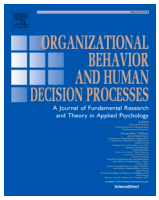
Organizational Behavior and Human Decision Processes 185 (2024) 104376

Contents lists available at ScienceDirect

Organizational Behavior and Human Decision Processes

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



Joining disconnected others reduces social identity threat in women brokers

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ARTICLE INFO

Keywords:
Brokerage
Social networks
Gender stereotypes
Creativity

ABSTRACT

This article examines gender differences in social network brokerage. We theorize that whether women brokers experience social identity threat with downstream consequences for their creative performance depends on whether they use a separation (intermediating between network members) or a joining (bringing disconnected network members together) approach. Using a survey (Study 1), a pilot field study and an experiment (Study 2), and another experiment (Study 3), we demonstrate the following, respectively: (1) there are stereotypes favoring men in separation brokerage and stereotypes favoring women in joining brokerage; (2) women (vs. men) who take a separation approach to brokerage experience reduced creative self-efficacy, whereas no gender difference emerges among individuals who undertake a joining approach; and (3) women (vs. men) experience greater social identity threat when undertaking separation brokerage, with fear of backlash mediating the link between gender, creative self-efficacy and creative performance, whereas no gender difference emerges among individuals who undertake a joining approach to brokerage.

1. Introduction

Brokerage, the act of bridging disconnected individuals and groups, is an important source of creative ideas (Burt, 2004; Hargadon & Sutton, 1997; Lingo & O'Mahony, 2010; Zou & Ingram, 2013), in-role performance (Burt, 1992), and entrepreneurship (Burt, 2019). Despite these documented benefits, however, occupying a brokerage position within a network may entail disadvantages for women because brokerage structures are male-typed, meaning they are associated with the stereotypically male characteristics of control, action-orientation, and entrepreneurial agency (Brands & Kilduff, 2014). As such, women are presumed to be less effective as brokers than men (Brands & Mehra, 2019). One of the pernicious consequences of these gender stereotypes is that they can be self-fulfilling. When a situational cue signals to individuals that they could be devalued because of one of their group memberships—in this case, gender—individuals experience social identity threat (Murphy, Steele, & Gross, 2007; Steele et al., 2002). Whether experienced consciously or non-consciously, this sense of threat triggers a range of cognitive and emotional consequences, which in turn have the potential to undermine individuals' performance in the domain (Schmader et al., 2008; Shapiro, 2011; Steele et al., 2002). For women, the situational cue is the brokerage structure itself: women who recognize themselves as being the only point of contact between their network members experience concern that their actions may confirm negative performance stereotypes about women brokers, which ultimately undermines their performance (Brands & Mehra, 2019).

Despite evidence that stereotypes *could* hamper women's performance as brokers, the empirical evidence that these stereotypes *do* hamper performance is mixed (as documented in a recent review by Woehler et al., 2021). One potential explanation for these mixed findings is that prior work has predominately invoked the structural perspective on social networks, according to which network actors hold static positions that explain not only their actions, but also the outcomes of these actions (Stevenson & Greenberg, 2000; Tasselli & Kilduff, 2021). What the structural perspective often neglects, however, is that individuals are not passive occupants of social network roles, but engage in purposeful actions to build connections and change their social networks (Tasselli & Kilduff, 2021). Indeed, such actions are essential for extracting value from brokerage positions (e.g., Soda et al., 2018). In the realm of brokerage, this network agency perspective highlights two distinct forms of brokerage: one that maintains and exploits disconnections between network members (i.e., separation brokerage, also known as *tertius separans* brokerage; Burt, 2021, p. 28) and one that brings disconnected people together, making them aware of each other's

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https://doi.org/10.1016/j.obhdp.2024.104376
Received 15 August 2022; Received in revised form 19 August 2024; Accepted 28 September 2024
Available online 16 October 2024

ideas and interests and synthesizing them in creative ways (i.e., joining brokerage, also known as *tertius iungens* brokerage; Burt, 2004; Lingo & O'Mahony, 2010; Obstfeld, 2005; Simmel, 1950; Soda et al., 2018).

The distinction between separation and joining approaches to brokerage has the potential to provide fresh insights into the puzzle of gender differences in brokerage outcomes. Separation brokerage is likely to be male-typed because it mirrors the classic conceptualization of structural brokerage wherein the broker acts as the sole point of connection between disconnected parties. Joining brokerage, however, can be seen differently. Joining brokers foster greater interdependence with their network members by forging connections between the people around them (Lingo & O'Mahony, 2010; Obstfeld, 2005; Soda et al., 2018). A joining approach to brokerage may thus resonate with female gender stereotypes that associate women with communal traits and behaviors such as seeking interdependence (Eagly & Mladinic, 1989; Eagly & Steffen, 1984; Ellemers, 2018). If this is the case, a joining approach would create a context for brokerage that is identity-safe for women—that is, one in which the situational cue that triggers social identity threat is altered or removed (Spencer et al., 2016). Consequently, joining brokerage may mitigate the social identity threat that women experience as brokers by offering an approach to brokerage that adheres to female gender stereotypes, which in turn could entail positive downstream consequences for their performance. This is the promising possibility that we examine in this research.

Our overall conceptual model is presented in Fig. 1. We focus on the performance domain of creativity, defined as the generation of novel and useful ideas (Amabile, 1983). The ability to come up with novel and useful ideas is not only a key outcome of brokerage and one of the main advantages that brokers have been shown to enjoy (Burt, 2004; Fleming et al., 2007; Flipo et al., 2023; Lingo & O'Mahony, 2010), but also the source of many other benefits usually associated with brokerage, such as career progression, project effectiveness, and entrepreneurial success (Burt, 2004, 2019; Lee & Gargiulo, 2022; Lingo & O'Mahony, 2010).

In Study 1, we examine the gender stereotypes associated with the separation and joining approaches to brokerage, respectively. Next, we explore the consequences of these gender stereotypes. In Study 2, we examine whether gender differences in creative self-efficacy arise from different brokerage approaches in an experiment, accompanied by a field-based pilot study that also explores the downstream consequences on creativity. Finally, in Study 3, we conduct an experiment scrutinizing the entire causal chain. Specifically, we investigate whether brokerage approach differentially affects women's versus men's experience of social identity threat, producing downstream consequences for women's self-efficacy, and ultimately, their creative performance.[1] Our novel theoretical approach highlights that gender differences in perceived social identity threat are not inherent in structural holes, but rather are contingent upon women's and men's differing approaches to brokering across those holes.

2. Gender stereotypes about brokerage approaches

Women who attempt to capitalize on their brokerage positions may be hindered by two interrelated gender stereotypes. First, there is a descriptive stereotype that associates brokerage roles with men: although women are less likely than men to occupy bridging positions in their networks (Fang et al., 2020), people tend to exaggerate the extent to which this is true (Brands & Kilduff, 2014). Additionally, there is a performance stereotype that favors men as brokers: people tend to assume that men will perform better than women in disconnected network structures (Brands & Mehra, 2019).

As noted, extant work has relied on a structural view of brokerage, in which brokerage is defined by the absence of ties among the contacts of a focal individual, the broker (Burt, 1992). The descriptive and performance stereotypes of brokerage have been examined through this structural perspective. For instance, Brands and Kilduff (2014) provide evidence of the descriptive gender stereotype about brokerage by comparing individuals' "mental maps" of the degree to which women (vs. men) span structural holes in their network to the extent to which they do so in reality. Likewise, Brands and Mehra (2019) provide evidence of a performance stereotype by showing individuals a triad in which a focal person connects two others who themselves are unconnected, then asking those individuals whether women or men would perform better in this network structure. Inherent in this prior work is the assumption that being a broker is about maintaining separation between two unconnected contacts and acting as a bridge between them.

Recently, however, network scholars have moved beyond the structural view of brokerage to focus on how brokers use their networks to achieve their goals (Khattab et al., 2020; Obstfeld, 2005; Obstfeld et al., 2014; Soda et al., 2018)—that is, *how* brokers broker (Quintane & Carnabuci, 2016). There are two main approaches that brokers can adopt in any given triad: they can either keep their contacts separated or they can bring them together (Obstfeld, 2005; Simmel, 1950). We propose that just as the structure of brokerage is gender-typed (Brands & Kilduff, 2014), so too are these predominant behavioral approaches to brokerage. We build this proposition on the notion that gender is a social identity (Ridgeway & Correll, 2004), meaning that individuals hold stereotyped expectations about women's and men's social roles and typical behaviors (Bem, 1981; Eagly & Steffen, 1984). On this basis, we theorize that separation and joining approaches to brokering, like many social behaviors, are likely to be gender-typed (i.e., they will differ in the degree to which they are seen as stereotypically feminine or masculine).

We first consider the gender-typing of joining brokerage. Although brokerage structures offer individuals the opportunity to exercise agency over their network members through control and influence (i.e., separation), a joining approach suggests an alternative, communal way to enact brokerage. Communality is defined as striving to integrate the self into a larger social group by focusing on others, building interdependence, and being cooperative and trustworthy (Abele & Wojciszke, 2007). Individuals who engage in joining brokerage put collective interests ahead of their own by sharing the benefits of brokerage with others in their network (Quintane & Carnabuci, 2016; Soda et al., 2018). Indeed, in making connections between network members, individuals proactively give up their structural power as brokers to create more interdependent relationships and to achieve shared goals (Lingo & O'Mahony, 2010). Social groups are typified by interconnected networks between their members (Ibarra et al., 2005). Thus, individuals who forge connections between network members can be seen as seeking to create a larger social group of which they are members. These characterizations of joining brokerage overlap with feminine gender stereotypes which similarly associate women with communal traits and behaviors (Eagly & Mladinic, 1989; Eagly & Steffen, 1984; Ellemers, 2018). Hence, we hypothesize that individuals will see joining brokerage as more typical of women than men.

Hypothesis 1a. *There is a descriptive gender stereotype associated with joining brokerage, such that individuals expect that women are more likely than men to engage in joining brokerage.*

In contrast to joining brokerage, we theorize that separation brokerage is stereotypically masculine. Existing work on gender and brokerage has found that because disconnected networks provide brokers with opportunities to influence and control their network members, individuals associate these brokerage structures with men rather than women (Brands & Kilduff, 2014; Brands et al., 2015). We build on this prior work to suggest that it is not only occupying brokerage positions that is seen as stereotypically masculine, but also the separation behavior itself that is assumed to be enacted by individuals in these positions. Separation brokerage emphasizes the strategies usually associated with brokerage in the existing literature, such as controlling

[1] Three additional studies that were in the original submission but replaced during the review process can be found at: https://osf.io/56fdx/.

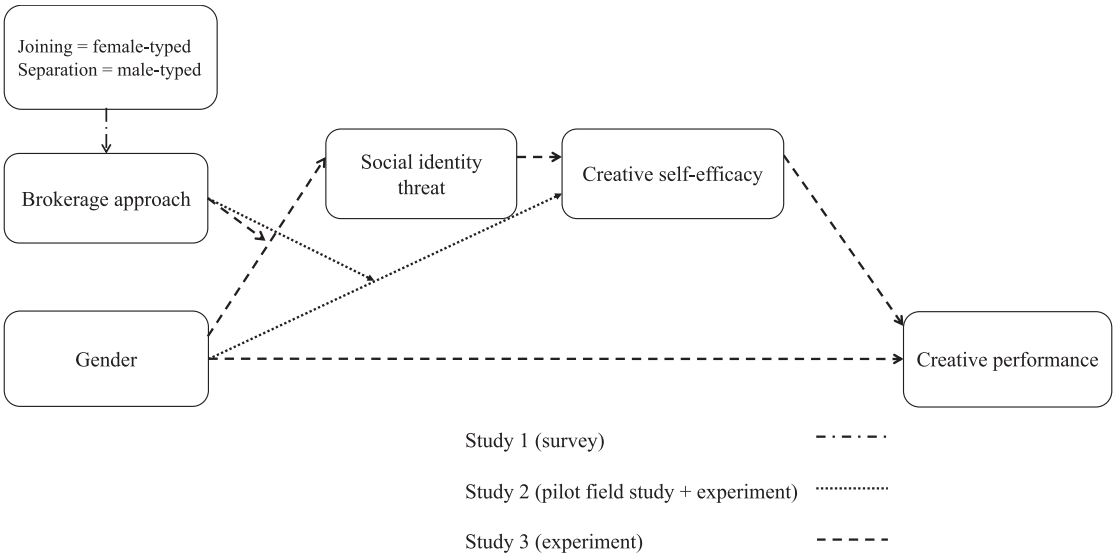


Fig. 1. Overall Model.

interactions and knowledge sharing between individuals, playing unconnected individuals off of one another, and exploiting conflict or misunderstanding between network members (see Burt, 1992, p. 30 for a discussion). These behaviors fall into the category of *agency*, defined as striving to individuate and expand the self through instrumentality, dominance, and independence (Abele & Wojciszke, 2007). Agency is one of the key dimensions on which gender stereotypes differentiate between men and women, with agency being stereotypically associated with men rather than women (Eagly & Steffen, 1984; Glick et al., 1995). Thus, we hypothesize that individuals will see separation brokerage as more typical of men than women.

Hypothesis 1b. *There is a descriptive gender stereotype associated with separation brokerage, such that individuals expect that men are more likely than women to engage in separation brokerage.*

We theorize that the links between these two different brokerage approaches and gendered dimensions of social behavior give rise to stereotyped expectations about the relative ability of women versus men to use these approaches. Given that joining brokerage requires individuals to be communal, and to therefore behave in stereotypically feminine ways, it is likely that individuals will assume women are better suited to this style of brokerage than men. Consequently, they will assume that women perform more highly than men when they take a joining approach. By the same token, separation brokerage requires individuals to behave in agentic and therefore stereotypically masculine ways. It is thus likely that individuals will assume that men are better suited to separation brokerage than women and that they will perform more highly than women when they take this approach. Accordingly, we hypothesize:

Hypothesis 1c. *There is a performance gender stereotype associated with joining brokerage, such that individuals expect that women will perform more highly than men when they undertake joining brokerage.*

Hypothesis 1d. *There is a performance gender stereotype associated with separation brokerage, such that individuals expect that men will perform more highly than women when they undertake separation brokerage.*

3. Social identity threat, brokerage approach, and performance

When people believe they may be treated negatively or devalued in a particular setting because they belong to certain social groups, they experience a social identity threat (Abrams & Hogg, 1999; Murphy et al., 2007). The performance-depleting effects of social identity threat may arise via two interrelated processes (summarized in Table 1). The first, known as stereotype threat, is the concern felt by individuals that their actions could inadvertently *confirm* negative, stereotype-based expectations for their performance (Shapiro, 2011; Spencer et al., 2016). Stereotype threat, whether consciously or non-consciously experienced, has been shown to undermine the performance of individuals who experience it in a range of performance domains. It is particularly acute in domains involving complex and novel tasks, such as creativity, due to the cognitive and emotional load that this threat places on individuals (Schmader et al., 2008; Spencer et al., 2016). This well-documented phenomenon can have negative consequences for women brokers. For example, women who recognize that they bridge structural holes in their surrounding networks have been shown to experience heightened anxiety, which ultimately undermines their performance on intellectual tasks (Brands & Mehra, 2019).

A second, related process of social identity threat, known as fear of backlash, occurs when individuals feel concern about the penalties that they might incur for *violating* gender stereotypes by engaging in counter-stereotypic behavior (Lindeman et al., 2019; Rudman & Fairchild, 2004; Rudman et al., 2012). The qualities we ascribe to women and men also tend to be prescribed (Prentice & Carranza, 2002), as evidenced by the fact that individuals are punished and devalued when they engage in

Table 1
Summary of Brokerage Stereotypes, Their Corresponding Social Identity Threats, and Their Associated Measures.

Type of Stereotype About Brokerage Approaches	Type of Social Identity Threat Provoked by the Stereotype	Social Identity Threat Measure
Performance stereotype i.e., whether women or men will perform more highly using joining or separation brokerage.	Stereotype threat Concern felt by individuals that their actions could inadvertently *confirm* negative expectations for their performance.	• Directly via explicit stereotype threat measure (adapated from Steele & Aronson, 1995). • Indirectly via anxiety measure (Brands & Mehra, 2019).
Descriptive & prescriptive stereotypes i.e., whether joining and separation brokerage are seen as more typical of, and more appropriate for, women vs. men.	Fear of backlash Concern felt by individuals about the penalties they might incur for *violating* gender stereotypes.	• Directly via fear of backlash measure (Rudman & Fairchild, 2004).

counter-stereotypic behaviors (e.g., Moss-Racusin et al., 2010). Since individuals are aware that they face sanctions for violating gender prescriptions, fear of backlash may occur when an individual is placed in a role (e.g., women leaders; Phelan & Rudman, 2010) or a situation (e.g., women in job interviews; Moss-Racusin & Rudman, 2010) which demands that they behave in counter-stereotypic ways. In such situations, individuals may modify their behavior to adhere to prevailing stereotypes, but in doing so, they may undermine their performance (Amanatullah & Morris, 2010; Moss-Racusin et al., 2010). Evidence suggests that women do incur penalties from others when they occupy brokerage roles (Brands & Kilduff, 2014); hence, fear of backlash may contribute to women's reluctance to engage in the purposeful networking needed to build broker networks (Fang et al., 2020; Greguletz et al., 2019).

In order for these social identity threat processes to occur, a situational cue must prompt individuals to consider their behavior in relation to prevailing stereotypes about one of their identities (Steele et al., 2002; Walton & Cohen, 2007). For women, the situational cue is the structural occupation of a brokerage role itself, which is male-typed (Brands & Mehra, 2019). Therefore, once a woman realizes that she occupies a brokerage position, the potential for stereotype threat (arising from the salience of negative performance stereotypes) and fear of backlash (arising from the salience of descriptive stereotypes) are activated. If she chooses to undertake separation brokerage and thus to maintain the brokerage structure, the status quo of social identity threat is maintained.

However, social identity threat is not inevitable. A body of evidence documents factors that attenuate social identity threat (for a review, see Spencer et al., 2016). First, the deleterious effects of stereotype threat on performance are ameliorated in identity-safe contexts, where the relevance of negative stereotypes is challenged. For example, stereotype threat can impair women's performance and ambition as leaders because the traits ascribed to leaders are stereotypical of men. However, when the validity of those stereotypes is explicitly challenged to women, these deficits are ameliorated (Davies et al., 2005). Second, individuals reduce performance deficits that derive from fear of backlash when they can both adhere to gender stereotypes *and* fulfill the demands of the situation or role. For instance, women experience fear of backlash during negotiations because the traits presumed to improve negotiation outcomes, such as dominance and assertiveness, are proscribed for women (Kray et al., 2001). However, women who negotiate on behalf of others, and who thus adhere to communal gender stereotypes, experience less fear of backlash, use more assertive negotiating tactics, and ultimately achieve better outcomes, relative to women who negotiate for themselves (Amanatullah & Morris, 2010).

We build on this prior work to suggest that when women take a joining approach to brokerage, they attenuate the social identity threat they would otherwise experience as brokers. If, as we theorize, there is a stereotype that women will perform more highly than men when they undertake joining brokerage, then this stereotype should challenge prevailing stereotypes of women as performing less well as brokers than men by reframing success in brokerage as dependent on the ability to deploy stereotypically feminine social behaviors, such as building relationships and forging consensus. Moreover, if joining brokerage is stereotyped as feminine, the joining approach should allow women to enact the brokerage role in a manner that reduces their concern that others will perceive them to be violating gender stereotypes – i.e., their fear of backlash. In other words, joining brokerage reduces social identity threat by creating an identity-safe environment for women to broker. We therefore expect that, relative to men, women will experience a reduction in social identity threat (and, specifically, in both stereotype threat and fear of backlash) when they undertake joining brokerage, with positive downstream consequences for their performance. In contrast, women (vs. men) who engage in separation brokerage are likely to experience social identity threat and ultimately, to encounter performance decrements normally associated with occupying a brokerage position.

3.1. The role of self-efficacy

We propose that domain-specific self-efficacy is the mechanism through which women's (vs. men's) experience of social identity threat affects their performance in joining versus separation brokerage. Self-efficacy is defined as a motivational state related to an individual's belief in their ability to execute the behaviors needed to perform highly (Bandura, 1977); domain-specific self-efficacy refers to that belief in a *specific performance domain* (Gardner & Pierce, 1998). We expect that women's domain-specific self-efficacy will be affected in all of the performance domains associated with brokerage, such as in-role performance (Burt, 1992), entrepreneurship (Burt, 2019), and creativity (Burt, 2004; Lingo & O'Mahony, 2010). Key to our logic is the insight that individuals understand brokerage as a social role (see Biddle, 1986) gained by experience and observation, which includes not only the prototypical occupants of brokerage roles (Brands & Kilduff, 2014) and the stereotypical skills required to be a broker (Brands & Mehra, 2019), but also expected performance domains. In particular, we build on prior work that shows that individuals readily observe the degree of interconnectedness around others[2] (Parkinson, Kleinbaum, & Wheatley, 2017) and, as a result, make attributions about their character and ability in various domains (Burt et al., 2021; Brands & Kilduff, 2014; Iorio, 2022; Leavitt, 1951). Thus, we theorize that when women experience a social identity threat as brokers, they will doubt their ability to execute the behaviors necessary to reap the benefits of brokerage across the range of performance domains associated with brokerage, including the domain we focus on, creativity.

We expect that women's creative self-efficacy—or their confidence in their ability to produce creative outcomes (Tierney & Farmer, 2002)—can be affected by social identity threat in the form of both stereotype threat and fear of backlash, and that whether it is affected or not depends on the approach they take to brokerage. First, research has shown that experience of stereotype threat reduces individuals' domain-specific self-efficacy (Chung et al., 2010). Hence, when women undertake a separation approach to brokerage and thus experience stereotype threat, they are also likely to experience lower creative self-efficacy relative to men. However, this gender difference in creative self-efficacy will be mitigated when individuals undertake a joining approach to brokerage because of reduced stereotype threat. Second, fear of backlash should also reduce creative self-efficacy because it reduces women's confidence in their ability to effectively take risks and experiment. Fear of backlash places individuals in assessment regulatory mode, meaning they are focused on caution and finding the right answer rather than on risk-taking and a trial-and-error approach (Moss-Racusin & Rudman, 2010). Since risk-taking and experimentation are central to the creativity domain (Amabile, 1983; Vera & Crossan, 2004), fear of backlash is likely to reduce creativity directly. However, individuals' awareness of their inhibited ability to engage in these behaviors which are essential to creativity will also, we theorize, reduce self-efficacy for creative tasks, with the reverse being true in situations where fear of backlash is reduced. Thus, we expect that the fear of backlash experienced by women undertaking a separation approach to brokerage will lead to lower creative self-efficacy relative to men, but that this gender difference will not be present among individuals undertaking a joining approach to brokerage. Creative self-efficacy, in turn, will foster individuals' creative performance by stimulating both cognitive flexibility and effort (Liu et al., 2016; Tierney & Farmer, 2002, 2011; Yong et al., 2020).

Hypothesis 2a. *Women* (vs. *men*) *who engage in separation brokerage will experience higher social identity threat; there will be no difference between women and men in social identity threat when they engage in joining brokerage.*

Hypothesis 2b. *Women* (vs. *men*) *who engage in separation brokerage will experience lower creative self-efficacy; there will be no difference*

[2] Albeit with varying degrees of accuracy (Brands, 2013).

between women and men in creative self-efficacy when they undertake joining brokerage.

Hypothesis 2c. *Among individuals who engage in separation brokerage (but not among individual who engage in joining brokerage), the relationship between gender and creative performance will be serially mediated by social identity threat and creative self-efficacy.*

Since we theorize that joining brokerage is female-typed, it could be expected that men who undertake this approach to brokerage might experience more social identity threat than women; yet we theorize that this will not be the case. In order for stereotype threat to occur, a situational cue must exist that raises the possibility that an individual could be judged through the lens of one of their group memberships (Murphy et al., 2007; Spencer et al., 2016; see also Walton & Cohen, 2007). For women, the situational cue is the structural occupation of a brokerage role itself, which is male-typed (Brands & Mehra, 2019). However, there is no parallel situational cue for men because the brokerage network structure itself is male-typed. Thus, we theorize that brokerage, regardless of approach, is an identity-safe domain for men. As a consequence, the relevance of gender stereotypes for women's superior performance as joining brokers is greatly reduced for men who undertake this style of brokerage. Moreover, the male-typing of the brokerage structure may also protect men from fear of backlash. Counter-stereotypical behavior (such as men engaging in joining brokerage) is often accepted if the individual is also seen to adhere to prescriptive gender stereotypes (Prentice & Carranza, 2002)—in this case, by occupying brokerage positions in the first place.

4. Study 1

The purpose of Study 1 was to confirm that there are descriptive and performance gender stereotypes associated with joining and separation brokerage. We preregistered this study: https://osf.io/wpzf9/?view_only = f1a21293acf4402cae11c3cb5f4575dc. All data and codes are available https://osf.io/56fdx/.

5. Method

5.1. Participants and design

We recruited participants for this study on Prolific Academic. The sample consisted of 332 working adults (162 women and 170 men; M_{age} = 37.21 years; SD = 11.00). A sensitivity analysis using G*Power (Faul et al., 2007) showed that, with power of B = 0.80, we would have sufficiently detected an effect size of d = 0.31.

5.2. Procedure

After providing informed consent, participants read a description of joining and separation brokerage. To construct the wording used to represent each type of brokerage, we carefully reviewed existing scales of separation and joining approaches and examined how they have been described in the extant research more broadly (e.g., Grosser et al., 2018; Lingo & O'Mahony, 2010; Obstfeld, 2005; Soda et al., 2018).[3] We built on these notions to create our manipulation of separation and joining brokerage. All participants read text describing the structural role of brokerage, separation brokerage, and joining brokerage. The text was accompanied by diagrams. The initial diagram, labeled "Maintain Separation," showed an open triad in which an individual (represented by a node labeled "broker") constituted the only bridge between the two other nodes, under which a second diagram appeared with the same triad. The following diagram was labeled "Make Introduction"; it showed the same open triad, followed by a second diagram in which the two other nodes were now connected by a line (see Fig. 2 for the full stimulus). After viewing these diagrams, individuals responded to the stereotype questions and filled out demographic information about themselves.

5.3. Gender stereotypes

Our hypotheses focused on descriptive and performance stereotypes. To capture descriptive stereotypes associated with joining brokerage, participants were asked to indicate whether they endorsed a gender stereotype on a 7-point bipolar scale: 1 = "Men are more likely than women to introduce their network members" to 7 = "Women are more likely than men to introduce their network members," with the midpoint of the scale (4) being "Men and women are equally likely to introduce their network members." The question was repeated for separation brokerage (1 = "Men are more likely than women to maintain separation between their network members" to 7 = "Women are more likely than men to maintain separation between their network members").

In order to test Hypotheses 1c and 1d, we captured a general performance stereotype for joining brokerage, by asking participants to indicate whether they endorsed a stereotype on a 7-point bipolar scale: 1 = "Men are more skilled at introducing their network members than women" to 7 = "Women are more skilled at introducing their network members than men," with the midpoint of the scale (4) being "Men and women are equally skilled at introducing their network members." The question was repeated for separation brokerage. Further, we asked whether participants endorsed a performance stereotype for both types of brokerage when the goal of the individual is to be creative or innovative, as well as whether participants endorsed a performance stereotype when the goal of the individual is to be efficient or to perform highly, in order to explore whether the performance stereotypes were domain-specific.

We also preregistered several exploratory research questions designed to capture the strength of gender stereotypes surrounding brokerage approaches. The first question addressed whether there were proscriptive and prescriptive gender stereotypes associated with joining and separation brokerage. To capture prescriptive gender stereotypes for both forms of brokerage, we asked whether it was more appropriate for men or women to engage in either form of brokerage, while to capture proscriptive gender stereotypes, we asked whether it was more improper for men or women to engage in either form of brokerage. All four questions used the same bipolar scale described above. Though individuals may not personally endorse a stereotype, they are still likely to be aware of its existence (Dasgupta et al., 2015). To explore this possibility, we asked individuals both about the extent to which they endorsed the stereotype and the extent to which they believed other people endorsed the stereotype.

6. Results

6.1. Hypothesis tests

Our first preregistered hypothesis (Hypothesis 1a) was that individuals would see joining brokerage as more typical of women than men. In a *t*-test conducted against the midpoint of the scale, we found support for this view (M = 4.43, SD = 1.41; $t_{(331)} = 5.53$, $p < 0.0001$, d = 0.30). We also found support for our prediction (Hypothesis 1b) that

[3] Separation was described as maintaining "active separation between two parties" (Obstfeld, 2005, p. 102), "keeping individuals apart" (Lingo & O'Mahony, 2010, p. 57), "recombining alters' knowledge resources in ways that directly benefit from alters being disconnected" (Soda et al., 2018, p. 897), and "intermediating the flow of information" (Quintane & Carnabuci, 2016, p. 1344). In contrast, joining was described as "connecting people" (Obstfeld, 2005, p. 102), "introducing people to each other" (Lingo & O'Mahony, 2010, p. 57), "actively and openly sharing information across structural hole(s)" (Soda et al., 2018, p. 897), and "facilitating a direct information exchange between the brokered parties" (Quintane & Carnabuci, 2016, p. 1344).

The diagrams below represent a common situation in which an individual connects people who are not connected to one another. In this situation, that person is the **broker** between their network members. *(Presented to all participants in Study 1 and Study 3.)*

In the workplace, it often makes sense for brokers to maintain the separation between network members, so that a relationship does not form between them (represented in the first diagram, "Maintain Separation"). By doing so, brokers benefit from meeting their network members separately and then recombining their insights. *(Presented to all participants in Study 1 and participants in the Study 3 separation condition.)*

At other times, it makes sense for brokers to introduce their network members, so that a relationship does form between them (represented in the second diagram, "Make Introduction"). By doing so, brokers benefit from meeting their network members together and then recombining their insights. *(Presented to all participants in Study 1 and participants in the Study 3 joining condition.)*

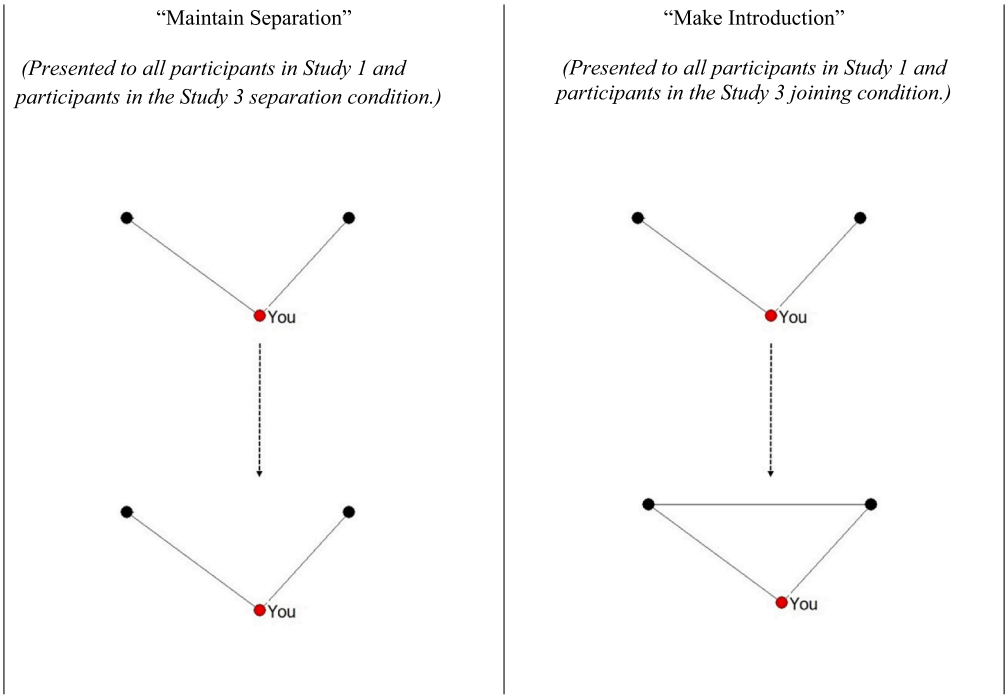


Fig. 2. Study 1 and Study 3 Stimulus.

individuals would see separation brokerage as more typical of men (M = 3.59, SD = 1.37; $t_{(330)} = -5.41$, $p < 0.0001$, $d = -0.30$). Thus, individuals endorsed descriptive gender stereotypes about joining and separation brokerage.

Next, we examined our preregistered hypothesis that individuals expect women to perform more highly than men when they undertake joining brokerage (Hypothesis 1c) and men to perform more highly than women when they undertake separation brokerage (Hypothesis 1d). We found support for a general performance gender stereotype favoring women for joining brokerage (M = 4.24, SD = 1.08; $t_{(330)} = 4.12$, $p < 0.0001$, $d = 0.23$) and for a performance stereotype favoring men for separation brokerage (M = 3.80, SD = 1.03; $t_{(330)} = -3.59$, $p < 0.001$, $d = -0.20$).

6.2. Exploratory analyses

We conducted several exploratory analyses that were preregistered. First, we examined whether there were prescriptive gender stereotypes associated with both forms of brokerage. We found that people see it as more appropriate for men to engage in separation brokerage than women (M = 3.92, SD = .56; $t_{(330)} = -2.77$, $p = 0.006$, $d = -0.15$), but that they see it as equally appropriate for men and women to engage in joining brokerage (M = 4.02, SD = .46; $t_{(331)} = 0.60$, *ns*, $d = 0.03$). We did not find evidence of a proscriptive gender stereotype for either joining (M = 3.98, SD = .63; $t_{(331)} = -0.70$, *ns*, $d = -0.04$) or separation (M = 4.02, SD = .60; $t_{(329)} = 0.46$, *ns*, $d = 0.03$) brokerage.

Additionally, we explored whether the performance stereotypes associated with separation and joining brokerage were domain-specific. We found that individuals endorsed these performance gender stereotypes when the goal was creativity and innovation, with individuals favoring women's creative performance for joining brokerage (M = 4.26, SD = 1.03; $t_{(331)} = 4.58$, $p < 0.0001$, $d = 0.25$) and men's creative performance for separation brokerage (M = 3.87, SD = 1.00; $t_{(330)} = -2.41$, $p = 0.02$, $d = -0.13$). We also found that individuals endorsed a performance gender stereotype when the goal was efficiency, favoring men in separation brokerage (M = 3.76, SD = .94; $t_{(330)} = -4.58$, $p < 0.0001$, $d = -0.25$). However, individuals tended to endorse the view that men and women performed equally highly when the goal was efficiency when joining their network members (M = 4.03, SD = 1.06; $t_{(331)} = 0.47$, *ns*, $d = 0.03$).

Finally, we explored whether women and men differed in the extent to which they endorsed these gender stereotypes, and found that they did not for all stereotypes we considered. We also explored whether individuals were more or less likely to endorse stereotypes when reflecting

on the views of others. We found that their perceived endorsement of stereotypes differed from the results described above when reflecting on the views of others in the following ways: (1) individuals endorsed a proscriptive stereotype for separation brokerage; (2) individuals did not endorse a general performance stereotype favoring women or men for either joining or separation brokerage; (3) individuals did not endorse a gendered performance stereotype for joining brokerage when the goal is to be creative; and (4) individuals did endorse a performance stereotype favoring men when joining network members to be efficient. Full results of these exploratory analyses are available at https://osf.io/56fdx/ under Study 1, supplementary Analyses.

7. Study 1 discussion

In line with our predictions, we found that joining brokerage was seen as more typical of women whereas separation brokerage was seen as more typical of men. We also found evidence of gendered performance stereotypes for joining and separation brokerage. Women were expected to outperform men as joining brokers in general and when the goal was to be creative, but not when the goal was efficiency. Men were expected to outperform women as separation brokers in general, when the goal was to be creative, and when the goal was efficiency.[4] Overall, the results suggest that the association between separation brokerage and masculinity is stronger than the association between joining brokerage and femininity, which lends support to our theory that brokerage may be an identity-safe domain for men.

We theorized that gendered performance stereotypes that favor men in separation brokerage provoke stereotype threat in women (but not men) who take this approach to brokerage—a gender difference that will not be observed among individuals who undertake joining brokerage, where performance stereotypes favor women. Likewise, because gender role descriptions are also prescriptive (Prentice & Carranza, 2002), we theorized that since men are seen as more typical separation brokers, women (but not men) will experience a fear of backlash when undertaking this style of brokerage, a gender difference that will not be observed among individuals undertaking joining brokerage (which is stereotypically feminine). The results of Study 1 lend support to these theoretical ideas: there is evidence for performance stereotypes favoring men as separation brokers and women as joining brokers, and for the fact that separation brokerage is seen as more typical of (and indeed appropriate for) men, while joining brokerage is seen as more typical of women.

8. Study 2

The purpose of Study 2 was to examine the consequences of gender stereotypes about brokerage approaches for women and men. We designed this study to test our hypothesis that women (vs. men) who undertake separation brokerage will report lower levels of creative self-efficacy (Hypothesis 2b). In Pilot Study 2, we ran a field-based pilot to test this Hypothesis in a real-world organization. This pilot study also allowed us to preliminarily test whether creative self-efficacy would mediate the effect of gender on creative performance for individuals who undertake separation brokerage. In the Main Study 2, we conducted a well-powered experimental test of Hypothesis 2b.

9. Pilot study

We conducted a field-based pilot study in a not-for-profit organization (NPO) that organizes mass-participation sports events in the UK. Full details about the sample, the measures, and the analyses are reported in the Online Appendix. The sample consisted of 60 people (76 % of the total employees in the organization). We collected data through two surveys, one for all employees and supervisors, and one just for supervisors.

Participants provided us with information about their gender (0 = man; 1 = woman), their brokerage approach ($\alpha = 0.90$), and their creative self-efficacy ($\alpha = 0.65$). We used a standard roster method to capture advice ties. We presented participants with a list of names of all the people in the organization and they were asked to indicate who they sought advice from. We then measured structural brokerage in the advice network using Burt's (1992) network constraint measure. Supervisors assessed their subordinates' creativity ($\alpha = 0.94$).

Women and men did not differ in terms of creative self-efficacy, B = −0.09, SE = .14, *ns,* $\beta = -0.08$. There was also no main effect of brokerage approach on creative self-efficacy, B = .14, SE = .07, *ns,* $\beta = 0.07$. As expected, we found a significant *gender* × *brokerage approach* interaction on creative self-efficacy, B = .31, SE = .15, p = 0.04, $\beta = 0.96$. Simple slopes analysis revealed that, among people who reported a greater propensity to engage in separation brokerage (a score of 1.8 or below on the brokerage approach scale), women had lower levels of creative self-efficacy than men, (B = −0.53, SE = .26, t = 2.06, p = 0.04). In contrast, there was no difference between women's and men's creative self-efficacy when they reported a greater propensity for engaging in joining brokerage (B = .19, SE = .18, t = 1.04, *ns*). These results provide preliminary support for Hypothesis 2b.

We explored the downstream performance consequences on creativity via a first-stage moderated mediation analysis, in which we tested the indirect effect of gender on creative performance via creative self-efficacy, conditional upon brokerage approach. We tested this using Mplus (Muthén & Muthén, 1998–2011). We found that creative self-efficacy was positively related to creative performance, B = .61, SE = .24, p = 0.02, $\beta = 0.30$. We examined the indirect effect of gender on creative performance via creative self-efficacy contingent on brokerage approach with a bootstrap sample of 10,000. We found that among individuals who reported a propensity to engage in separation brokerage, creative self-efficacy mediated the relationship between gender and creative performance, B = −0.32, SE = .23, 95 % CI[−0.92, −0.01]. In contrast, for individuals who reported a greater propensity to engage in joining brokerage, the indirect effect of gender on creative performance via creative self-efficacy was not significant, B = .13, SE = .14, 95 % CI [−0.05, 0.54]. The index of moderated mediation was reliably different from zero, B = .19, SE = .14, 95 % CI[.01, 0.56], providing further support for our Hypothesis 2b.

10. Main study 2

While our Pilot Study 2 provides an ecologically valid and generalizable test of our Hypothesis 2b in the field, it is based on a small sample of individuals. Moreover, because it was a correlational study, we cannot assert that brokerage approach causally affects women's versus men's creative self-efficacy. Our Main Study 2 addresses these shortcomings and provides a well-powered causal test of Hypothesis 2b. This Main Study was preregistered (https://osf.io/fxbae/?view_only = dea4b32afd344ceea238b7ec8f6cb35a). All data and codes can be accessed here: https://osf.io/56fdx/. We implemented a 2 (gender: woman vs. man) × 2 (brokerage approach: separation vs. joining) between-subjects design.

11. Methods

11.1. Participants and exclusion criteria

We initially recruited 1199 participants. According to our preregistered exclusion criteria, we dropped participants (a) who failed the attention check; (b) who took too much (time > Mean + 1 SD) or too

[4] We note, however, that except for stereotypes favouring men in separation brokerage in the specific performance domains of creativity and efficiency, the effect sizes for the other gender-brokerage approach stereotypes fell below those indicated in the sensitivity analysis, pointing to the need for replication work.

little (time < Mean − 1 SD) to complete the task; (c) whose response to the scenario was missing, gibberish, or read as if it was written by ChatGPT.[5] After applying these exclusion criteria, our sample consisted of 859 participants (M_{age} = 40.29, 500 women, 359 men). A sensitivity analysis using G*Power (Faul et al., 2007) showed that, with power of B = 0.80, we would have sufficiently detected an effect size of d = 0.19.

11.2. Procedure

Participants were tasked with generating creative product ideas by undertaking either a separation or a joining brokerage approach. After providing informed consent, participants completed the brokerage manipulation. Next, participants completed the creative self-efficacy measure specific to the task at hand, and they then provided demographic information.

11.3. Brokerage approach manipulation

All participants read the following text:

> Imagine that you work as a product designer at a leading furniture manufacturer. You have been asked to design a new sofa range for the company. Your goal is to design a range that will set a new trend in interior design and sell well – i.e., something that is seen as creative (both novel and useful) by customers. In order to succeed, you will need input from: (a) the sales and marketing department, which has information about what styles of furniture are popular; and (b) the supply chain department, which has information about costs and availability of different fabrics and material.
> Fortunately, you have friendly contacts in both departments with whom you regularly exchange advice – Quinn who works in sales and marketing, and Taylor who works in the supply chain department. Quinn and Taylor are not connected to one another (represented in the first diagram).

The second part of the text differed across the *separation* and *joining* conditions. Participants in the *separation* condition read:

> You decide that in this situation, it makes sense for you to maintain the separation between Quinn and Taylor so that a relationship does not form between them. By doing so, you will benefit from meeting with Quinn and Taylor separately and then recombining their insights alone to enhance the creativity of your designs. How will you achieve this? Please outline a plan for how you will work with Quinn and Taylor separately.

Participants in the *joining* condition instead read:

> You decide that in this situation, it makes sense for you to introduce Quinn and Taylor so that a relationship forms between them. By doing so, you will benefit from meeting with Quinn and Taylor together and combining their insights to enhance your creativity (represented in the second diagram). How will you achieve this? Please outline a plan for how you will work with Quinn and Taylor together.

The text was accompanied by diagrams like those we used in Study 1 (Fig. 3). In all conditions, the first diagram showed an open triad in which an individual (represented by a node labeled "you") was the only bridge between the two other nodes (labeled "Quinn" and "Taylor"). In the separation condition, the second diagram displayed the same triad, with Quinn and Taylor still disconnected. In the joining condition, the second diagram showed a close triad, with a connection having formed between Quinn and Taylor.

[5] We determined whether text looked suspicious and potentially authored by ChatGPT when (a) it was not written in the first person and (b) it had substantial textual similarity to other responses.

11.4. Creative self-efficacy

We used the scale developed by Tierney and Farmer (2002) to assess creative self-efficacy. The three items were: "I have confidence in my ability to solve problems creatively"; "I feel that I am good at generating novel ideas"; and "I have a knack for further developing others' ideas" (1 = strongly disagree; 5 = strongly agree; α = 0.86).

11.5. Manipulation check

We used three items to assess brokerage approach, (α = 0.90), using a 5-point Likert scale (1 = not at all; 5 = a great deal). The items asked participants to indicate the extent to which they: "Introduce two people when they might benefit from becoming acquainted"; "Introduce people who might have a common strategic work interest"; and "Forge connections between different people dealing with a particular issue." The items were drawn from Obstfeld's (2005) six-item measure. We reduced the scale to three items because our theory specifically focuses on actions that individuals take to join disconnected network members or maintain separation between them, and not on other behaviors captured in the scale such as issue framing and opportunity spotting. High scores represent a behavioral tendency to close structural holes in the surrounding network, whereas low scores represent a behavioral tendency to maintain structural holes in the surrounding network.[6]

12. Results

12.1. Manipulation check

Consistent with our expectations, participants assigned to the joining condition (M = 4.59, SD = .49) reported a greater propensity to join others than participants assigned to the separation condition (M = 1.89, SD = .88; $t_{(857)} = 55.25$, $p < 0.001$).

12.2. Main analysis

We conducted a 2 × 2 ANOVA to test Hypothesis 2b. The interaction term was significant, $F_{(1,855)} = 4.08$, $p = 0.04$; partial $\eta^2 = 0.005$. Planned contrast analyses with Sidak correction revealed that, among individuals in the separation condition, women (M = 3.71, SD = .85) displayed significantly lower self-efficacy than men (M = 3.98, SD = .71; $t_{(427)} = -3.37$, $p = 0.005$; $d = 0.35$). This gender difference was not present among individuals in the joining condition ($M_{women} = 3.81$, $SD_{women} = 0.90$; $M_{men} = 3.85$, $SD_{men} = 0.84$; $t_{(428)} = -0.54$, $p = 0.995$; $d = 0.05$). Overall, these results provide robust support for Hypothesis 2b.

12.3. Results without excluding participants

Results from planned contrasts analyses with Sidak correction were virtually identical to those presented above even when including all participants excluded for the reasons we listed. Among individuals in the separation condition, women displayed significantly lower self-efficacy than men ($M_{women} = 3.69$, $SD_{women} = 0.86$; $M_{men} = 3.94$, $SD_{men} = 0.72$; $t(573) = -3.47$, $p = 0.003$; $d = 0.30$). This gender difference was instead not present among individuals in the joining condition (M_{women}

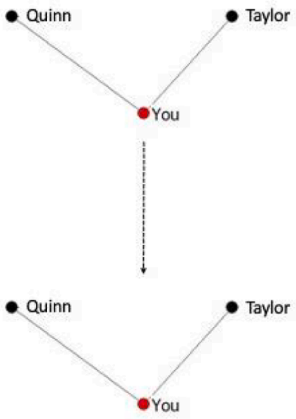
[6] These behavioral tendencies could be representative of a strategic orientation toward closing holes or maintaining separation. However, it could also be that a high score represents a lack of active separation, while low scores represent a lack of active joining. This difference is not material to the current investigation because the gender stereotypes concern the behavior, not the intention that underlies the behavior. Thus, our measure captures individuals' self-report of the extent to which they engage in a gender normative (or counter-normative) brokerage behavior and, accordingly, their susceptibility to social identity threat.

Imagine that you work as a product designer at a leading furniture manufacturer. You have been asked to design a new sofa range for the company. Your goal is to design a range that will set a new trend in interior design and sell well - i.e., something that is seen as **creative** (both novel and useful) by customers. In order to succeed, you will need input from: (a) the sales and marketing department, which has information about what styles of furniture are popular; and (b) the supply chain department, which has information about costs and availability of different fabrics and material.

"Maintain Separation"

Fortunately, you have friendly contacts in both departments with whom you regularly exchange advice - Quinn who works in sales and marketing, and Taylor who works in the supply chain department. Quinn and Taylor are not connected to one another (represented in the first diagram below). You decide that in this situation, it makes sense for you to maintain the separation between Quinn and Taylor so that a relationship does not form between them. By doing so, you will benefit from meeting with Quinn and Taylor separately and and then recombining their insights alone to enhance the creativity of your designs.

How will you achieve this? Please outline a plan for how you will work with Quinn and Taylor separately.



"Make Introduction"

Fortunately, you have friendly contacts in both departments with whom you regularly exchange advice - Quinn who works in sales and marketing, and Taylor who works in the supply chain department. Quinn and Taylor are not connected to one another (represented in the first diagram). You decide that in this situation, it makes sense for you to introduce Quinn and Taylor so that a relationship forms between them. By doing so, you will benefit from meeting with Quinn and Taylor together and combining their insights to enhance your creativity (represented in the second diagram).

How will you achieve this? Please outline a plan for how you will work with Quinn and Taylor together.

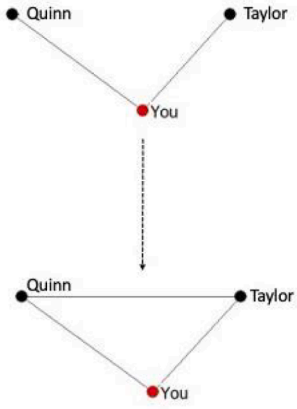


Fig. 3. Study 2 Stimulus.

$= 3.77$, $SD_{women} = 0.90$; $M_{men} = 3.91$, $SD_{men} = 0.78$; $t(608) = -2.02$, $p = 0.236$; $d = 0.16$).

13. Study 2 discussion

Study 2 found that, as expected, gender differences in creative self-efficacy only emerged among individuals who said they adopted a separation approach to brokerage. Among individuals who adopted a joining approach to brokerage, there were no gender differences in creative self-efficacy. We found evidence for this pattern in a field-based pilot and replicated it in a preregistered experimental scenario study. In the pilot, we also found that creative self-efficacy mediated the relationship between gender and creative performance in individuals who adopted a separation approach to brokerage, but not among individuals who adopted a joining approach to brokerage.

14. Study 3

Study 2 provided tentative evidence from a real-world organization, and strong causal evidence from an experiment, that whereas a separation approach to brokerage results in gender differences in creative self-efficacy, these gender differences are not evident among individuals who undertake a joining approach. Although we theorize that the lack of gender differences in the latter case emerges because joining brokerage reduces the social identity threat women otherwise experience in brokerage structures, we did not test this mechanism explicitly. Accordingly, we designed an experiment that would demonstrate the entire causal chain, in which individuals were asked to reflect on deliberate instances of either separation or joining brokerage (Hypotheses 2c and 2d).

15. Method

We preregistered our experiment: https://osf.io/aejxt/?view_only = 61f657d328b44f3a922e9669f2b9223b.[7] All data and code are available at: https://osf.io/56fdx/.

15.1. Participants and design

We recruited 800 working adults. We excluded three individuals who did not identify as a woman or a man as well as those participants who returned nonsense, gibberish, or irrelevant responses to the written portions of our experiment, in accordance with our preregistered exclusion criteria. This selection yielded a final sample of 773 individuals (336 men, 437 women; $M_{age} = 35.71$ years; $SD_{age} = 10.58$).[8] The study used a 2 (gender: woman vs. man) × 2 (brokerage approach: separation vs. joining) between-subjects design. A sensitivity analysis using G*Power showed that, with power of B = 0.80, we would have sufficiently detected an effect size of d = 0.24.

15.2. Procedure

After providing informed consent, participants completed the brokerage manipulation. Next, they completed three measures of social identity threat, followed by a measure of creative self-efficacy. Then, participants undertook a creativity task, adapted from Goncalo et al. (2015), which consisted of generating creative ideas for a space at a UK university. Creative ideas were defined as ideas that are both novel and useful (Amabile, 1982, 1983). We asked participants to generate creative ideas for the space and then to select the idea that they deemed to be most creative. At the conclusion of the experiment, participants provided demographic information.

15.3. Brokerage manipulation

We used a similar procedure as in Study 1. All participants in the brokerage conditions read the same initial paragraph used in Study 1. The second part of the manipulation differed across the *separation* and *joining* conditions. Participants in the *separation* condition read about separation brokerage and saw the "Maintain Separation" diagram used in Study 1. Participants in the joining condition read about joining brokerage and saw the "Make Introduction" diagram used in Study 1 (refer back to Fig. 2 for the full manipulation).

Following the stimulus, participants in the joining condition were asked to think about a time when they were the broker and introduced their network members to each other. They were asked to describe the situation in detail, focusing on why they did this, what came out of it, and how it made them feel. Participants in the separation condition were asked to do the same task but to think about a time when they maintained separation between their network members. Please see the Online Appendix for a description of our manipulation development.

15.4. Social identity threat

We used three measures of social identity threat, two of which measured stereotype threat and one of which measured fear of backlash. All three measures asked participants to reflect on the interaction they had just described.

The first measure was explicit stereotype threat, consisting of three items: "How much did you worry that the people you interacted with might draw conclusions about you based on what they think about your gender?"; "How much do you think your gender affects people's impressions of your ability during the interaction you described?"; and "How much do you think you face biased evaluations in the interaction you described because of your gender?" (1 = not at all; 5 = a lot; α = 0.87; adapated from Georgeac & Rattan, 2023; Rattan et al., 2018).

Individuals can experience stereotype threat even if they are not explicitly aware of it (Kulik et al., 2016). In such cases, stereotype threat is often felt as anxiety (Ben-Zeev et al., 2005; Brands & Mehra, 2019), which constituted our second measure of stereotype threat. Participants were asked to indicate the degree to which they felt agitated, anxious, nervous, uneasy, and worried in relation to the interaction they described (1 = not at all; 5 = a lot; α = 0.92).

We used one measure of fear of backlash (Rudman & Fairchild, 2004). Participants were asked: "Would you worry about being labeled negatively?"; "Would you be afraid that others would think you were odd?"; "Would your friends be likely to negatively tease you?"; and "Would you be afraid that you might be disliked?" (1 = not at all; 5 = a lot; α = 0.89). As expected, all three measures were highly correlated: explicit stereotype threat and anxiety, $r = 0.43$, $p < 0.0001$; explicit stereotype threat and fear of backlash, $r = 0.46$, $p < 0.0001$; and anxiety and fear of backlash, $r = 0.59$, $p < 0.001$.

15.5. Creative self-efficacy

We used the same scale used in Study 2 (Tierney & Farmer, 2002) to measure creative self-efficacy (α = 0.86).

15.6. Creative performance

Creative performance was assessed using the consensual assessment technique (Amabile, 1982). Two research assistants, blind to the experimental conditions and the gender of the participants, served as the judges. The judges rated, on a scale from 1 to 7, the overall novelty and usefulness of the ideas that participants had selected as their best ideas for the space.[9] The questions were framed as "Please indicate the degree to which the following idea is…." Judges used two items to rate novelty ("novel" and "original") and two items to rate usefulness ("useful" and "practical"). We assessed interrater reliability using Cohen's (1960) weighted kappa, which is more appropriate for ordinal variables (Bakeman & Gottman, 1997). The average kappa for the two novelty items was 0.78, and the average kappa for the two usefulness items was 0.65. Both are above the threshold of 0.61 generally accepted as a good level of overall agreement (Kvålseth, 1989). We thus averaged the two judges' ratings to obtain two aggregate items for novelty and two for usefulness. The Cronbach's alpha was 0.99 for novelty and 0.97 for usefulness, and 0.89 for overall creativity. We thus aggregated all four items to create our measure of creativity.

16. Results

Means, standard deviations, and correlations appear in Table 2. Hypothesis 2a predicted a significant interaction between gender and brokerage condition, such that women assigned to the separation

[7] There are two differences between our preregistration and what we present here. Our preregistered hypothesis focused on a within-gender comparison across brokerage conditions. Acting on the guidance of the editorial team, we shifted our focus to an across-gender, within brokerage condition comparison. Statistically, the test for a significant gender x brokerage approach on the mediators is equivalent in both hypotheses, but the mediation analyses differ. Second, in our preregistration we refer to all three measures as measures of stereotype threat. Again, acting on the guidance of an anonymous reviewer, we now refer to these as measures of social identity threat.

[8] We used Prolific Academic's balanced sample option to recruit an equal number of women and men; this function failed. To ensure that the unequal sample size of women and men did not bias our analysis, we conducted a chi-square test of independence to ensure that they were randomly assigned to brokerage conditions. The results show no evidence of an association between gender and assignment to brokerage condition ($X^2(1) > = 0.04$, $p = 0.84$).

[9] Following the consensual assessment technique protocol, the judges also rated each idea on other unrelated dimensions (e.g., potential cost).

brokerage condition would experience more social identity threat relative to men. Hypothesis 2c predicted that social identity threat and creative self-efficacy would serially mediate the relationship between gender and creative performance among individuals who engage in separation brokerage, but not among individuals who engage in joining brokerage. Statistically, this theorization represents a first-stage moderated mediation model in which the effect of gender on creativity, via social identity threat and creative self-efficacy, depends on brokerage approach (see Fig. 4 for the full model). We used Mplus to conduct three separate analyses (Table 3), one for each measure.

First, we examined explicit stereotype threat. As can be seen in Model 1, there was a significant interaction between brokerage approach and gender on explicit stereotype threat, B = −0.33, SE = .11, p = 0.004, partial η^2 = 0.01 (see Fig. 5). As predicted in Hypothesis 2a, women in the separation condition (M = 1.71, SD = .90) experienced more stereotype threat than men in the separation condition (M = 1.35, SD = .65), B = .35, SE = .08, p < 0.0001, *d* = 0.80. In contrast, women (M = 1.44, SD = .75) and men (M = 1.37, SD = .63) reported the same degree of stereotype threat in the joining condition, B = .07, SE = .08, *ns,* *d* = 0.70. However, as can be seen in Model 4, individuals' experience of explicit stereotype threat did not affect their creative self-efficacy, B = −0.03, SE = .05, *ns* (although creative self-efficacy was positively related to creativity, B = .64, SE = .04, p < 0.001; Model 5). Likewise, the indirect effect of gender on creativity, via explicit stereotype threat and creative self-efficacy was not significant for separation 95 % CI [−0.03, 0.02] or joining brokerage 95 % CI[−0.01, 0.01]. Thus, Hypothesis 2c was not supported for explicit stereotype threat.

Next, we examined our indirect measure of stereotype threat, namely anxiety. As can be seen in Model 2, and supporting Hypothesis 2a, there was a significant interaction between brokerage approach and gender on anxiety, B = −0.25, SE = .10, p = 0.02, partial η^2 = 0.01 (see Fig. 5). Women in the separation condition (M = 1.70, SD = .90) experienced more anxiety than men in the separation condition (M = 1.45, SD = .67), B = .26, SE = .07, p < 0.001, *d* = 0.81. Contrastingly, women (M = 1.34, SD = .60) and men (M = 1.31, SD = .57) experienced the same degree of anxiety in the joining condition, B = .03, SE = .07, *ns, d* = 0.59. To the extent that individuals reported less anxiety, they experienced more creative self-efficacy, B = −0.10 SE = .05, p = 0.03 (Model 6), and creative self-efficacy, in turn, was positively related to creative performance, B = .64, SE = .04, p < 0.0001 (Model 7). However, the indirect effect of gender on creativity, via anxiety and creative self-efficacy, was not significant in either the separation condition B = −0.02, SE = .01, 95 % CI[−0.04, 0.004] or the joining condition, B = .00, SE = .00, 95 % CI[−0.01, 0.01]. Thus, Hypothesis 2c was not supported for implicit stereotype threat.

Finally, we examined fear of backlash. As can be seen in Model 3, and supporting Hypothesis 2a, there was a significant interaction between brokerage approach and gender on fear of backlash, B = −0.37, SE = .12, p = 0.001, partial η^2 = 0.01 (Fig. 5). As predicted, women in the separation condition (M = 1.86, SD = .94) experienced more fear of backlash than men in the separation condition (M = 1.55, SD = .73), B = .30, SE = .08, p < 0.001, *d* = 0.86. In contrast, women (M = 1.44, SD = .75) and men (M = 1.46 SD = .70) reported the same fear of backlash in the joining condition, B = −0.02, SE = .08, *ns,* d = 0.73. To the extent that individuals reported less fear of backlash, they experienced higher creative self-efficacy, B = −0.12, SE = .04, p = 0.005 (Model 8), creative self-efficacy, in turn, predicted higher creative performance, B = .64 SE = .04, p < 0.0001 (Model 9). The indirect effect of gender on creativity via fear of backlash and creative self-efficacy was significant in the separation condition, B = −0.02 SE = .01, p = 0.04, 95 % CI[−0.05, −0.004] but not in the joining condition, B = .01, SE = .01, 95 % CI [−0.01, 0.02]. This result means that fear of backlash and creative self-efficacy serially mediated the relationship between gender and creative performance among individuals assigned to the separation brokerage condition but not among individuals assigned to the joining brokerage condition. Hypothesis 2c was therefore supported for fear of backlash.

As in Study 2, we went beyond testing our mediation hypothesis to explore the total effect of *gender* × *brokerage approach* on creative performance. The gender × brokerage approach interaction on creativity was not significant, $F_{(1,773)}$ = 0.68, *ns*. Likewise, we did not find a significant interaction effect on creative self-efficacy, $F_{(1,773)}$ = 0.06, *ns,* thus Hypothesis 2b was not supported in Study 3. We comment on these results in the General Discussion.

17. Study 3 discussion

In line with our predictions, in Study 3, we found that women (vs. men) who were assigned to the separation brokerage condition reported higher social identity threat, and specifically more explicit and implicit stereotype threat and fear of backlash. However, it was only fear of backlash that mediated the link between gender, creative self-efficacy, and creative performance. In the joining brokerage condition, women's and men's respective experiences of social identity threat were equivalent. Crucially, the use of an experimental design allows us to assert that brokerage approach causes changes to women's experience of social identity threat and that the effects we found do not result from stereotyping (i.e., observers penalizing women's creative efforts).

Finally, on average, both women and men tended to disagree that they experienced social identity threat, be it in the form of stereotype threat, anxiety, or fear of backlash (i.e., the mean scores were below the midpoint of the scale). This evidence, coupled with our findings, is consistent with the oft-noted surreptitious nature of social identity threat: even if individuals disagree with a stereotype and reject the notion that they are worried about conforming or violating stereotypes, they are still susceptible to the threat-derived depleting effects on performance (Schmader et al., 2008). Moreover, our hypotheses concern the relative threat experienced by women relative to men. As evidenced by our results, any reduction in threat experienced by women who undertake joining brokerage has meaningful consequences for their experience and outcomes.

18. General discussion

In this paper, we sought to understand gender differences in brokerage by moving beyond an examination of brokerage structures to focus on the way individuals approach situations in which they are the only point of connection between two others. We found that there are gender stereotypes associated with separation and joining approaches to brokerage, with joining being seen as stereotypically feminine and separation as stereotypically masculine. Given these gendered expectations, the social identity threat that women often experience in brokerage structures can be mitigated if they adopt a joining rather than a separation approach, with downstream consequences for their self-efficacy and creative performance.

Our findings contribute to scholarship on gender and brokerage. Women have been shown to be less likely to build and benefit from brokerage networks (Fang et al., 2020). Prior research has highlighted that this disparity is partly due to the fact that brokerage networks are male-typed. Not only are women negatively stereotyped when they are in brokerage roles (Brands & Kilduff, 2014), but they are also aware of these stereotypes, which engenders a performance-depleting social identity threat in women when they recognize themselves as brokers in their networks (Brands & Mehra, 2019). However, research shows that threat-derived performance deficits are not always evident: some studies indicate that women are disadvantaged as brokers, whereas others document no gender differences (Woehler et al., 2021).

Our research provides insight into this puzzle by highlighting that whether gender differences emerge in returns to brokerage may be contingent upon how women approach brokerage. The implication for gender and brokerage research is that while brokerage structures are male-typed, approaches to brokerage vary in their gender-typing, meaning that there are some brokerage approaches that women can

Table 2
Study 3: Means, Standard Deviations & Correlations.

		Mean	SD	1	2	3	4	5	6
1	Creative performance	4.35	1.15						
2	Creative self-efficacy	3.49	0.92	0.49					
3	Explicit stereotype threat	1.48	0.76	−0.05	−0.02				
4	Anxiety	1.46	0.72	−0.04	−0.08	0.43			
5	Fear of backlash	1.58	0.81	−0.07	−0.11	0.45	0.59		
6	Brokerage approach	1.52	0.50	−0.02	0.02	−0.09	−0.19	−0.17	
7	Gender	1.57	0.50	−0.03	−0.10	0.14	0.10	0.08	−0.01

N = 773. Correlations > |.07| are significant at $p < 0.05$.
Gender: 1 = man, 2 = woman; Brokerage approach: 1 = separation, 2 = joining.

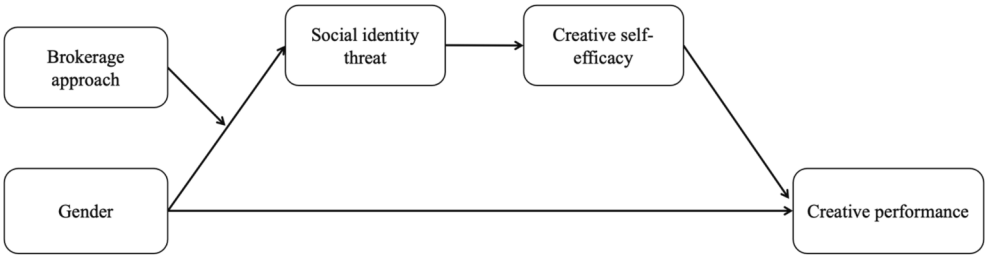


Fig. 4. Study 3: Moderated Mediation Model.

Table 3
Study 3: First-Stage Moderated Mediation of the Effect of Gender and Brokerage Approach on Creative Performance via Social Identity Threats and Creative Self-Efficacy.

	EST Model 1	Anxiety Model 2	Fear of backlash Model 3	CSE Model 4	Creativity Model 5	CSE Model 6	Creativity Model 7	CSE Model 8	Creativity Model 9
Intercept	0.64*	1.07***	0.95**	3.50***	1.73***	3.62***	1.62***	3.69***	1.70***
	(0.27)	(0.27)	(0.29)	(0.08)	(0.16)	(0.15)	(0.26)	(0.09)	(0.16)
Gender	0.68***	0.50**	0.68***	0.02	0.33	0.01	0.33*	−0.00	0.33
	(0.18)	(0.18)	(0.19)	(0.01)	(0.00)	(0.08)	(0.13)	(0.02)	(0.00)
Brokerage approach	0.37*	0.12	0.31†						
	(0.17)	(0.16)	(0.18)						
Brokerage approach × Gender	−0.33**	−0.25*	−0.37**						
	(0.11)	(0.10)	(0.12)						
EST				−0.03	−0.09				
				(0.05)	(0.05)				
Anxiety						−0.10*	−0.02		
						(0.05)	(0.06)		
Fear of backlash								−0.12**	−0.05
								(0.04)	(0.05)
CSE					0.64***		0.64****		0.64****
					(0.04)		(0.04)		(0.04)

N = 773. † $p < 0.10$, *$p < 0.05$, **$p < 0.01$ ***$p < 0.001$ ****$p < 0.0001$.
Unstandardized coefficients, standard errors in parenthesis.
EST = explicit stereotype threat; CSE = creative self-efficacy; Gender: 1 = man, 2 = woman; Brokerage approach: 1 = separation, 2 = joining.

adopt without violating gender stereotypes. It is notable that the presence of gender stereotypes favoring women in joining brokerage did not trigger social identity threat (either in the form of stereotype threat or fear of backlash) in men when they took this approach. As such, a joining approach to brokerage may represent a level playing field in which both women and men can avoid the experience of social identity threat and thus capture the performance returns of structural holes.

Our work also contributes to social networks research more broadly, and in particular, to the emerging literature that examines how brokers broker (Quintane & Carnabuci, 2016). Past work on brokerage behaviors has predominantly examined the contingent effects of brokerage structure on brokerage approach (Quintane & Carnabuci, 2016), as well as the contingent effect of brokerage approach on performance returns to brokerage structures (Soda et al., 2018). To date, this stream of work has theoretically overlooked gender, and empirically either treated it as a demographic control (e.g., Quintane & Carnabuci, 2016) or ignored it entirely (e.g., Lingo & O'Mahony, 2010; Obstfeld, 2005; Soda et al., 2018). In doing so, prior work implicitly assumes that gender is independent not only of how individuals choose to broker, but also of the consequences of choosing one approach over another. In this research, we issue a direct challenge to this idea. By showing the interplay of gender and brokerage approach on social identity threat, self-efficacy, and creative performance, our research contributes to a growing body of work (see Fang et al., 2020 for a *meta*-analysis) that demonstrates that a fully articulated theory of brokerage requires explicit consideration of the broker's gender (Brands et al., 2022).

Finally, this research contributes to work on social networks and creativity. Existing literature has argued that brokerage and creativity tend to go hand in hand because brokers are exposed to diverse information and perspectives (Burt, 1992, 2004). However, there is increasing evidence that individuals do not always accrue creative advantages from brokerage, due to various factors, such as differences in cognitive style

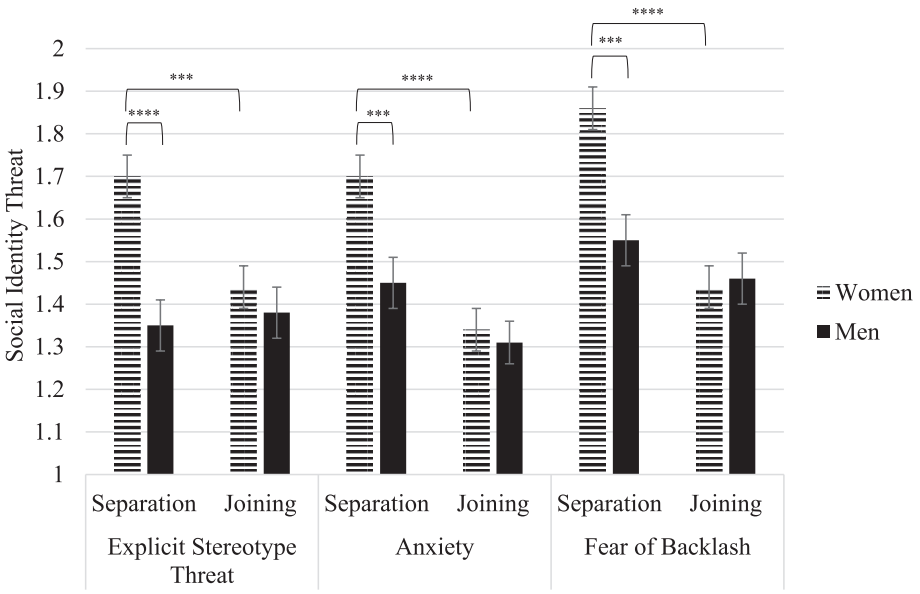


Fig. 5. Study 3: The Effect of Brokerage Condition on Women's Versus Men's Experience of Social Identity Threat. Note. N = 773.*** $p < 0.001$ **** $p < 0.0001$ Bars represent standard errors.

(Carnabuci & Diószegi, 2015), focus of attention (Rhee & Leonardi, 2018), or individuals' propensity to add new people to their social networks (Soda et al., 2021). We contribute to this research by moving beyond the dominant structural view of brokerage (see Perry-Smith & Mannucci, 2015 for a review) to focus on how individuals who occupy a brokerage position interpret and make use of this position. In pinpointing the crucial role of approaches to brokerage, we contribute to emergent scholarship showing that individuals' ability to accrue creative advantages from their networks is dependent on how they use these networks (Grosser et al., 2018; Mannucci & Perry-Smith, 2022; Rhee & Leonardi, 2018). We further contribute to this area of research by identifying creative self-efficacy as a novel mechanism through which brokerage leads to creativity (which we find evidence for in two of the three studies in which we tested it). The theorized creative benefits of brokerage usually hinge on the informational benefits that these network structures deliver (Burt, 2004). However, as we show, motivational mechanisms also play a role: the approach chosen by creative brokers can foster or diminish creative self-efficacy, depending on brokers' gender.

19. Limitations and directions for future research

A first limitation of our research lies in the external validity of our findings. While we did find preliminary support for our findings in a field study (Pilot Study 2), this study was based on a small sample of individuals. Future research should therefore conduct more robust field studies to assess whether our findings replicate in the field, and also assess whether there are differences across fields based on the type of creative work (Harrison, Rouse, Fisher, & Amabile, 2022) or the phase of the idea journey (Perry-Smith & Mannucci, 2017). For example, it could be that our effects play out differently when considering phases (like implementation) that inherently require more collaboration.

Another limitation of our research is the lack of consistent effects across studies. Specifically, although we found support for Hypothesis 2b in the pilot field study and in Study 2, and we found support for the serial mediation (Hypothesis 2c) with fear of backlash in Study 3, Hypothesis 2b was not supported in Study 3. We also found the total interactive effect of gender and brokerage approach on creative performance to be non-significant in Study 3. We speculate that these inconsistent effects in Study 3 may have arisen due to the experimental method we used, in which participants were asked to recall brokerage, rather than being put in or being in a brokerage position.

Notwithstanding these caveats, the lack of a total effect in Study 3 points to a fruitful line of inquiry for future research, namely, investigating under what conditions gender differences emerge in performance returns to brokerage approaches. It may be that although separation brokerage undermines women's creativity through social identity threat and reduced self-efficacy, the separation approach might enhance women's creativity through other yet-to-be-explored mechanisms. For example, it is possible that separation brokerage reduces social pressure to compromise on creative ideas, with such compromise rendering those ideas less creative, or that separation reduces social pressure for brokers to share credit for creative ideas with others. It should also be noted that the mixed evidence for a total effect of gender and brokerage approach on performance is consistent with research examining gender differences in returns to brokerage structures, further highlighting the complex manner in which gender stereotypes affect (or do not affect) women's versus men's behavior, evaluation of their behavior, and ultimately, the performance returns to brokerage.

Another direction for future research concerns how brokerage is measured. If joining brokerage is perceived as an identity-safe way for women to approach brokerage, it stands to reason that women brokers will often engage in joining brokerage. If this is the case, the gender differences often observed in the occupation of brokerage positions could be a statistical artifact rather than a reality. Current measures of brokerage are ill-equipped to capture the brokerage activities of joining brokers, since joining brokers appear embedded in a dense network (rather than as a focal point between two contacts) despite their brokerage role. Women's brokerage activities could thus be overlooked because they are not captured by current, conventional ways of measuring brokerage, which instead emphasize the maintenance of structural holes between contacts.

Another fruitful direction for future research could lie in exploring whether the nature of creative outcomes varies as a function of brokerage approach. For example, it could be that the outcomes generated by separation brokers are more of the "import–export" type, borrowing concepts from one field and applying them to another (Burt, 2004), while those generated by joining brokers are more integrative, combining different concepts and perspectives. While extant research has highlighted that these typologies of creativity exist (Harvey & Berry, 2023), they have not yet been connected to brokerage approaches. Future research could explore this issue, which could also shed light on creative differences between men and women brokers: if men (women)

are more likely to engage in separation (joining) brokerage than women (men), this tendency could lead to systematic differences in the type of creative outcomes that men and women generate.

A final limitation, and call for future research, concerns the interplay of gender and race. The populations in which we studied our effects were mostly white. However, gender stereotypes are racialized (Hall et al., 2019), meaning that they are activated and applied differently depending on the race of the individual in question. Hence, it may be that the gender stereotypes we identified—and their potential to trigger social identity threat in women—are more strongly applied to some racial groups than others. Future research should therefore explore how brokerage approach affects women and men who are members of racial minority groups.

20. Practical implications

Our findings yield several relevant implications for organizations who wish to unleash women's creative potential. Given the benefits of structural holes for creativity, job performance, and career progression, it would be wise for organizations to implement interventions that reduce the social identity threat that women experience as brokers—for instance, by educating women about stereotype threat and how to counter it, challenging negative stereotypes about women brokers, and promoting women who broker as role models (Liu et al., 2021). Additionally, encouraging women to engage in joining behaviors could provide them with the self-efficacy necessary to overcome the many barriers that stand in the way of expressing their creative ideas and suggestions (Amabile et al., 2005; Proudfoot et al., 2015); this could be achieved, for example, by putting women in charge of introducing new employees to other people in the firm (i.e., socializing these employees). Similarly, managers could assign women to lead cross-functional teams, where the need to bring different people and perspectives together is particularly pronounced (Harvey, 2014; Lingo & O'Mahony, 2010; Mannucci, 2017).

21. Conclusion

Networks theory has long emphasized the creative benefits of bridging structural holes, but research on gender and brokerage suggests that women are unlikely to reap these benefits due to the performance-depleting effects of negative gender stereotypes. In contrast to these previous accounts, our research shows that whether women experience social identity threat as brokers depends on how they behave in these roles—specifically, whether they approach them with a *joining* or a *separation* goal. To gain a better understanding of gender differences in returns to brokerage, we argue that scholars must consider not only individuals' position in their surrounding social structure, but also how they interpret and enact this position.

22. Author note

Data collection and preliminary analysis were sponsored by London Business School and University College London. We have no conflicts of interest to disclose.

CRediT authorship contribution statement

Raina A. Brands: Writing – review & editing, Writing – original draft, Visualization, Validation, Resources, Project administration, Methodology, Investigation, Funding acquisition, Formal analysis, Data curation, Conceptualization. **Pier Vittorio Mannucci:** Writing – review & editing, Writing – original draft, Visualization, Validation, Resources, Project administration, Methodology, Investigation, Funding acquisition, Formal analysis, Data curation, Conceptualization.

Data availability

The data and code are available on OSF and linked in the manuscript.

Appendix A. Supplementary material

Supplementary data to this article can be found online at https://doi.org/10.1016/j.obhdp.2024.104376.

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