families (Greguletz et al. 2019), and low numbers of women relative to men tend to induce a chilly climate toward women's network participation (Maranto and Griffin 2011). Gender can be seen as a set of practices that tend to exclude women's participation (van den Brink and Benschop 2014) including from the top management positions (Einarsdottir et al. 2018) that enable brokering activity (Burt 1992).

The exclusion of women from social networks is particularly evident in the case of successful women in male-typed jobs who are seen as more hostile and less likable than equally successful men (Heilman et al. 2004). To the extent that brokering behavior requires assertiveness, this is likely to be evaluated negatively by others in the case of women relative to men (Bowles et al. 2007). Women also face active discrimination and harassment in male dominated environments (O'Leary-Kelly et al. 2009) and this is likely to restrict their propensity to engage in brokering across separated groups or individuals in these environments.

Indeed, recent research summarized that relative to men, women exhibit less propensity toward brokering (Fang et al. 2020). They tend to value interpersonal relationships in terms of belongingness and intimacy (e.g., Benenson and Christakos 2003, Eagly 1987, Kwang et al. 2013, Spence and Buckner 2000). Men, relative to women, strive to increase visibility and popularity by interacting with various organizational members who are not directly connected (Brands and Kilduff 2014, Hasan 2010). The inference from this research is that women, relative to men, prefer to network with people who already

know each other. As a review of gender and social interaction (Ridgeway and Smith-Lovin 1999) noted, women tend to belong to small groups organized around social and religious activities, whereas men tend to belong to large, work-oriented groups (McPherson and Smith-Lovin 1982). When women perceive themselves as occupying positions between people and groups that are disconnected, and that, might therefore require *tertius iungens* brokering, they experience threat that undermines their work performance (Brands and Mehra 2019).

Based on prior theory and evidence, therefore, we posit the following hypotheses relating to gender differences in brokering propensity and the effect of environmental pressures on women relative to men.

**Hypothesis 1.** *Men, relative to women, exhibit a greater propensity toward brokering that brings people in contact with each other.*

**Hypothesis 2.** *There is a stronger effect of environmental factors on women's relative to men's propensity toward brokering that brings people in contact with each other.*

### **Heritability of Social Networking Propensities**

Frequently neglected in approaches that emphasize how environments affect individuals and vice versa (e.g., Giddens, 1984; Weick, 1979) are genetic influences on behavioral propensities. The routines, values and structures that constitute society affect our propensities for action, but each individual also inherits a distinctive genetic endowment from biological parents. This genetic inheritance has significant implications for how people enact their social roles. As Plomin et al. (2013: 105) argue, “people create their own experiences, in part for genetic reasons.” Behavioral geneticists have called this process gene-environment correlation, of which there are three different types: active, evocative, and passive (Plomin & Bergeman, 1991; Rowe, 2003; Plomin et al., 2013).

People can *actively* select, modify or construct their environments based on their genetic endowments. For example, people with an inherited propensity toward bringing people together may be more likely than those without such an inherited propensity to notice opportunities for brokering and to

take action to put people in touch with each other (see Nicolaou et al. 2008, for a similar argument with respect to entrepreneurship). An inherited propensity toward brokering, therefore, may well increase the individual's chances of occupying a brokerage position in social networks. People may *evoke* reactions from others based on a genetic propensity. Thus, people who inherit a brokering propensity may evoke positive reactions from their network and be less deterred in their brokering activity by the stress and distrust that tends to accompany such activity (Stovel and Shaw 2012). Third, there are *passive* gene-environment correlations, which occur when people receive from their biological parents not only their genes but also an environment that is correlated with their genotypes. For example, a child might inherit a genetic tendency toward brokering (see Fowler et al. 2009 for evidence concerning genetic origins of network centrality) but might also have parents with the right contacts and an environment that is conducive to the development of this propensity (Furstenberg, 2005). Through these active, evocative, and passive processes, people are likely to enact roles that match their genetically-inherited propensities.

Given that gene-environment correlations affect individuals' behavioral tendencies, the question we address concerns the extent to which the sexes exhibit different levels of inherited propensities toward *tertius iungens* brokering. This is an important question because if networking propensities are partly inherited, then there is a need to identify the environmental factors that enable actors to mitigate any genetic influences. Research shows that genes do play a significant (but not dominant) role in the social network positions that people occupy. This research represents a relatively recent research arena with pioneering work (Fowler et al. 2009) showing that genetic factors account for between 29 percent and 46 percent of the variation in three familiar aspects of individuals' social network positions: indegree centrality (the number of times a person is named as a friend), betweenness centrality (the extent to which the individual connects friends who are not connected), and transitivity (the extent to which two friends of the individual are themselves connected). Specifically, this research (Fowler et al. 2009) showed, in a sample of adolescents, that genetic factors accounted for 46 percent of the variation in the number of times a person is named as a friend and 29 percent of the variation in the extent to which an individual connects friends who are not connected.

These results, according to a follow-up simulation, suggest that some individuals are inherently more likely to attract network connections than others, and, therefore, become more popular. And, with particular relevance for our study, some individuals are inherently more inclined to introduce new friends to existing friends. Given this prior research, we suggest that heritability is likely to affect propensities toward brokering.

But prior research has not examined *gender differences* in the heritability of social network propensities or behaviors despite pervasive evidence of differences in the brains of men and women and the paucity of genetics research that looks at samples of both genders (McCarthy et al. 2012). Further, research on the heritability of human propensities is divided concerning the question of whether gender differences are likely to be flexible in the context of genetic influences. The view from evolutionary psychology is one of relative inflexibility: gender differences arose in the distant past as a result of natural selection; and these differences continue to affect attitudes, propensities, and behaviors of men and women in the present day (e.g., Buss 1995, Cosmides and Tooby 1989, Lewis et al. 2017). According to this perspective, women have evolved tendencies to form long term sociosexual alliances with competent resource providers and the many gender differences in cognition and behavior are unlikely to be reversed (Ellis 2011). This perspective has been challenged by a Darwinian feminist research program that recognizes gender as a crucial dimension along which human lives are organized, but which strongly criticizes views that enshrine inequality, female passivity, and patriarchal structures as adaptive and inherited behaviors from the Pleistocene era (see Liesen 2007, for a review). Feminist research rejects the view that male dominance and female dependence derive from relatively unchanging inherited dispositions (Eagly and Wood 2011). From a Darwinian feminist perspective, men and women are strategic actors in the context of current environmental conditions (e.g., Hannagan et al. 2014). Evolution is an ongoing interaction between people and environmental constraints and resources (Gowaty 1997). And brain science provides overwhelming evidence for experience-dependent plasticity relating to a wide range of skill acquisition including musical performance, basketball, dancing, taxi driving, and juggling (for a review see May 2011).

Thus, there is a contrast between the evolutionary psychology view concerning the relative inflexibility of inherited propensities and a Darwinian feminist view (backed by research showing the plasticity of the brain in its capacity to learn from experience) of the relative adaptability of men and women with respect to inherited propensities. Neither perspective has addressed the extent to which sex differences in social networking propensities are partly heritable. But research concerning the relative adaptability of the brain to environmental stimuli and experiences is compelling (Fine et al. 2013). We argued previously that women are likely to be more affected by environmental factors in the development of their networking propensities. It follows therefore that women, relative to men, are less likely to exhibit inherited tendencies toward networking. The corollary of hypothesis 2 is that if differences in networking propensities have a genetic basis, there is likely to be a stronger effect of inheritance on men relative to women.

**Corollary 2.** *There is a stronger effect of genetic factors on men's relative to women's propensity toward brokering that brings people in contact with each other.*

### **Mitigation of Possible Gender Effects through Empowerment**

The third aspect of our research inquiry is to ask: what environmental engagement might mitigate brokering propensity disadvantages for women? We have argued that women's brokering propensity is likely to be related more to environmental influences, such as prevailing stereotypes and workplace discrimination, than to hard-wired heritability. In addressing the issue of stereotyping, it is useful to draw a distinction between public stigma, namely the negative stereotypes circulating in society, and self-stigma, the extent to which individuals internalize the stereotypes (Corrigan and Watson 2002). Some individuals, more than others, engage in activities that facilitate empowerment, defined as: "a process by which people... gain mastery over issues of concern to them" (Zimmerman 1995: 581). Empowered people experience themselves as competently pursuing meaningful work that they have chosen to pursue and that is likely to make a positive difference in the lives of themselves and others (Yukl and Becker 2006). In actively resisting disempowering stereotypes (Crocker and Major 1989) these individuals

engage in self-empowerment rather than using coping to deal with environmental stress (Shih 2004). They are assertive and persistent in their efforts to challenge stigma and other negative attributions; and they vigilantly monitor their social interactions (Shih 2004). Resistance to subliminal stereotypes is especially evident among women who identify with feminist groups (van Breen et al. 2018); and feminist-identification also provides protection against discrimination. In general, people can learn to improve how they interact with other people, including improving accuracy of network perceptions (Janicik and Larrick 2005) and efficacy of brokering behaviors (Burt and Ronchi 2007).

Empowerment options are not available to all women. For example, entrepreneurship as a vehicle for empowering the self is likely to be more available to women located in munificent environments, defined as those in which critical resources are available (Dess and Beard 1984); and higher education is likely to be more available to women from privileged backgrounds. Given these caveats, we note that some women, in part because of favorable life circumstances, are able to take control of outcomes through persistence, vigilance, and learning, thereby providing mitigation against the disadvantages associated with gender stereotypes, discrimination, and other barriers to brokering behavior. Research across a number of contexts suggests that gender differences in social network positions tend to disappear once relevant controls for empowerment are instituted. Gender differences in centrality in an advertising agency disappear once background characteristics such as education are controlled for (Ibarra 1992). Similarly, most gender differences in network composition for a national sample of English-speaking American adults disappear once relevant controls are instituted (Moore 1990). And there are few gender differences in network structure observed among established male and female entrepreneurs (Aldrich 1989).

On the one hand, therefore, there is evidence of the pernicious effects of stereotypes, discrimination, and other barriers on women's ability to occupy advantageous structural positions in organizations (Brands and Kilduff 2014, Burt 1998). And on the other hand, there is evidence that education strongly relates to measures of social network centrality (e.g., Burkhardt and Brass 1990) and that entrepreneurial status (e.g., Aldrich 1989) can mitigate the effects of discriminatory pressures. With

respect to discrimination, many countries have enacted legislation, such as the USA 1964 civil rights act, to prohibit discrimination on the basis of gender with respect to employment. These legal efforts have failed to eradicate discrimination. But employment levels among college-educated women in professional and managerial occupations have increased across cohorts, even among women in historically male professions (Percheski 2008).

Empowered people, such as those with higher education or those with experience of starting their own businesses, perceive a close correspondence between their goals and how to achieve them, a correspondence between their efforts and their life outcomes (Zimmerman 1995). People who feel powerful are more likely to engage in instrumental networking (Casciaro et al. 2014) and in brokering (Landis et al. 2018). Empowerment makes individuals more likely to be aware of and in a much stronger position to combat stereotypical expectations, implicit biases, and discrimination. Both higher education and entrepreneurship are leading indicators of empowerment. Higher education reduces fatalism and passivity and encourages openness to new experiences (Mechanic 1991, p. 641), whereas entrepreneurship involves spotting potential and acting on opportunity (Moreira et al. 2019). Both of these forms of empowerment are likely to reduce differences between men and women with respect to brokering propensities. Therefore, we conjecture that differences between men and women in brokering propensities will characterize samples of relatively disempowered individuals, whereas such differences will not be apparent for a well-educated or entrepreneurial sample.

**Hypothesis 3.** *The propensity to bring people in contact with each other will be lower for women relative to men only for less empowered samples.*

To summarize, we anticipate that men, relative to women, will exhibit a higher propensity toward tertius iungens brokering. We anticipate that this propensity will be significantly affected by environmental influences (more so for women) and by genetic influences (more so for men). And we suggest that the differences between men and women regarding this brokering propensity will be evident only for the relatively disempowered.

To test these ideas we conducted two studies. In Study 1, we show that the Totterdell et al. (2008) 3-item propensity-to-join-others scale that we use in Study 2 and the Obstfeld (2005) tertius iungens scale overlap not only conceptually but also empirically; and that these measures of tertius iungens are distinct from mediation and separation brokering propensities (Grosser et al. 2019). We use the Totterdell et al. (2008) approach because we can assess on related scales whether there are gender differences in propensity toward networking in general or whether any difference is restricted to brokering. We find that brokering propensity was lower for women than for men although the propensity toward sociability was lower for men. In Study 2, we use a natural experiment to examine environmental and genetic influences on the tertius iungens brokering propensities of 876 identical and 625 fraternal same-sex twins, and whether empowerment mitigated differences between men and women with respect to brokering propensity.

### **Study 1**

Because our approach to brokering propensity relates to the general tendency to bring people together and because we want to compare environmental and genetic influences on this tendency relative to the more general tendency to engage in social networking, we used the Totterdell et al. (2008) propensity to connect with others scale that includes measures of joining others together with measures of making friends and acquaintances. The joining others scale overlaps conceptually with the Obstfeld (2005) tertius iungens scale but is less focused on people who have “a common strategic work interest” (Obstfeld 2005: 111). Totterdell et al.’s (2008) scale and Obstfeld’s (2005) scale should, we expected, be distinct from scales that measure brokering propensities to keep people apart or mediate between them. We carried out principal component and confirmatory factor analyses to determine whether the Totterdell et al. (2008) scale we used in Study 2 overlapped empirically with Obstfeld’s (2005) measure; and whether these measures of tertius iungens differed from measures of other brokering propensities.

No prior analysis has examined the extent to which the propensity to join others scale and the tertius iungens scale compared with other brokering scales, namely mediation brokering and separation



brokering discussed in recent research (Grosser et al. 2019). Mediation brokering is when the actor functions as an intermediary between parties that do not interact with each other (i.e., Simmel's nonpartisan); whereas separation brokering is when the actor deliberately maintains a separation between the parties (i.e., Simmel's *tertius gaudens* broker) (Grosser et al. 2019). The questions we addressed concerned whether propensity to join others and *tertius iungens* represented a single construct in comparison with mediation and separation brokering. We utilized a sample of 310 individuals who were in full-time employment from a Qualtrics online panel. They possessed an average of 20.8 years of work experience ( $SD = 13.9$ ) while 78.7 percent were college educated. The mean age was 42 ( $SD = 12.9$ ) and 52 percent of the sample was female.

First, we conducted a principal component analysis with varimax rotation (Hair et al., 1998) including the three "propensity to join others" items from Totterdell et al. (2008) and the six "*tertius iungens*" items from Obstfeld (2005). We noted that the two scales correlated at 0.79. The nine items from the combined scales loaded on a single factor that accounted for 64.9% of the total variance (eigenvalue = 5.84). The Kaiser Meyer Olkin measure of sampling adequacy was 0.936 and Bartlett's test of sphericity was 1910.51 ( $p < 0.001$ ). A scree plot also confirmed the unidimensionality of the construct. Second, we ran another principal component analysis with varimax rotation (Hair et al., 1998) adding the mediation brokering and separation brokering scales (Grosser et al., 2019) to the nine items above (from Totterdell et al., 2008; and Obstfeld, 2005). Three factors were extracted that were identical to their theoretical dimensions: the first factor consisted of the nine items that comprised both the Totterdell et al. (2008) three items and the Obstfeld (2005) six items; the second factor consisted of the three mediation brokering items (Grosser et al., 2019); and the third factor consisted of the three separation brokering items (Grosser et al., 2019). The extracted factors accounted for 69.1% of the variance and there were no cross-loadings. The Kaiser Meyer Olkin measure of sampling adequacy was 0.927 and Bartlett's test of sphericity was 2924.67 ( $p < 0.001$ ). Third, we conducted confirmatory factor analyses to demonstrate discriminant validity across the three constructs – (i) "propensity to connect others/*tertius iungens*", (ii) mediation brokering, and (iii) separation brokering. The results of our CFA analysis show that the best

fitting model, based on goodness of fit indicators and chi-square difference tests (Hu and Bentler, 1999), is the model where the combined “propensity to connect others/tertius iungens” scale exhibits discriminant validity from both mediation brokering and separation brokering:  $\chi^2(87) = 245.53$ ,  $p < 0.001$ ; RMSEA = 0.077; CFI = 0.95; TLI = 0.93; SRMR = 0.044. Acceptable model fit was defined by the following criteria: standardized root mean squared residual (SRMR)  $\leq .08$  (Hu and Bentler, 1999), root mean square error of approximation (RMSEA)  $\leq .08$  (MacCallum et al, 1996), comparative fit index (CFI)  $\geq .95$  (Hu and Bentler, 1999), and the Tucker-Lewis index (TLI)  $\geq .90$  (Kelloway, 1998).

Cronbach’s alphas were 0.93, 0.88 and 0.74 for “propensity to join others/tertius iungens”, mediation brokering, and separation brokering respectively. The average variance extracted (AVE) for all constructs was greater than 0.50 while the values for Bagozzi’s (1980) construct reliability index were above 0.70. We also evaluated discriminant validity by examining whether each construct’s average variance extracted was greater than the squared correlation with the other constructs (Fornell and Larcker 1981) and found support for this.

Finally, because of the relatively small sample size (N=310) we re-estimated our models using item parcels; this involved creating parcels for constructs with four or more items (Marsh and Hocevar 1988, Porck et al. 2019). Specifically, we created parcels for the 9-item propensity to join others/tertius iungens combined scale such that there were three indicators on this scale. Re-estimating with the item parcelling strategy indicated that the three factor model was again the best fitting model ( $\chi^2(24) = 47.27$ ,  $p < 0.01$ ; CFI = 0.986; TLI = 0.979; SRMR = 0.036; RMSEA = 0.056) demonstrating discriminant validity between the three constructs.

We concluded that the Totterdell et al. (2008) three-item propensity to join others scale and the Obstfeld six-item (2005) tertius iungens scale overlapped not only conceptually but also empirically; and that these measures of tertius iungens were distinct from measures of mediation and separation brokering propensities.

## **Study 2**

## Method

**Data.** The data used in this study were collected via mailed questionnaires that focused on a variety of topics including medical conditions and networking. The mix of questions helped render unlikely any awareness by respondents of the subject of our investigation. We sent the survey to a population of 6984 twins from TwinsUK, the UK adult twin register. TwinsUK is the largest twin registry in the UK and twins were recruited via a series of media campaigns (Moayyeri et al. 2013). The population is representative of the general UK population and it is not enriched for a particular characteristic or disease (Mangino et al. 2017). The survey generated a total of 4427 responses, yielding a response rate of 63.39%. Standardized validated scales and DNA testing were used to establish whether the twins were monozygotic (MZ) or dizygotic (DZ)<sup>1</sup> (Moayyeri et al. 2013; Singer et al. 2005). We excluded any twins of unidentified zygosity and those who were not in paid employment or self-employment. Therefore, the final sample only includes people working in organizations or for themselves. This final sample comprised 3115 twins. These included 876 pairs of MZ and 625 pairs of same-sex DZ twins, and 113 individuals for which there was no response from their co-twin in the survey (66 MZ and 47 DZ). Similar to other twin samples, there was an overrepresentation of women in the sample (Lykken et al. 1987) which included 265 men and 2850 women. This is also because the twin registry was originally established to examine medical conditions such as osteoporosis that are more prevalent among women. The average age was 59.1 years. In addition, we obtained data on education from a previous survey to the twins. Using each person's unique identification code, we were able to merge the education data with our new data. Education data were available on 1,603 individuals, for which we also had data on brokering and sociability.

**Procedure.** We used independent samples t-tests and clustered effects regressions to examine the association between sex and networking orientation. Because of the paired nature of twin data, standard

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<sup>1</sup> Monozygotic, or identical, twins are formed when a single sperm fertilizes a single egg (the fertilized egg is called a zygote) which then splits into two leading to the creation of two separate organisms that share 100 percent of their genes. Dizygotic, or fraternal, twins are formed when two sperm fertilize two separate eggs with the resulting twins sharing, on average, 50 percent of their segregating genes.

OLS is problematic and can lead to biased results. Instead, we use clustered effects regressions that relax the independence assumption in twin data. It is not possible to run fixed-effects models since there is no gender variation within clusters, as all twin pairs are of the same sex (Schunck 2013).

In addition, we use behavioral genetics techniques to disentangle into genetic and environmental influences the variance of the propensity to join others and sociability. Identical twins share all of their genes whereas fraternal twins share, on average, half of their segregating genes. Under the equal environments assumption<sup>2</sup>, greater similarity between identical twins than between fraternal twins for the propensity to join others and sociability must be due genetic influences -- this provides an estimate for additive genetic effects (designated by  $A$  in the equations below). Shared environmental effects that are shared between twin pairs (such as family socioeconomic influence) are indicated in the equations below by  $C$ . Because identical twins share the same environment and the same genes, any observable (phenotypic) differences between them must be due to unique environmental influences (such as different interactions with family or friends and external environmental influences). Non-shared environmental effects that are unique to each twin are designated by  $E$ .

The models that we estimated are indicated by the following structural equations:

$$\Phi_{\lambda\omega} = aA_{\lambda\omega} + cC_{\lambda\omega} + eE_{\lambda\omega}$$

$$V_{\Phi} = a^2 + c^2 + e^2 = 1$$

where  $\Phi$  is each observable characteristic (or phenotype) of the  $\lambda$ th individual in the  $\omega$ th twin pair ( $\lambda = 1, 2$ ;  $\omega = 1, 2, \dots, N$ ) and  $V_{\Phi}$  is the total variance of the observable characteristic in the population corresponding to the sum of the additive genetic ( $a^2$ ), shared environmental ( $c^2$ ), and unique

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<sup>2</sup> Numerous studies have examined the equal environments assumption using different methodologies and most have concluded that pairs of identical and fraternal twins face the same environments (Bouchard and Propping 1993, Carey 2003, Hettema et al. 1995, Kendler et al. 1993, Lykken et al. 1993). For example, there is evidence that identical twins reared apart turn out to be more similar than fraternal twins reared together (Bouchard et al. 1990). Studies have also shown that parents often make wrong evaluations or are misinformed about the zygosity of their twins leading them to raise identical twins as fraternal twins and vice versa; in such cases, it is actual and not perceived twin zygosity that is associated with the similarity between the twins (Gunderson et al. 2006, Scarr and Carter-Saltzman, 1979). There is also evidence that parents tend to emphasize the resemblances between their fraternal twins by clothing them in similar outfits while they intentionally individualize their identical twins. As a result, identical twins experience no greater similarity in treatment by their parents than fraternal twins.

environmental ( $e^2$ ) variance. We estimated the contribution of A, C, and E to the total variance by comparing nested models to the saturated model. In each analysis, we chose the most parsimonious model through three standard tests employed in the genetic modeling literature: the chi-square goodness of fit test, Akaike's Information Criterion (AIC) (Akaike 1987) and the Root Mean Square Error of Approximation (RMSEA) (Neale et al. 2003). When comparing different models, the model with the lowest AIC and RMSEA is selected as the best fitting model. We also adjusted for age in all analyses following previous research (Hakim et al. 2004, Mohammed et al. 2003).

## Measures

***Propensities toward social networking.*** Respondents rated their networking propensities on a scale of 1 (*does not describe me very well*) to 5 (*describes me very well*) for items developed and psychometrically validated by Totterdell et al. (2008) that measured the propensity to bring disconnected people together (three items); the propensity to make friends (three items); and the propensity to make acquaintances (three items). Specifically, in our measure of tertius iungens brokering propensity, respondents rated their propensity to join others on three items that included "I often put people in touch with the right person when they need something" and "I find it easy to bring individuals together." In the present study, the three items represented a reliable measure ( $\alpha = 0.81$ ).

Our expectation was that the greater networking propensity of men, relative to women, would be restricted to brokering, rather than extending to sociability propensities in general. We thought it was important to check whether any effects of sex on brokering propensity could be explained by a general tendency toward sociability, defined as the propensity to make friends and acquaintances easily (e.g., Simmel 1949). Theory and evidence are unclear as to whether men or women are advantaged with respect to sociability. Women are presumed to be "social specialists" in occupying helping and supportive roles whereas men are seen as "task specialists" in occupying instrumental and agentic roles (Bales and Slater 1955, Meeker and Weitzel-O'Neill 1977). Women tend to have larger numbers of kinship ties than men, whereas men tend to have larger numbers of non-kinship ties, but the overall size of networks does not differ by gender (Moore 1990). Given this mixed picture, which provides no clear indication as to the

existence or extent of gender differences in sociability, we investigated whether there were differences between women and men in the propensity toward making friends and acquaintances in the absence of any specific hypothesis.

Respondents rated their propensity toward *sociability* on the six items that included friendship propensity and acquaintanceship propensity. Items included “I make friends easily,” “I like to know a lot of people,” “I have many acquaintances,” and “I readily make connections with people I do not know.” In the present study, these six sociability items represented a reliable measure ( $\alpha = 0.82$ ).

**Zygosity.** Monozygotic twins (i.e., identical twins) were coded as 1 and dizygotic twins (i.e. non-identical twins) were coded as 2.

**Empowerment.** We measured the extent to which respondents were empowered in two different ways: entrepreneurship and education. There is considerable research concerning the extent to which women’s entrepreneurship represents an empowered state (e.g., Al-Dajani and Marlow 2013, Greene 2012). Similarly, education is seen as vital to the empowerment of women in society (e.g., Stromquist 2015). The tendency to be an entrepreneur was measured as the tendency to start a new business, following a common approach in the literature (Delmar and Davidsson 2000, Gartner 1989, Mesch and Czamanzki 1997). The variable was coded as 1 if the individual reported having started a new business and zero otherwise. Education, as an indicator of empowerment, was coded as 1 for individuals who had finished their education at an age greater than or equal to 22; and coded as 0 otherwise. Thus, individuals empowered through education would have at least 4 years of university education, which in the UK, would be equivalent to at least a Master’s degree.

**Sex.** Males were coded as 1 and females as 0.

**Age.** We also controlled for age as this could influence the tendency to engage in brokering and sociability.

## Results

Table 1 displays means, standard deviations, and correlations. Recall that hypothesis 1 suggested that men, relative to women, would exhibit a greater propensity to bring people together. This hypothesis was

supported as shown by the significant and positive effect of sex on brokering propensity in column 2 of Table 2 (0.331,  $p < 0.001$ ). But perhaps men were more likely to engage in network activity more generally in terms of making friends and acquaintances? In fact, our exploratory analysis showed that women, relative to men, exhibited a greater propensity toward sociability, as shown by the significant and negative effect of gender on sociability in column 3 of Table 2 (-0.203,  $p < 0.01$ ). Age was also positively related to sociability propensity ( $p < 0.001$ ).

These results showing men with a higher propensity toward tertius iungens brokering and women with a higher propensity toward sociability were mirrored in the differences between the mean values of brokering and sociability. Men had higher tertius iungens brokering propensity scores than women (3.50 vs. 3.17,  $p < 0.001$ ); whereas women had higher sociability scores than men (3.46 vs. 3.26,  $p < 0.01$ ). Thus, the greater propensity toward brokering by men was not an artifact of a tendency toward greater sociability on the part of men.

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Insert Tables 1 and 2 about here

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Hypothesis 2 related to whether the difference in brokering propensity between women and men was influenced by environmental factors. First, it is notable that most of the variation in networking propensities was explained by the environment rather than by heritability. Rows 1 and 2 of Table 3 show that unique environmental factors explained 61 percent and 53 percent of the variation in brokering and sociability propensities across the sample. None of the variance could be attributed to shared environmental factors. Rows 1 and 2 in Table 3 show that additive genetic factors accounted for 39% (95% CI: 0.34-0.44) and 47% (95% CI: 0.42-0.51) of the variance in brokering and sociability respectively.

Was there a stronger effect of the environment on women's versus men's propensity toward brokering? The answer is yes. Rows 3 and 4 in Table 3 show that unique environmental influences were higher for women (0.63) than for men (0.43) ( $p < 0.05$ ) consistent with hypothesis 2. Was this difference specific to brokering, or was there a more general difference in how the environment affected sociability?

Specifically, were environmental influences on propensities toward friendship and acquaintanceship formation different for women relative to men? The answer is no: Rows 5 and 6 in Table 3 show that the unique environmental influences on sociability for women and men were not significantly different, although the sociability coefficient was higher for women than for men (women = 0.55, men = 0.44).

Thus, there is a difference between women and men that seems specific to tertius iungens brokering propensity. Environmental influences explain the majority of the variation in propensity toward brokering. And it is women, relative to men, for whom the environment tends to be a stronger influence on brokering propensity.

The corollary of the above results is that inherited differences also help explain why men and women have different brokering propensities. The results in rows 3 and 4 of Table 3 show that, as suggested by corollary 2, men, relative to women, were significantly more likely to inherit a propensity toward brokering ( $p < 0.05$ ). Additive genetic factors accounted for 57% (95% CI: 0.42-0.69) of the variance in brokering for men and 37% (95% CI: 0.31-0.41) of the variance in brokering for women. Again, this result seems specific to brokering rather than extending to sociability. The results in rows 5 and 6 of Table 3 show that differences in inherited propensities toward sociability did not significantly differ for women (45%; CI: 0.39-0.50) relative to men (56%; CI: 0.41-0.68).

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Insert Table 3 about here

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The results show that it is not heritability that is the main limiting factor on women's propensities toward brokering. Rather, it is environmental influences that are dominant in the case of women. If the environment is the main influence on women's brokering propensities, then women who experience empowerment through education or entrepreneurship are likely to exhibit reduced or no gender differences in brokering propensities.

Specifically, hypothesis 3 suggested that women's lower propensity toward brokering would be mitigated in the case of people empowered through education or entrepreneurship. Tables 4 and 5 provide



support for this hypothesis. There were significant differences between women and men who either had relatively low education (Table 4) or who had no experience in entrepreneurship (Table 5) such that, in either case, men tended to have a higher propensity toward such brokering than women. There were no such differences among those who were empowered either through education or through entrepreneurship. Further, neither education nor entrepreneurship affected differences in sociability, as women exhibited a greater propensity toward sociability irrespective of education or entrepreneurship.

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Insert Tables 4 and 5 about here

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## **Discussion**

The focus of this paper is on the origins and mitigation of differences between women and men in the tertius iungens brokering propensity to bring people together. In Study 1, we confirmed the validity of our measure of tertius iungens in relation to other measures of brokering propensities. We showed that the Totterdell et al. (2008) three-item propensity to join others scale that we used in Study 2 and the Obstfeld six-item (2005) tertius iungens scale overlapped not only conceptually but also empirically; and that these measures of tertius iungens were distinct from recently established measures of mediation and separation brokering propensities (Grosser et al. 2019).

In Study 2, we examined the brokering propensities of 876 identical and 625 fraternal same-sex twins. The twins sample represented a natural experiment that permitted the analysis of environmental versus genetic effects on tertius iungens brokering propensities for women and for men. We found that the propensity to engage in tertius iungens brokering was lower for women than for men although the propensity toward sociability in terms of making friends and acquaintances was lower for men. For women, relative to men, tertius iungens brokering propensity was largely affected by environmental influences such as the experience of stereotyping and discrimination, rather than representing an inherited disposition. The lower propensity for women with respect to brokering was mitigated for people with either higher education or business startup experience: for this group, there were no gender differences

with respect to brokering propensity. Women who have experienced empowerment, through education or through entrepreneurship, eliminate drawbacks with respect to their propensity to connect people.

### **Contribution to Theory and Research**

The paper features a natural experiment in which identical and same-sex fraternal twins were compared in terms of their propensity for brokering. The first contribution, therefore, is toward understanding gender differences in brokering propensity, and how these differences can be mitigated through empowerment. Our study helps integrate work that separately examines gender differences in brokering (Fang et al. 2020), the role of empowerment for networking (Landis et al. 2018), and the heritability of social networking (Fowler et al. 2009). By differentiating between environmental and genetic effects on brokering propensity, we change the nature of the debate concerning gender differences in brokering. Women in brokering positions tend to be disadvantaged in their careers (Burt 1992), and their brokering often remaining invisible to their colleagues (Brands and Kilduff 2014). When women perceive themselves as brokers, occupying positions between separated others, they experience threat, rooted in negative stereotypes about women brokers, which undermines their performance (Brands and Mehra 2019). But much of this existing research draws inferences from gender differences in the occupation of brokering positions rather than investigating differences between women and men in brokering propensity. As Obstfeld (2020) noted, the process of *tertius iungens* brokering involves bringing people together rather than occupying a static position in a social network. In showing that women's disadvantage with respect to the propensity to engage in brokering is largely environmentally-induced rather than being hard-wired, we establish the basis for mitigation of gender differences in brokering behavior through women's empowerment.

Prior research shows that people profit from learning to broker more effectively, both in terms of spotting brokering opportunities (Janicik and Larrick 2005) and in career advancement – but only for those who engage with the environmental opportunity (Burt and Ronchi 2007). According to our results, there is a significant inherited predisposition toward social networking behaviors, but in the case of women's brokering propensity, heritability is less influential than the environment. And any

predisposition to avoid brokering is less likely for those women with experience of higher education or entrepreneurship.

Our next contribution is to provide theory on the environmental versus inherited influences on tertius iungens brokering for women and men. Empirical research has begun to examine possible inherited influences on social networking (e.g., Fowler et al. 2009) but this work does not examine any gender differences and focuses on network positions rather than networking propensities. At a broader level we contribute to the emerging literature that examines the role of biology in social life (e.g., Freese and Shostak 2009, Nicolaou et al. 2008, Schnittker 2008). Biology shapes social patterns but its effects are under-theorized and understudied in organizational research (Nofal et al. 2018). In studying the different effects of inherited propensities on men and women, we challenge existing emphases on the inflexible nature of human dispositions. In social psychology, for example, there are exaggerated claims that “how people react and interact with one another is spelled out in DNA” (<https://www.psychologytoday.com/gb/basics/evolutionary-psychology>). To counter these claims, it is necessary to examine genetic and environmental influences and show that heritability is not destiny: people can and do learn from experience and modify even intrinsic aspects of their selves (Tasselli et al. 2018).

Our final contribution is to help unify the measurement of tertius iungens brokering by showing that two established measures of brokering propensity tap into the same underlying construct. The propensity to join others scale (Totterdell et al. 2008) and the tertius iungens scale (Obstfeld 2005) were developed and validated separately. But our research suggests that they target the same human propensity to bring into contact those who can benefit from each other’s knowledge. Moreover, we show that they are distinct from mediation and separation brokering propensities (Grosser et al. 2019).

### **Limitations and Future Research**

Our study is limited in several ways. The sample in this research was skewed female, as is true for many twin samples (e.g., Lykken et al. 1987), so future research will need to examine a more balanced mixture of men and women. Despite the imbalanced gender ratio in our study, the fairly large sample fosters

confidence in the results. Another limitation relates to the possibility that our findings are constrained by cultural norms, although brokering that joins people is observed across societies (Stovel and Shaw 2012) including China (see Xiao and Tsui 2007 on the value of “integrators”); and returns to brokering are not limited to Western countries (e.g., Merluzzi 2013). Future work can examine the extent to which our findings may be contingent on cultural views about the role of *tertius iungens* brokering. Further research can also examine whether ethnic differences may moderate our findings.

As in all twin studies, our study assumes that identical twins are no more likely than non-identical twins to imitate the brokering propensity of their co-twin. If any imitation occurs for genetic reasons then the heritability estimates are not affected but if imitation occurs for non-genetic reasons then the heritability estimates will be inflated. Imitating the brokering propensity of their co-twin for non-genetic reasons is, however, unlikely as identical twins are more prone than non-identical twins to select behaviors that differentiate themselves from their co-twin (Pearlman and Ganon 2000).

We note that our research does not attempt to identify specific genes underlying the effects we investigate. Despite ambitious efforts to identify “candidate genes” for a variety of behaviors such as leadership (e.g., De Neve et al. 2013), these studies have now been largely replaced by genome-wide association studies (GWAS) in which the whole genome is tested for associations with the outcomes of interest (Luciano et al. 2018, Nicolaou et al. 2021). Even for highly heritable traits, the search for specific genes associated with outcomes is enormously complex and requires analyses based on hundreds or thousands of DNA markers (Arvey et al. 2016, p. 181). Studies have also begun to examine polygenic risk scores that are calculated as the sum of their genome-wide genetic markers, weighted by their corresponding effect sizes derived from GWAS (Choi et al. 2020, Khera et al. 2018). Such analyses are beyond the scope of this paper.

In building on prior work showing the importance of feelings of power for instrumental networking and for opportunity seizing (Casciaro et al. 2014, Landis et al. 2018) we run the risk of suggesting that empowerment is within the individual’s control. Our work does suggest that differences in the propensity to broker can be ameliorated for those women who have experience of empowering

processes such as higher education and entrepreneurship. But these opportunities are not available to all women who may lack the funds or the time to pursue self-improvement. Future research can examine other ways in which women are disadvantaged in the creation of social capital, and whether such disadvantages can be addressed through empowerment practices such as participative management, democratic decision making, and employee ownership plans (see Yukl and Becker 2006 for a review).

### **Practical Implications**

In social network research, the structure vs. process distinction with respect to social networks is well-established (e.g., Obstfeld et al. 2014). The process of social networking involves both sociability and brokering. Both network process domains are worthy of scrutiny for enhancing career success and efficacy. We found that men have a greater propensity to engage in the process of brokering. Fortunately, certain life experiences can mitigate or eliminate this difference. The ones we were able to measure in our study are education and entrepreneurship. And yet there are wrinkles here in that women may experience empowerment as a result of engaging in a startup, but find their early-stage ventures penalized relative to men by investors (e.g., Lee and Huang 2018) whose views derive from lay theories that penalize women's instrumental networking (Kuwabara et al. 2018).

Women's empowerment can be enhanced more directly within organizations if we view education and entrepreneuring experience more broadly. Policies to empower women can include encouragement for intrapreneuring and innovation within organizations. Managers can provide focused training toward building employee confidence, they can encourage intrapreneurial activity, and facilitate participative leadership. These and other initiatives can foster the empowerment of women in organizational settings (Yukl and Becker 2006) thus increasing their propensity to engage in tertius iungens brokering. This can benefit organizations (Long Lingo and O'Mahony 2010, Obstfeld 2005), enable women to get further ahead in their careers (Fang et al. 2015), and change gender stereotypes

(Brands and Kilduff 2014). Providing inclusive opportunities for women's entrepreneuring within organizations (e.g., Patterson 2020) has the potential to facilitate women's brokering activity.

Organizations can also provide resources for staff to pursue formal education, which has been shown to foster gender equality (Tharenou 1994, p. 918). Our research suggests that encouraging women to pursue higher education can ameliorate gender differences in brokering. With respect to entrepreneurship education, business schools can include an entrepreneurial concentration within their programs given that this facilitates self-efficacy for women more so than it does for men (Wilson et al. 2007).

Changing stereotyped expectations and discriminatory practices may require training not just for the women would-be brokers but for their colleagues trapped in out-of-date preconceptions. Organizations need to work to eliminate situations in which stereotypes trigger fears of being judged or treated negatively (Spencer et al. 2016); and in which women are subjected to harassment (O'Leary-Kelly et al. 2009).

### **Conclusion**

Our research opens the door to questions about environmental pressures and inherited propensities on social networking. We showed that men and women differed on the propensity to broker and that this difference was mitigated in women who were empowered. If the research has one overarching conclusion it is that gender differences in brokering may be amenable to mitigation through the provision of empowering practices that include higher education and entrepreneurial experience.

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Table 1. Means, Standard Deviations, and Correlations

Variable	Mean	SD	1	2	3	4	5	6
1. Brokering	3.20	1.19						
2. Sociability	3.44	1.01	0.64***					
			<i>3049</i>					
3. Age	59.14	13.31	-.01	.10***				
			<i>3088</i>	<i>3062</i>				
4. Zygoty	1.42	.49	.00	.04*	.17***			
			<i>3088</i>	<i>3062</i>	<i>3115</i>			
5. Sex	.09	.28	.08***	-.06**	.01	-0.06***		
			<i>3088</i>	<i>3062</i>	<i>3115</i>	<i>3115</i>		
6. Entrepreneur	.24	.43	.18***	.07***	.02	-.00	.11**	
			<i>3049</i>	<i>3024</i>	<i>3074</i>	<i>3074</i>	<i>3074</i>	
7. High education	.10	.30	.01	-.05	-0.20***	-.06*	.10***	.03
			<i>1590</i>	<i>1571</i>	<i>1603</i>	<i>1603</i>	<i>1603</i>	<i>1581</i>

Notes. \*  $p < 0.05$ ; \*\*  $p < 0.01$ ; \*\*\*  $p < 0.001$ , two-tailed; Sample sizes in italics underneath the correlation coefficients.

**Table 2.** Gender Effects on Social Networking Propensities

	Brokering Propensity	Sociability Propensity
Age	-.001 (.002)	.007*** (.002)
Zygoty	0.017 (.049)	.048 (.042)
Sex	.331*** (.093)	-.203** (.077)
Constant	3.189*** (.120)	2.966*** (.105)
F	4.26	10.78
Prob > F	0.005	0.000
N	3088	3062

*Notes.* \*  $p < 0.05$ ; \*\*  $p < 0.01$ ; \*\*\*  $p < 0.001$ , two-tailed ; Clustered effects regression with standard errors in parentheses. Men = 1, women = 0.

**Table 3.** Genetic and Environmental Influences on Men's and Women's Networking Propensities

Networking propensity	Sex	Additive Genetic % of Variance Explained (95% CI)	Common Environ. % of Variance Explained (95% CI)	Unique Environ. % of Variance Explained (95% CI)	p-value	AIC	RMSEA
1. Brokering	Men & Women	0.39 (0.34-0.44)	-	0.61 (0.56-0.66)	0.46	-4.410	0.015
2. Sociability	Men & Women	0.47 (0.42-0.51)	-	0.53 (0.49-0.58)	0.02	3.841	0.041
3. Brokering	Men	0.57 (0.42-0.69)	-	0.43 (0.31-0.58)	0.99	-7.99	0.001
4. Brokering	Women	0.37 (0.31-0.41)	-	0.63 (0.59-0.69)	0.54	-4.899	0.013
5. Sociability	Men	0.56 (0.41-0.68)	-	0.44 (0.32-0.59)	0.99	-7.988	0.001
6. Sociability	Women	0.45 (0.39-0.50)	-	0.55 (0.50-0.61)	0.02	4.200	0.044

*Notes.* Three different models (ACE, CE and AE) were run for each variable. The results for the best-fitting model for each variable are shown. This was the AE model in all cases. AIC is Akaike's information criterion (Akaike 1987) and RMSEA is the root mean square error of approximation (Neale et al. 2003).

**Table 4.** Effects of Sex on Individuals' Networking Propensities for Individuals with and without Four Years of Higher Education

	Brokering		Sociability	
	Higher Ed		Higher Ed	
	Yes	No	Yes	No
Age	.004 (.008)	.001 (.004)	.007 (.007)	.014*** (.003)
Zygoty (MZ=1)	.101 (.184)	-.021 (.069)	.058 (.168)	.071 (.060)
Sex (Men=1)	.043 (.243)	.430* (.214)	-.548* (.246)	-.281 <sup>†</sup> (.154)
Constant	2.812*** (.476)	3.091*** (.260)	2.895*** (.488)	2.470*** (.225)
N	164	1426	163	1408

Notes. <sup>†</sup>p < 0.10 ; \* p < 0.05 ; \*\* p < 0.01; \*\*\* p < 0.001, two-tailed; Standard errors in parentheses.

**Table 5.** Effects of Sex on Individuals' Networking Propensities for Entrepreneurs and Non-Entrepreneurs

	Brokering		Sociability	
	Entrepreneurs	Non-entrepreneurs	Entrepreneurs	Non-entrepreneurs
Age	-.005 (.004)	-.000 (.002)	.002 (.004)	.008*** (.002)
Zygoty (MZ=1)	.028 (.084)	.005 (.056)	.100 (.078)	.033 (.047)
Sex (Men=1)	.097 (.131)	.281** (.114)	-.335*** (.121)	-.268*** (.090)
Constant	3.884*** (.240)	3.070*** (.129)	3.371*** (.223)	2.906*** (.116)
N	733	2316	727	2297

Notes: \*  $p < 0.10$ ; \*\*  $p < 0.05$ ; \*\*\*  $p < 0.01$ , two-tailed; Standard errors in parentheses.