






## ORIGINAL ARTICLE OPEN ACCESS

# When Form Leads to Function: Network Closure and Social Identity Threat Among Women Entrepreneurs

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**Received:** 29 September 2023 | **Accepted:** 31 January 2025

**Keywords:** entrepreneurship | social identity threat | social networks | trust

## ABSTRACT

We contend that the degree of closure in women entrepreneurs' social networks affects how concerned they feel about being judged through the lens of negative gender stereotypes (i.e., their experience of social identity threat). Using data from a survey of entrepreneurs in Study 1, we observe that women (but not men) entrepreneurs who report more closure in their social networks experience less social identity threat. Study 2 shows that the trust that is inherent in closed social networks accounts for our effects. Using an experimental design, we find that a field sample of entrepreneurs who are assigned to develop a closed (vs. open) network experience more trust, which is associated with reduced social identity threat for women (but not men). Our findings suggest that a closed social network may inoculate women against the risk of being derailed by negative stereotypes in the venture creation process. We conclude by discussing the theoretical and practical implications of our findings.

## 1 | Introduction

Despite undeniable progress in women's advancement across many professional domains, women entrepreneurs lag behind men in measures of venture growth and economic success (Jennings and Brush 2013). Among myriad explanations invoked to contextualize gender differences in entrepreneurial outcomes (e.g., investor-driven factors, Becker-Blease and Sohl 2007; Brooks et al. 2014; Kanze et al. 2018; Lee and Huang 2018; entrepreneur-driven factors, Brush et al. 2018; Huang et al. 2021), a notable explanation points to the differences between women's and men's social networks (Brands et al. 2022; Ely et al. 2011; Ibarra 1993; Woehler et al. 2021). By providing access to material resources such as professional advice, financial capital, and potential investors, social networks can profoundly influence entrepreneurial success (Burt and Oppen 2017; Greve and Salaff

2003). However, social networks are more than mere conduits for instrumental resources; they also serve as rich sources of intangible emotional and psychological support (Gersick et al. 2000; van Emmerik 2006). Social networks "socialize aspiring members, regulate inclusion, and convey normative expectations" (Ibarra et al. 2005, 362), and in doing so, they confer identities, such as that of an entrepreneur, on individuals.

The identity conferral function of social networks has the potential to provide insight into gender differences in entrepreneurial success. Research in social psychology has highlighted that women's and men's professional identity development may differ markedly in domains like entrepreneurship, where women are significantly underrepresented and negatively stereotyped (Bird and Brush 2002; Bruni et al. 2004; Gupta et al. 2009). Negative stereotypes about women's abilities are highly salient in the

Order of authorship has been determined by relative contributions of each author to the manuscript.

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entrepreneurial ecosystem (Bruni et al. 2005), leading women entrepreneurs to be concerned about being judged negatively or treated differently on the basis of them—a well-documented phenomenon referred to as “social identity threat” (Petriglieri 2011; Steele et al. 2002). To the extent that cues in the environment confirm the validity of their concern and the reality of the threat, women are less likely to pursue, and persist in, their entrepreneurial endeavors (Gupta and Bhawe 2007; Gupta et al. 2008; Gupta et al. 2009). However, although social psychological research has pointed to the importance of dyadic social interactions in confirming or undermining identity threat (e.g., Hall et al. 2015; Holleran et al. 2011; Logel et al. 2009), little is known about how structural characteristics of the social network surrounding individuals shape identity threat, or identities in general (Ibarra et al. 2005). Thus, developing a theoretical understanding of how social networks shape individuals’ self-concepts is essential for expanding our knowledge of gender differences in returns to social networks, particularly in domains where women are underrepresented, such as entrepreneurship.

Our primary goal in the current research is to address this theoretical gap. We propose that, in addition to providing women and men with the tangible resources and professional support they need for entrepreneurial success, social networks also affect individuals’ experience of their entrepreneurial identities. In our theorizing, we draw from social network perspectives that suggest that relational dynamics that are inherent in social structure, such as trust, norms, obligations, and expectations (Nahapiet and Ghoshal 1998), are a primary means by which individuals construct their identities (Ibarra et al. 2005; Podolny and Baron 1997), such as that of an entrepreneur. Building on this view, we theorize that the pattern of interactions that take place between individuals’ network members—regardless of their awareness of these relationships or the degree to which they participate in them—shapes individuals’ experience of social identity threat. We focus particularly on the structural attribute of network closure (the extent to which an entrepreneur’s network is interconnected; Wasserman and Faust 1994), hypothesizing that to the extent women are surrounded by closed networks, they will be less vulnerable to identity threat and its negative consequences. We build this theoretical proposition from the observation that closed networks foster trust among network members (Burt et al. 2018; Coleman 1988). We thus argue that for individuals at risk of experiencing identity threat, a sense of trust drawn from their closed network would alleviate the concern that network members could subject them to negative stereotyping.

We test our propositions in two studies. We first conduct a field study with men and women entrepreneurs, finding evidence that the degree of closure in women’s, but not men’s, social networks predicts the extent to which they experience social identity threat. In a subsequent field experiment, we zoom in on the proposed mechanism of trust that we theorize underlies this effect. We find that whereas both women and men entrepreneurs assigned to closed (vs. open) network conditions feel more trust in their network members, greater trust is associated with lower social identity threat only among women entrepreneurs. In both studies, we assess entrepreneurs in the earliest stages of their businesses. This initial venture stage is when women face the most disadvantages (Kanze et al. 2018) and when decision uncertainty about whether to pursue an entrepreneurial growth

strategy or a small business strategy is at its highest; hence, it is the stage when social identity threat poses the most substantial risk to women’s entrepreneurial success and, as a result, to progress toward gender equity in entrepreneurship.

## 1.1 | Entrepreneurship and Social Identity Threat

Entrepreneurship is an activity that is, broadly speaking, open and freely accessible to any individual who has identified an opportunity and seeks to capitalize on it (Shane 2003). However, although entrepreneurship is theoretically available to everyone, research suggests that women and men face different realities in forming their entrepreneurial ventures (Robb 2002). Indeed, women who start new entrepreneurial ventures do so knowing that, in general, women-led businesses are more likely to fail (Heilman and Chen 2003; Jennings and Brush 2013; Thébaud 2015). The reduced success rate of women’s ventures is partly attributable to evaluations from financiers and other resource providers who often judge women as less likely to achieve venture success (Becker-Blease and Sohl 2007; Brooks et al. 2014; Carter and Cannon 1992; Greene et al. 2001). For example, even though women-founded firms represent almost 40% of the privately held companies in the United States (American Express OPEN 2016), only 2% of the external venture capital funding available goes to these women founders (Pitchbook and National Venture Capital Association 2017). Financial providers consider gender when making these determinations, not only because it is a visible and stable ascriptive characteristic (Rudman and Phelan 2008), but also because gender stereotypes are also widely reinforced within the entrepreneurial ecosystem (Lee and Huang 2018). Women entrepreneurs are stereotyped as being less competent, less skilled, and less experienced than their male counterparts, even when objective measures suggest otherwise (Balachandra et al. 2019; Lee and Huang 2018).

It is not surprising, therefore, that women entrepreneurs internalize these stereotypes, experience a sense of identity threat (Petriglieri 2011; Steele et al. 2002), and worry that they may be treated differently on the basis of the stereotypes (Bruni et al. 2005). Moreover, these concerns can be reinforced as they perceive, as well as actually experience, bias and discrimination while attempting to build their ventures (Guzman and Kacperczyk 2019). When situational cues make salient the link between individuals’ social identity and negative stereotypes, they are likely to worry about being judged through the lens of those negative stereotypes rather than on their merit (i.e., they experience a social identity threat; Cheryan and Plaut 2010; Petriglieri 2011; Shapiro and Neuberg 2007; Steele et al. 2002). This social identity threat perspective builds from research on “stereotype threat,” a phenomenon in which individuals tend to underperform on evaluative tests when negative stereotypes about their group’s ability are salient to them and they believe that the test is diagnostic of their ability (Steele and Aronson 1995). More recent research has highlighted that the antecedents and consequences of social identity threat extend beyond the threat of stereotypes affecting test performance (e.g., Good et al. 2012). Accordingly, social identity threat is the broad theoretical perspective that captures how the threat of one’s identity being devalued in a context negatively affects cognition, affect, and behavior, with stereotype threat being a specific performance

phenomenon within this broader perspective (Schmader et al. 2008; Steele 1997; Steele et al. 2002; Walton et al. 2015).

Existing research on social identity threat has relied on individuals' cognitive interpretations of situational cues—indeed, it is often described as a situational threat (Steele and Aronson 1995). According to this research, when individuals anticipate their behavior will be evaluated in a domain where stereotypes about their group's abilities exist, they become vigilant, searching for and paying attention to cues in their environment that can either confirm or disconfirm their suspicion that they are being judged through the lens of negative stereotypes (Babbitt and Sommers 2011; Dasgupta et al. 2015; Emerson and Murphy 2014; Logel et al. 2009; Mendoza-Denton et al. 2002; Murphy et al. 2007). From this perspective, whether or not individuals experience a threat depends on what situational cues they directly observe in the organizational context (Cohen and Garcia 2008; Emerson and Murphy 2014; Murphy et al. 2007), including how they interpret their interactions with others (e.g., conversation patterns, Hall et al. 2015; Holleran et al. 2011; interacting with individuals who hold stereotyped views of them, Logel et al. 2009). Thus, research on attenuating the negative effects of social identity threat often focuses on shifting an individual's psychological experience by manipulating cues in the potentially threatening environment (Walton and Spencer 2009). In contrast to the reliance on cues in the immediate situation to activate or attenuate social identity threat, we raise the possibility that more stable and fixed structural features of the social environment—namely, the structure of an individual's social network—may shape experiences of social identity threat.

## 1.2 | Social Network Closure and Social Identity Threat

Social networks are fundamental to individuals' success in all professional domains, but particularly so in the domain of entrepreneurship, given the critical importance of relationships in this context (Burt and Oppen 2017; Greve and Salaff 2003; Rauch et al. 2016). Informal social networks are the channels through which funding, business opportunities, knowledge, and advice flow to entrepreneurs (Ebbers 2014; Ozdemir et al. 2016), facilitating the development of their nascent businesses (Engel et al. 2017; Semrau and Werner 2014; Stam et al. 2014; Sullivan and Ford 2014). To build and sustain their ventures, entrepreneurs must interact with investors, mentors, friends, family members, and acquaintances to access both tangible (e.g., funding) and intangible (e.g., advice and support) resources (Arenius and De Clercq 2005; Greve and Salaff 2003). The resources available to entrepreneurs by way of their social networks are collectively known as social capital, which facilitates actions and outcomes that would be difficult to achieve without the network, such as starting a business (Burt 2005; Coleman 1988; Nahapiet and Ghoshal 1998).

We focus our theorizing on a particular structural feature of entrepreneurs' social networks that has been a focus of much scholarly attention, namely the extent to which their networks are interconnected (i.e., closed) or disconnected (i.e., open). A wealth of research evidence points to the benefits of open networks. People whose networks are open are exposed to

different pools of knowledge, perspectives, and practices that form around interconnected actors in a network (Burt 1992, 2004). This exposure is theorized to benefit entrepreneurs by facilitating opportunity recognition, enhancing their ability to communicate the potential of their nascent venture to diverse stakeholders, and providing them with a range of ideas, tools, and practices to adapt and respond to setbacks and challenges during the venture creation process (Burt 2019). Recently, scholarship has noted a boundary condition to the benefits of open networks—and one that is particularly relevant for the current research—namely, that mature entrepreneurial ventures benefit most from open networks when the entrepreneur was embedded in a closed network during the early-stage venture creation process (Burt 2019; Burt and Oppen 2017).

One reason that entrepreneurs may benefit from closed networks in the venture creation process is that closed networks are characterized by high degrees of interpersonal trust. Trust is defined as the willingness of an individual to be vulnerable to the actions of another person based on the expectation that the other person will perform a particular action, irrespective of whether the individual can monitor or control them (Mayer et al. 1995, 172). When two individuals interact in a closed, interconnected network, information about their respective behaviors reverberates through the network, transmitted by mutual third parties, which open networks, by definition, lack (Burt 2005). In this way, a closed network acts as a “broadcast system transmitting stories to a colleague audience of armchair quarterbacks in vicarious game play [with the individual]” (Burt 2005, 105). In an interconnected network, members learn about an individual's qualities through gossip shared in the form of news and stories, whereas in an open network, where members do not interact, there is an inherent paucity of reputational information.

Therefore, unlike open networks, closed networks entail the potential for reputational damage. This potential acts as a social control mechanism, inhibiting individuals from engaging in counter-normative or self-interested behavior with their network members (Coleman 1988; Uzzi 1997). The more interconnected contacts the individual and their network members share, the greater the clarity and consistency of the vicarious knowledge that those network members gain about the individual (and vice versa). This clarity and consistency enhance trust: as Burt (2005) notes, “The more a person is predicted to behave in a way consistent with shared beliefs, the less risky it is to trust the person (107).”<sup>1</sup>

The trust in closed networks facilitates success in the early stages of ventures, such as idea realization and building a new enterprise, because individuals can exchange ideas freely, trusting that their network members will not steal their intellectual capital or otherwise exploit them (Tortoriello et al. 2012; Tortoriello et al. 2015)—that is, there is no need for formal contracting or monitoring systems (Uzzi 1996). In contrast to open networks, therefore, closed networks provide a trusting safe-haven for surviving the exploratory trial and error of venture formation (Burt 2019, 28).

Thus, in our theorizing, we take it as a given that the degree of closure in individuals' networks affects the amount of trust they place in their network members, and that this is likely to

benefit all entrepreneurs in the initial stages of their ventures. However, beyond these benefits that accrue to any entrepreneur in a closed network, we theorize that the trust afforded by closed networks will uniquely impact women's experience of social identity threat. We build our argument from the psychology of motivated reasoning, which establishes that people are driven toward cognitive consistency in their beliefs about others, such that they believe that those who wish them well will do good toward them and those who do badly toward them must wish them harm (Gawronski 2012). Extending this to the network context under investigation here, we argue that the trust that women experience in a closed network (a positively-valenced belief) is cognitively inconsistent with the belief that those network members could treat them with bias (a negatively-valenced belief). Of course, closed networks themselves do not necessarily protect women against gender-biased treatment in the entrepreneurial ecosystem, and it is possible for trusted others to act in gender-biased ways toward women. However, cognitively, the belief that network members hold good intentions toward a woman and will treat her with integrity (i.e., trust) is contradictory to the idea that those same individuals would judge her through the lens of harmful gender stereotypes. We theorize that women will resolve the potential inconsistency between these two beliefs by reducing their vigilance to social identity threat because the trust they experience arises from the network structure—that is, it is a belief validated by everyday experiences in actual interactions. Thus, the trust that is inherent in closed social structures creates a relational halo effect: women trust their network members and therefore expect them to treat them in fair and unbiased ways. In contrast, in open networks where trust is not a given, individuals must remain vigilant to the risk that others could treat them negatively—a belief that, for women, is consistent with the need to be vigilant to the possibility that others will treat them in gender-biased ways. Therefore, women in open networks (and thus lacking the trust inherent in closed networks) experience a cognitive consistency between their open network ties and the need for vigilance (i.e., rather than inconsistency) and will thus experience the status quo of entrepreneurship as an identity-threatening domain.

In comparison to women, men have a positively stereotyped social identity in entrepreneurship (i.e., they are portrayed as more competent and skilled than women) and are well-represented in most entrepreneurial settings; as such, there is little reason for men to worry they will be treated negatively as entrepreneurs due to their gender (Cohen and Garcia 2008; Emerson and Murphy 2015; Murphy et al. 2007; Walton et al. 2015). Accordingly, although men will experience heightened trust in closed networks, this trust will not affect beliefs about the likelihood that others will judge them through the lens of negative stereotypes about their gender. That is, we do not suggest that the relationship between trust and social identity threat is gendered; rather, we contend that the concerns that provoke identity threat within the domain of entrepreneurship are present for women but not men. In another setting in which men did experience a social identity threat, our theory suggests they would similarly experience a reduction in identity threat to the extent they were embedded in an interconnected network.

In sum, then, we hypothesize that closure in women's (but not men's) social networks will inoculate them against social

identity threat in entrepreneurship: women in closed networks will experience less social identity threat than women in more open networks. We attribute the association between network closure and reduced social identity threat to the trust that is inherent in closed social networks. We expect that both men and women will experience more trust in closed networks, but for women (and not men), this trust will reduce their concern about being judged through the lens of negative gender stereotypes.

**Hypothesis 1.** *To the extent that women's (but not men's) social networks have a higher degree of closure, they will experience less social identity threat.*

**Hypothesis 2.** *Trust will mediate the relationship between network closure and social identity threat such that to the extent that entrepreneurs' social networks have a higher degree of closure, they will experience more trust, and for women (but not men), this will reduce their experience of social identity threat.*

We note that prior work has highlighted that open networks may themselves be a source of threat for women (Brands and Mehra 2019). This prior scholarship focuses on situations in which a woman is in a particular type of open network—that of a broker network—i.e., in which she is the sole source of connection between otherwise disconnected actors. By virtue of the fact that brokers exercise dominance and control over their network members, brokerage networks are theorized to be male-typed (Brands and Kilduff 2014). As a result, when women perceive themselves to be brokers, they experience anxiety, which undermines their performance (Brands and Mehra 2019). Our argument—and empirical exposition—differs in two important ways from this prior work. First, whereas prior work focused on network *perceptions* (i.e., subjective appraisals of one's network position), the current work focuses on network *structure* (i.e., objective pattern of network ties). Second, in contrast to prior work, which has focused on expressive relations (Brands and Kilduff 2014; Brands and Mehra 2019), we focus on instrumental relations. We elaborate on these points and the unique contribution of our work in the discussion section.

## 2 | Overview of Studies

We tested Hypothesis 1 in a field study with entrepreneurs who started their own ventures and Hypothesis 2 in a field experiment with another group of entrepreneurs attending a conference. In Study 1, we predicted that to the extent women (but not men) were surrounded by a more closed network, they would experience less social identity threat in interactions with their network members. In Study 2, we honed in on our theorized mechanism and demonstrated a causal relationship between network closure and trust, which in turn reduced social identity threat for women (but not men). Anonymized data for all studies are available at [https://osf.io/689d7/?view\\_only=fce771691bdf421791d6cc4b7ab96f2b](https://osf.io/689d7/?view_only=fce771691bdf421791d6cc4b7ab96f2b).

## 3 | Study 1

To establish the real-world validity of our theory, we began with a survey of early-stage entrepreneurs, examining the link between network closure and social identity threat. We theorized that to



the extent that women (but not men) are embedded in more closed professional networks, they would report feeling less social identity threat in interactions with their network members.

### 3.1 | Method

#### 3.1.1 | Sample and Procedure

Participants comprised 150 (94 women, 56 men) entrepreneurs who responded to an online survey.<sup>2</sup> This panel was recruited from a series of entrepreneurship events sponsored by angel investing groups on the East Coast of the United States, each with a focus on providing resources and support for entrepreneurs who have traditionally been underserved and disadvantaged<sup>3</sup>. These events were held to bring together investors, entrepreneurs, and entrepreneurship service providers (e.g., accounting services, legal service providers) in a casual setting, and the entrepreneurs who attended were uniformly at an early stage of their businesses, and only beginning to gain traction, seek formal incorporation, and receive external resources, making them ideal participants for the study. Events were held on a monthly basis, and participants were contacted via an online survey, which was sent to them using the email address they provided upon registration. Participation was voluntary, and the response rate was 37%.

Of those respondents for whom it was possible to calculate network density, 125 identified as White, 10 as African American, 4 as Asian American, 6 as Hispanic, 3 as Native American, and 5 did not identify with any ethnic group.<sup>4</sup> The average age of the respondents was 44.57 years (SD = 12.37). Upon investigating whether or not network size systematically varied with any particular demographic characteristic, we found that older respondents had smaller networks, although this was only marginally significant ( $r = -0.14$ ,  $p = 0.073$ ) and those with a bachelor's degree had larger networks ( $r = 0.22$ ,  $p = 0.007$ ). As such, we included age and educational credentials as control variables in our analyses.

#### 3.1.2 | Measures

The survey began with an ego network measure (Burt 1992). Participants were asked, “*Who has contributed most to your success as an entrepreneur to date? These are individuals who have provided you with concrete resources (e.g., making introductions) or intangible support, such as advice and assistance, to help you run your venture.*” Participants were allowed to list up to 10 names (prior research by Merluzzi and Burt (2013) suggests that 5 names are sufficient; we opted to double this to ensure that we did not artificially inflate network closure). Subsequently, entrepreneurs who participated in the survey were asked to provide the following information about their network members: (1) demographic characteristics (i.e., age, gender, ethnicity, and whether they were family members) and occupation; (2) how close they were to each of their network members; (3) whether their network members had invested money in their venture; (4) the extent to which their network members believed that everyone has the potential to be a successful entrepreneur (1 = *all people*, 10 = *only some people*).

In order to capture network structure, we asked respondents to indicate whether the members of their network were known to one another. This is a field-standard measure of social network structure (e.g., Burt 1992; Merluzzi and Burt 2013), and although we could not verify respondents' reports with their network members, research on network perceptions shows that individuals are accurate in their perceptions of overall network structure (Freeman et al. 1987; Freeman and Webster 1994). To reduce the likelihood of inaccurate reporting, we deliberately avoided asking about the quality or nature of the relationship between respondents' network members (e.g., closeness, friendship, advice) because these involve private feelings and judgments that may be hidden from respondents and thus are prone to bias. Conversely, reporting on whether two individuals are known to one another simply involves behavioral observation, which individuals can accurately report (Freeman and Webster 1994).

Next, participants completed a measure of social identity threat. Finally, respondents provided details about their current and prior entrepreneurial ventures and demographics.

**3.1.2.1 | Professional Network Closure.** We measure closure via network density, which is the number of ties that exist in the network as a proportion of the number of ties that could exist in the network—i.e., the interconnectedness of the network (Wasserman and Faust 1994). Thus, density captures the extent to which an entrepreneur reported that the individuals in their professional development network also had relationships with one another.

First, we calculated how many ties could exist in the respondents' networks, given the number of network contacts that they reported, using the formula below, where  $n$  = number of network contacts:

$$\text{Number of possibilities} = \frac{n * (n - 1)}{2}$$

Next, we counted the number of ties each respondent reported among their network members. Network density was then calculated by dividing the total number of ties in the network by the number of possible ties (Wasserman and Faust 1994).

**3.1.2.2 | Gender.** Respondents indicated their gender (−1 = *man*, 1 = *woman*).

**3.1.2.3 | Social Identity Threat.** We used a three-item measure of social identity threat, developed by Georgeac and Rattan (2023), adapted to focus on individuals' social networks and validated in a supplemental study against well-established measures of social identity threat (see [Supplemental Online Materials](#)). Participants were asked, “(1) How much do you worry that the people in your network might draw conclusions about you based on gender stereotypes? (2) How much do you think gender stereotypes affect the people in your network's impression of your ability? (3) How much do you think you might face biased evaluations from your network members because of your gender?” ( $\alpha = 0.88$ ). Respondents indicated the extent to which they agreed with each item on a 7-point Likert scale (1 = *not at all*, 7 = *a lot*).

**3.1.2.4 | Control Variables.** We controlled for variables that were correlated with our outcome variable, social identity threat. As can be seen in Table 1, respondent age and having some college experience or a doctorate degree were the variables that correlated with social identity threat, so we controlled for age and educational attainment. Additionally, individuals who have higher self-efficacy in the domain in which stereotypes exist are less susceptible to stereotype threat (Steele 1997). Thus, we included a proxy for self-efficacy—number of prior ventures—as a control (0 = *no prior ventures*, 1 = *one or more prior ventures*). As smaller networks tend to be higher in closure, we also controlled for network size.

**3.1.2.5 | Robustness Measures.** We calculated several other network measures to use in our robustness checks. As there are debates about the efficacy of density as a measure of closure (Borgatti 1997; Burt 1992), we calculated another measure of closure, transitivity, which occurs when there is a tie between an ordered pair of nodes  $i$  and  $j$ , and there exists at least one node  $k$ , such that there are directed ties from  $i$  to  $k$ , and from  $k$  to  $j$  (Dekker et al. 2019). Whereas measures of closure, such as density and transitivity, focus on capturing the extent of interconnectedness within a network, measures of brokerage emphasize the role of individuals in bridging structural holes between otherwise disconnected parts of the network. Therefore, we additionally calculated two measures of brokerage. The first was effective size, which is the number of alters that an ego is connected to, controlling for the extent to which those alters are redundant (Borgatti et al. 1998). The second was constraint, which comprises size, density, and hierarchy (Burt 1992). We also calculated the degree of gender homophily in each individual's network, expressed as the proportion of the individual's network who are the same gender as them. In addition, we calculated the average tie strength of the network. Individuals were asked how close they were to each of their network members (1 = *not very close*, 5 = *very close*); the average of each of the individual relationship ratings was calculated for the network. Finally, we asked whether each network member had invested in the individual's venture and took a log of this value as an additional control<sup>5</sup>.

## 3.2 | Analysis

Hypothesis 1 predicted that to the extent women (but not men) were surrounded by a more closed network, they would experience less social identity threat in interactions with their network members. We tested this model with a regression analysis using the PROCESS macro for SPSS (Model 1; Hayes 2022). All continuous variables were mean-centered prior to the analysis, enabling us to describe our effects in relation to the average respondent (Hayes 2022).

## 3.3 | Results

Table 1 presents the means, standard deviations, and correlations; Table 2 presents the results of the analysis. Model 1 presents our control variables, Model 2 adds the main effects, and Model 3 adds the predictor of interest, the interaction term for *gender*  $\times$  *network closure*. In line with our prediction, there was evidence of a *gender*

$\times$  *network closure* interaction on social identity threat ( $B = -0.01$ ,  $p = 0.010$ ), suggesting that the degree of closure in an individual's social network affects that person's experience of social identity threat, but that the relationship between closure and identity threat differs for men and women. To further understand the effect, we conducted a simple slopes analysis (Figure 1). As predicted, women who reported having more closed networks experienced lower levels of social identity threat when interacting with their network members, relative to women whose networks were more open ( $B = -0.02$ ,  $p = 0.006$ ). Alternatively stated, for every standard deviation increase in network closure, women reported feeling 0.02 units of a scale less social identity threat. In contrast, the degree of closure in men's networks did not affect their experience of social identity threat ( $B = 0.01$ ,  $p = 0.407$ ).

## 3.4 | Robustness Checks

We conducted several robustness checks. First, we examined whether our results would hold if we included gender homophily, tie strength, and average monetary investment made by the network members—we found that they did (Model 4). We also tested whether the results would replicate on another measure of closure, that of transitivity—we again found that they did (Model 5). In contrast, the results failed to reach conventional levels of significance ( $p$  values  $< 0.10$ ) when we tested our model using measures of brokerage—that is, effective size and constraint (Models 6 and 7). We elaborate on this finding in the discussion section.

## 3.5 | Discussion

Study 1 established the real-world validity of our theory by surveying entrepreneurs about their actual social networks and ventures. We found that, relative to men, women entrepreneurs with more closed professional networks experienced lower levels of social identity threat. We also found that our results were highly robust to measures of closure but less so to measures of brokerage. This suggests that brokerage, which captures the potential for women entrepreneurs to control the flow of information and resources across the network and otherwise influence relations between their network members, exerts less influence on women entrepreneurs' experience of social identity threat than the overall connectivity of the network. We also found that our results were robust to the gender of the network members, the strength of the relationships between the entrepreneur and their network members, as well as whether the network member had invested in their business. We chose these variables because each could provide a signal to women that they will not be treated in a gender-biased manner by their network members: women may expect less biased treatment from other women (Greenberg and Mollick 2017), their close friends (Field et al. 2016), and those that believe in their potential (Guzman and Kacperczyk 2019; Tinkler et al. 2015). The fact our results are robust to these indicators highlights the importance of network structure in confirming or undermining social identity threat.

The correlational design of Study 1 confers several limitations. First, given the lack of randomization in our study design, we

TABLE 1 | Study 1: Means, standard deviations, and unstandardized correlation coefficients.

Variable	M	SD	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1 Closure	83.83	19.99	0.89	-0.80	0.73	-0.19	-0.08	-0.54	0.08	-0.09	0.20	-0.24	-0.13	0.15	0.05	0.32	0.09
2 Transitivity	0.88	0.16		-0.73	0.72	-0.19	-0.11	-0.38	0.14	-0.09	0.17	-0.21	-0.11	0.12	0.09	0.27	0.08
3 Effective size	1.59	1.07			-0.78	0.12	0.11	0.59	-0.19	0.06	-0.22	0.29	0.13	-0.10	-0.07	-0.12	-0.07
4 Constraint	0.87	0.23				-0.10	-0.12	-0.80	0.13	0.05	0.18	-0.28	-0.07	0.14	0.05	0.20	0.03
5 Social identity threat	1.85	1.30					0.19	0.10	-0.33	0.10	-0.16	0.09	0.18	0.09	-0.15	-0.09	0.14
6 Gender (-1 = men, 1 = women)	0.25	0.97						0.07	-0.12	-0.04	-0.10	-0.03	0.01	0.07	-0.46	-0.13	-0.01
7 Network size	3.52	1.85							-0.18	-0.02	-0.13	0.22	0.06	-0.13	0.01	-0.14	0.07
8 Age	44.57	12.37								0.001	0.24	-0.03	-0.09	-0.003	0.10	-0.04	-0.17
9 Prior venture	0.97	0.16									-0.09	0.01	0.02	0.03	-0.06	-0.09	0.05
10 Some college	0.26	0.44										-0.37	-0.08	-0.11	0.14	-0.07	-0.12
11 Bachelor's degree	0.28	0.45											-0.09	-0.12	0.02	0.01	-0.03
12 Doctorate	0.02	0.14												-0.03	-0.08	-0.07	0.11
13 Professional degree	0.03	0.18													-0.04	0.06	0.04
14 Gender homophily	0.61	0.33														-0.01	-0.25
15 Tie strength	4.16	0.79															0.16
16 Average \$ inv. by network (logged)	4.58	3.93															

Note: N = 150. Correlation coefficients greater than |0.16| are significant at  $p < 0.05$ .

**TABLE 2** | Study 1: Moderated regression analysis of the effect of network closure and gender on social identity threat.

Predictor variables	Dependent variable						
	Social identity threat						
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7
Intercept	2.33 <sup>d</sup> (0.76)	2.56 <sup>d</sup> (0.78)	2.48 <sup>c</sup> (0.76)	2.70 <sup>c</sup> (0.99)	2.18 <sup>c</sup> (0.76)	2.21 <sup>b</sup> (0.71)	2.17 <sup>c</sup> (0.72)
Gender (−1 = men, 1 = women)		0.20 <sup>a</sup> (0.10)	0.21 <sup>b</sup> (0.10)	1.35 <sup>c</sup> (0.47)	0.20 <sup>a</sup> (0.10)	0.22 <sup>b</sup> (0.10)	0.20 <sup>a</sup> (0.10)
Closure		−0.01 (0.01)	−0.01 (0.01)	−0.01 (0.01)			
Transitivity					0.01 (0.76)		
Effective size						−0.09 (0.11)	
Constraint							0.15 (0.48)
Gender × Closure			−0.01 <sup>b</sup> (0.01)	−0.01 <sup>b</sup> (0.01)			
Gender × Transitivity					−1.62 <sup>b</sup> (0.72)		
Gender × Effective size						0.18 <sup>a</sup> (0.11)	
Gender × Constraint							−0.90 <sup>a</sup> (0.47)
<b>Controls</b>							
Network size	0.03 (0.06)	−0.04 (0.06)	−0.04 (0.06)	−0.05 (0.06)	0.01 (0.06)		
Age	−0.03 <sup>d</sup> (0.01)	−0.03 <sup>d</sup> (0.01)	−0.03 <sup>c</sup> (0.01)	−0.03 <sup>d</sup> (0.01)	−0.03 <sup>c</sup> (0.01)	−0.03 <sup>d</sup> (0.01)	−0.03 <sup>d</sup> (0.01)
Prior venture	0.71 (0.61)	0.66 (0.62)	0.64 (0.60)	0.58 (0.61)	0.70 (0.61)	0.76 (0.61)	0.82 (0.62)
Education controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Gender homophily				0.07 (0.35)			
Tie strength				−0.09 (0.13)			
Average \$ invested by network (logged)				0.03 (0.03)			
R <sup>2</sup>	0.16 <sup>d</sup>	0.20 <sup>d</sup>	0.23 <sup>d</sup>	24 <sup>d</sup>	0.21 <sup>d</sup>	0.19 <sup>d</sup>	0.19 <sup>d</sup>

Note: Table presents unstandardized regression coefficients. Standard errors are reported in parentheses.  $N = 150$ .

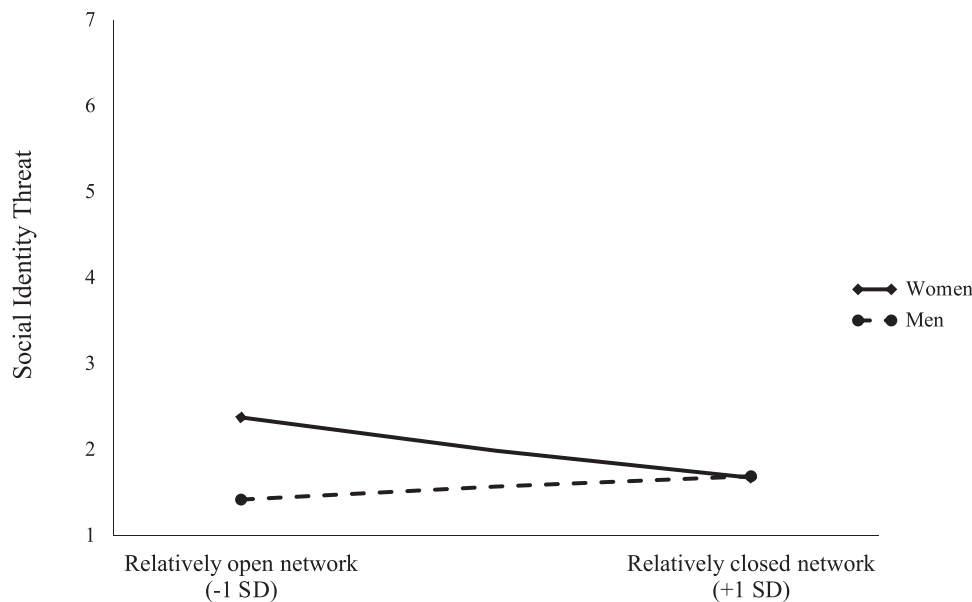
<sup>a</sup> $p = 0.10$ .

<sup>b</sup> $p < 0.05$ .

<sup>c</sup> $p < 0.01$ .

<sup>d</sup> $p < 0.001$ .





**FIGURE 1** | Study 1: Plot of the interaction between network closure (mean-centered) and gender predicting social identity threat.

cannot pinpoint the direction of our core effect. That is, it is plausible that women who experience higher levels of social identity threat are more likely to build open social networks, or that some other individual difference accounts for our findings (e.g., trust propensity; Colquitt et al. 2007; Mayer et al. 1995). Second, this study provides us with little insight into *why* network closure reduces social identity threat for women entrepreneurs. We have theorized that the trust that is endogenous to interconnected networks accounts for the observed link between network closure and threat, but we did not measure this factor in Study 1. Third, Study 1 does not allow us to rule out an important, alternative explanation for our findings. In the survey data, we cannot distinguish whether an interconnected network signals that members interact with one another in pairs or all together as a group (or some combination). We theorize that it is the overall structure of the network driving our effects, so it should not matter whether individuals interact as a group or one-on-one. However, it may be that group interactions are driving the association between network closure and social identity threat, which would suggest that psychological factors associated with group dynamics, such as psychological safety, would account for our findings. Thus, we next conducted an experiment.

## 4 | Study 2

The purpose of Study 2 was twofold. First, we wanted to offer evidence for our theory that trust underlies the association between closed networks and reduced social identity threat for women. Second, we wanted to rule out the possibility that the style of group interactions was driving our findings, and thus the possibility that a closed network is just a proxy variable. We hypothesized (Hypothesis 2) that trust would mediate the relationship between network closure and social identity threat for women entrepreneurs, such that entrepreneurs with more closed networks would experience more trust, and for women (but not men), this would be associated with reduced social identity threat.

## 4.1 | Method

### 4.1.1 | Participants

The study's participants were 469 entrepreneurs (242 women, 227 men) who attended an entrepreneurship conference in the United States and participated in one of three sessions of a workshop on "Human Capital in Tech Entrepreneurship."<sup>6</sup> The conference was convened with the goal of providing groups who are traditionally underrepresented and/or disadvantaged in entrepreneurship with information and networking opportunities to help them successfully navigate entrepreneurship. The setting thus represented a gender-balanced and relatively identity-safe environment for women entrepreneurs, providing a conservative context in which to test our theory. The average age of the participants was 35.98 years ( $SD = 12.20$ )<sup>7</sup>.

### 4.1.2 | Design and Procedure

Study 2 manipulated network context in a cluster-randomized experimental<sup>8</sup> design. Each session was randomly assigned to either the open group, closed group, or closed pairs condition<sup>9</sup>. As noted, an interconnected network structure could mean that individuals interact together as a group or that they interact one-on-one but nonetheless all share relationships with each other. Theoretically, we expect that closed networks, whether indicative of group interactions or dyadic interactions, will engender similar levels of trust. However, to confirm this theory, we created two closed network conditions. In the closed group condition, individuals interacted with their network members all at once (i.e., as a group). In contrast, in the closed pairs condition, individuals interacted with their network members one at a time, but each individual met every other individual so that, by the end of the task, they had similarly generated a closed network. Our a priori expectation was that the closed group and closed pairs conditions would be equivalent manipulations of network closure.

**4.1.2.1 | Network Manipulation.** At the beginning of the workshop, participants were handed an information sheet with the following instructions on it:

Before we begin this workshop, we will be doing an icebreaker exercise where you will have the chance to network with a few of the other participants. Despite the “public” nature of entrepreneurship, in practice, it is often an isolating endeavor. Therefore, the goal of this exercise is to introduce yourself, exchange ideas, and look for opportunities to help each other. I want you to make four new connections.

In the open network condition, participants received the following instructions:

To facilitate this [the networking task], I have assigned you to network with four different people. You will have a total of 16 minutes for all of the conversations. You should introduce yourselves, your businesses, and exchange advice and ideas before rotating. Because you will be interacting with four unique individuals, when you walk away from the workshop you will have a network that looks like this: [accompanied by a network with one node connected to four other nodes that were not connected to each other—see [Appendix](#)].

In the closed group condition, participants received the following instructions:

To facilitate this, I have assigned you to network in groups. You will have a total of 16 minutes in your group for the conversation. You should introduce yourselves, your businesses, and exchange advice and ideas before rotating. Because you will be interacting all together as a group, when you walk away from the workshop you will have a network that looks like this: [accompanied by a picture of a network of five interconnected nodes—see [Appendix](#)].

In the closed pairs network condition, participants received the following instructions:

To facilitate this, I have assigned you to network in groups. You will have a total of 16 minutes in your group for all of the conversations. You should introduce yourselves, your businesses, and exchange advice and ideas before rotating. Because you will be interacting in pairs within the same group, when you walk away from the workshop you will have a network that looks like this: [accompanied by a picture of a network of five interconnected nodes—see [Appendix](#)].

The workshop leader then showed a slide indicating who the workshop participants would be networking with and began the 16-min networking exercise. The main content of the workshop was then delivered. At the end of the workshop, participants filled

out the trust and social identity threat measures, measures of potential alternative mediators and confounds, and demographic and work experience items, and were subsequently debriefed.

### 4.1.3 | Measures

**4.1.3.1 | Trust.** We used a five-item measure of trust (Simons and Peterson 2000), which involved participants answering the following questions: “To what extent are the people in the network you made today certain they can trust each other? To what extent do you expect to get complete truth from the network you made today? To what extent do the members of the network you made today show absolute integrity? To what extent does the network you made today count on each other to fully live up to their word? To what extent does the network you made today respect each other’s competence?” All items were measured on a 7-point Likert scale (1 = *not at all*, 7 = *a lot*,  $\alpha = 0.87$ ).

**4.1.3.2 | Social Identity Threat.** Similar to Study 1, we used a three-item measure of social identity threat adapted from Georgeac and Rattan (2023), asking participants the following questions: “(1) How much do you worry that people in entrepreneurship might draw conclusions about you based on gender stereotypes? (2) How much do you think that gender stereotypes affect people’s impressions of your ability as an entrepreneur? (3) How much would you think that you might face biased evaluations as an entrepreneur because of your gender?” Items were measured on a 7-point Likert scale (1 = *not at all*, 7 = *a lot*,  $\alpha = 0.89$ ).

**4.1.3.3 | Alternative Mediators.** We theorized that network closure affects identity threat for women (vs. men) entrepreneurs through the trust it engenders. However, two alternative possibilities exist: First, it could be that a closed (vs. open) network structure confers greater certainty about viewing the self as an entrepreneur, which might reduce social identity threat. Second, it is also possible that a closed (vs. open) network structure is experienced as more psychologically safe, which would also be less identity threatening. Either case could produce the same pattern of effects but through a different mechanism. To rule out these possibilities, we captured two alternative mediators: identity certainty and psychological safety. Identity certainty was measured with a six-item scale (sample item: “In general, I have a clear sense of who I am and what I am,” Hohman et al. 2017,  $\alpha = 0.80$ ). Psychological safety was measured with a seven-item scale (sample item: “No one in this network would deliberately act in a way that would undermine my efforts,” Edmondson 1999,  $\alpha = 0.78$ ). Both scales were assessed on a 7-point Likert scale (1 = *strongly disagree*, 7 = *strongly agree*).

We also captured several items relating to the content of the interactions during the networking exercise that might systematically differ with our manipulation and therefore provide an alternative explanation for our findings. We asked participants to report: (1) the extent to which their discussion focused on “1 = *exchange of resources and advice*” versus “7 = *getting to know each other*”; (2) whether the people they met were “1 = *more task focused*” versus “7 = *more socially focused*”; (3) how comfortable they felt during the networking activity, “1 = *very uncomfortable*” to “7 = *very comfortable*”; (4) how much time they spent talking during the

networking activity, “1 = *less than other people*, 4 = *about the same as other people*, 7 = *more than other people*”; and (5) perceptions of group entitativity, “1 = *not very much like a group*,” “7 = *very much like a group*.”

## 4.2 | Results

### 4.2.1 | Manipulation and Attention Checks

Participants were shown the two network pictures used in the manipulation and asked to identify the network they made in the workshop. We excluded 18 people who picked the wrong network, which resulted in a final sample of 451 entrepreneurs (237 women, 214 men).

In order to assess the validity of the manipulation, we asked participants to indicate how disconnected or interconnected the network they formed in the workshop was (1 = *very disconnected*, 7 = *very interconnected*). Our a priori expectation was that the closed group and closed pairs conditions would be equivalent. A one-way analysis of variance (ANOVA) indicated evidence of an effect of experimental condition on perceptions of network connectivity,  $F(2, 448) = 98.43, p < 0.001$ . Pairwise comparisons using a Bonferroni adjustment showed that, as expected, the open network condition was seen as significantly less interconnected ( $M = 3.75, SD = 2.08$ ) than both the closed group ( $M = 5.95, SD = 1.21$ ) and closed pairs ( $M = 5.86, SD = 1.18$ ) conditions. As predicted, the closed group and closed pairs conditions were seen as equally interconnected,  $p = 1$ . Accordingly, we collapsed the two closed network conditions.

We also confirmed that the networking exercise, regardless of experimental condition, was externally valid by examining whether individuals indicated that they were likely to keep in contact with one or more of the people they met at the networking exercise. A  $t$ -test conducted against the midpoint of the scale showed that on average, individuals intended to stay in touch with at least one of the people from the networking exercise ( $M = 5.69, SD = 1.47, t(450) = 24.36, p < 0.001$ ).

Existing literature on trust dynamics in groups (Mayer et al. 1995; Lewicki et al. 2006) raises the possibility that group entitativity, time spent talking, or comfort could shape trust. Because our interest is in the effect of network structure on trust, and not these other variables, it was important to account for any effect of these constructs, which may be incidental to the closed versus open network condition manipulations. Indeed, participants in the closed network condition perceived more group entitativity,  $t(449) = -10.12, p < 0.001$ , and spent significantly more time talking,  $t(449) = -2.43, p = 0.015$ , than in the open network condition. Although there was no difference by network condition in how comfortable participants felt during the networking activity,  $t(449) = -1.52, p = 0.130$ , participants' level of comfort correlated with trust,  $r = 0.44, p < 0.001$ . Thus, in order to isolate the effect of network condition on trust and thus social identity threat, we included group entitativity, time spent talking, and comfort as covariates in our analysis.

Given that we conducted our experiment at a conference, we could not control the number of people in each session, or

the number of women and men who attended. In order to accommodate these factors, 24 people were assigned to network in groups of six rather than in groups of five, and we used group size as a covariate in our analysis. Likewise, individuals were allowed to network in groups of varying gender composition, and we used gender homophily of the group as a covariate in our analysis (the proportion of the network that was the same gender as the participant). Finally, following Study 1, we included prior experience in entrepreneurship as a covariate (0 = *no prior ventures*, 1 = *one or more prior ventures*). All variables were mean-centered prior to the analysis.

### 4.2.2 | Hypothesis Tests

Given our cluster-randomized experimental design, which assigned groups of participants to network conditions, we first examined whether mixed effects modeling would be more appropriate to test our hypothesis. However, the within-group effect of network condition on trust was not statistically significant,  $Wald Z = 0.02, p = 0.984$ , suggesting that a random effect was not present in our data. We therefore tested our hypothesis using a single-level (i.e., ordinary least squares) regression-based approach.

Hypothesis 2 predicted that entrepreneurs assigned to the closed network conditions would feel more trust in their network members than entrepreneurs assigned to build an open network, and that for women (but not men), increased trust would reduce their social identity threat. Statistically, this hypothesis represents a second-stage moderated mediation in which the indirect effect of network closure on social identity threat via trust is moderated by gender. We tested this model using Model 14 of the PROCESS macro for SPSS (Hayes 2022).

Table 3 shows the means, standard deviations, and correlations; Table 4 shows the results of the analysis. In Model 1, we entered the covariates; in Model 2, we tested the first stage of the mediation model by examining the effect of network condition on trust. There was evidence of an effect of network condition on trust ( $B = 0.17, p < 0.001$ ). Given the coding of the condition, the positive coefficient indicates that individuals who formed a closed network placed significantly more trust in their network members than individuals who formed an open network. Next, we investigated whether the effect of trust on social identity threat would differ for women and men. As can be seen in Model 6, there was marginal evidence of a *trust*  $\times$  *gender* interaction on social identity threat ( $B = -0.12, p = 0.067$ ). In order to understand how the indirect effect of network condition on social identity threat via trust differed between women and men, we examined their respective coefficients and plotted the interaction (Figure 2). For women, the more trust they felt in their network members, the less social identity threat they experienced ( $B = -0.24, p = 0.024$ ). In other words, for every standard deviation increase in trust in their network members, women entrepreneurs reported feeling 0.24 units of a scale less social identity threat. By contrast, men's experience of social identity threat was unaffected by the degree of trust they experienced in their network members ( $B = -0.01, p = 0.925$ ). The index of moderated mediation indicated that the indirect effect of network condition on social identity threat via trust differed for women and men, with a 90% confidence interval

TABLE 3 | Study 2: Means, standard deviations, and unstandardized correlation coefficients.

Variable	M	SD	1	2	3	4	5	6	7	8	9	10	11	12
1 Social identity threat	3.69	1.69												
2 Trust	5.27	1.21	0.18											
3 Psychological safety	5.15	1.05	0.04	0.04										
4 Identity certainty	5.08	1.11	0.04	0.09	0.09									
5 Condition (−1 = open, 1 = closed)	0.32	0.95	−0.23	0.35	0.40	0.03								
6 Gender (−1 = men, 1 = women)	0.05	1.00	−0.03	0.49		0.02	0.05							
7 Comfort	5.91	1.19	−0.13	0.44	0.48	0.07	0.11	0.43						
8 Time spent talking	4.98	1.33	0.13	0.36	0.07	0.05	0.05	0.08	0.09					
9 Group entitativity	5.03	1.72	0.13	0.44	0.48	0.07	0.11	0.36	0.28	0.01				
10 Group size	5.05	0.22	0.07	0.09	0.09	0.07	0.07	0.45	0.02	−0.02	0.02			
11 Prior venture (0 = no prior venture, 1 = prior venture)	0.88	0.33	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09		
12 Group gender homophily	0.63	0.22	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.09	−0.004	−0.05

Note:  $N = 451$ . Correlation coefficients greater than |0.10| are significant at  $p < 0.05$ .

used to assess the precision of the estimate ( $B = -0.04$ , 90% CI  $[-0.0866, -0.0006]$ )<sup>10</sup>. Thus, Hypothesis 2 was supported.

**4.2.2.1 | Alternative Mediators.** Models 4 and 7 present the same model using psychological safety as the mediator, and likewise, Models 5 and 8 present the analysis for identity certainty as the mediator. Whether entrepreneurs built a closed or an open network did not affect either their psychological safety ( $B = 0.06$ ,  $p = 0.285$ ; Model 4) or their identity certainty ( $B = -0.03$ ,  $p = 0.610$ ; Model 5). Likewise, although higher psychological safety ( $B = -0.57$ ,  $p < 0.001$ ) and higher identity certainty ( $B = -0.32$ ,  $p < 0.001$ ) reduced feelings of social identity threat, the *psychological safety*  $\times$  *gender* and the *identity certainty*  $\times$  *gender* interaction terms were not significant (Models 7 and 8). These results allowed us to rule out these alternative mechanisms for our findings.

**4.2.2.2 | Alternative Model.** Our theory argues that trust is endogenous in interconnected networks but has a differential effect on women's and men's experience of social identity threat. However, it may be that women and men experience different levels of trust in interconnected networks, which has downstream consequences for their experience of social identity threat. This alternative conceptualization would suggest a first-stage moderated mediation in which gender moderates the effect of closure on trust, which in turn mediates the effect of closure on social identity threat. We tested this alternative specification. As can be seen in Table 4 (Model 3), there was no evidence of a statistically significant *condition*  $\times$  *gender* interaction predicting trust,  $B = -0.03$ ,  $p = 0.561$ . Thus, the alternative model was not supported.

### 4.3 | Discussion

The results of Study 2 confirmed Hypothesis 2, that trust mediates the relationship between closed networks and social identity threat for women entrepreneurs but not for men. We found that entrepreneurs who built a closed network—whether in a group or in pairs—reported more trust in their network than those who built an open network. For women, increased feelings of trust were associated with reduced social identity threat. Although men also reported higher trust in closed networks than in open networks (as expected, given prior network research), consistent with our theorizing, trust in their network members did not correlate with their experience of social identity threat.

Importantly, Study 2 allowed us to rule out several possible alternative explanations for our findings. First, it did not matter whether participants formed a closed network as a group or in one-on-one pairings, indicating that it is not the style of group interactions that reduces social identity threat, but rather, the structure of the network. This finding makes sense from a theoretical point of view because it is the existence (or absence) of ties made to mutual third parties, rather than the manner in which they were forged, that gives rise to trust. We also ruled out two alternative theoretical mediators—identity certainty and psychological safety—as potential explanations for our results.

Finally, it is notable that the indirect effect of network condition on social identity threat via trust emerged as predicted, but the

**TABLE 4** | Study 2: Second stage moderated mediation analysis of the effect of network closure and gender on social identity threat via trust.

Predictor variables	Dependent variables							
	Trust			Psych. safety	Identity certainty	Social identity threat		
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8
<b>Covariates</b>								
Intercept	0.72 (1.00)	0.94 (0.99)	0.93 (1.00)	1.74 <sup>a</sup> (1.03)	4.17 <sup>c</sup> (1.17)	−6.06 <sup>b</sup> (1.86)	4.74 <sup>b</sup> (1.75)	6.20 <sup>c</sup> (1.79)
Comfort	0.24 <sup>c</sup> (0.04)	0.26 <sup>c</sup> (0.04)	0.26 <sup>c</sup> (0.04)	0.43 <sup>c</sup> (0.04)	0.32 <sup>c</sup> (0.05)	−0.27 <sup>c</sup> (0.07)	−0.06 (0.07)	−0.19 <sup>b</sup> (0.07)
Time spent talking	0.06 (0.04)	0.07 <sup>a</sup> (0.04)	0.07 <sup>a</sup> (0.04)	−0.07 <sup>a</sup> (0.04)	−0.07 <sup>a</sup> (0.04)	0.22 <sup>c</sup> (0.07)	0.18 <sup>b</sup> (0.06)	0.19 <sup>c</sup> (0.06)
Group entitativity	0.36 <sup>c</sup> (0.03)	0.32 <sup>c</sup> (0.03)	0.32 <sup>c</sup> (0.03)	0.02 (0.03)	0.06 <sup>a</sup> (0.04)	0.09 (0.06)	0.06 (0.06)	0.07 (0.06)
Group size	0.20 (0.19)	0.18 (0.19)	0.17 (0.19)	0.22 (0.19)	−0.16 (0.22)	−0.41 (0.34)	−0.32 (0.33)	−0.47 (0.34)
Prior venture	0.04 (0.13)	0.01 (0.13)	0.01 (0.13)	0.01 (0.14)	0.01 (0.15)	−0.28 (0.24)	−0.21 (0.23)	−0.25 (0.23)
Group gender homophily	−0.07 (0.20)	−0.08 (0.19)	−0.07 (0.20)	−0.03 (0.20)	−0.15 (0.23)	−0.02 (0.35)	−0.11 (0.34)	−0.12 (0.35)
<b>Independent variables</b>								
Condition (−1 = <i>open</i> , 1 = <i>closed</i> )		0.17 <sup>c</sup> (0.05)	0.17 <sup>c</sup> (0.05)	0.06 (0.05)	−0.03 (0.06)	0.03 (0.09)	0.03 (0.09)	−0.003 (0.09)
Gender (−1 = <i>men</i> , 1 = <i>women</i> )			0.02 (0.04)			0.33 <sup>c</sup> (0.08)	0.41 <sup>c</sup> (0.07)	0.33 <sup>c</sup> (0.08)
Trust						−0.13 (0.09)		
Psychological safety							−0.57 <sup>c</sup> (0.08)	
Identity certainty								−0.32 <sup>c</sup> (0.07)
Gender × Trust						−0.12 <sup>a</sup> (0.06)		
Gender × Condition			−0.03 (0.04)					
Gender × Psych. Safety							0.09 (0.07)	
Gender × Id. certainty								0.05 (0.07)
R <sup>2</sup>	0.45 <sup>c</sup>	0.47 <sup>c</sup>	0.47 <sup>c</sup>	0.24 <sup>c</sup>	0.13 <sup>c</sup>	0.11 <sup>c</sup>	0.19 <sup>c</sup>	0.13 <sup>c</sup>

Note: Table presents unstandardized regression coefficients. Standard errors are reported in parentheses. *N* = 451.

<sup>a</sup>*p* < 0.10.

<sup>b</sup>*p* < 0.01.

<sup>c</sup>*p* < 0.001.

total effect of network condition on social identity threat was not supported (Table 4, Model 6). This is not an uncommon phenomenon in social psychological research, where discussions suggest that statistical power may be an issue (Hayes 2022, 2009; Hayes and Rockwood 2017; Rucker et al. 2011; Shrout and Bolger

2002). We look forward to future research that further explores this question with larger samples, and thus with greater statistical power. In sum, the results of Studies 1 and 2 together provide robust support for the link between network closure and reduced social identity threat with women (but not men) entrepreneurs.



## 5 | General Discussion

Sara Blakely, an entrepreneur and the founder of Spanx, once remarked that, “When a person has an idea at that conception moment, it is the most vulnerable—one negative comment could knock you off course.” Blakely’s comment reflects a truism for women who aspire to be entrepreneurs. For any individual, launching a new venture is a difficult task where the odds of success are low. However, women, in particular, face additional difficulties when they are judged not on their merits as an entrepreneur, but through the lens of negative stereotypes about women in entrepreneurship. This chronic social identity threat that women face as entrepreneurs curtails their ambitions, reducing the likelihood they will continue and succeed in their ventures (Gupta et al. 2008). In our research, we highlight an important source of variation in women’s experience of social identity threat in entrepreneurship—the structure of their social networks. As theorized, we find that women who are embedded in closed networks experience less social identity threat because they trust their network members more, relative to women who are embedded in open networks. In other words, individuals at risk of social identity threat who report more trust in their networks are less worried about being judged through the lens of negative stereotypes.

### 5.1 | Contributions to Theory and Research

Our research contributes to gender and entrepreneurship research. Much previous work has highlighted the role of gender stereotypes in reducing women’s chances for success in entrepreneurship. As noted, many of the qualities deemed necessary for entrepreneurial success (e.g., risk-seeking, aggression, and assertiveness) are stereotypically attributed to men and denied to women (Bird and Brush 2002; Bruni et al. 2004). These stereotypes, whether consciously or unconsciously held, underlie negative evaluations of women entrepreneurs’ potential for success (Balachandra et al. 2019; Lee and Huang 2018), resulting in biased treatment (Lewis 2006; Shinnar et al. 2012). Moreover, the salience of these gender stereotypes to women undermines their ambition and persistence in entrepreneurship (Gupta et al. 2008; Gupta et al. 2009).

However, although the trajectory for women in entrepreneurship is, on average, less inclined toward long-term success and suggests that women may persist less than men, there are some women who nonetheless persevere in their entrepreneurial endeavors and perform highly. These women are exposed to the same gender stereotypes, and yet they seem to be inoculated against the social identity threat that derails other women. Existing research provides little insight into how we might account for this documented variance among women entrepreneurs. Our research contributes to remedying this neglect, by showing that women entrepreneurs who are embedded in closed social networks may be inoculated against the otherwise persistent social identity threat that they face.

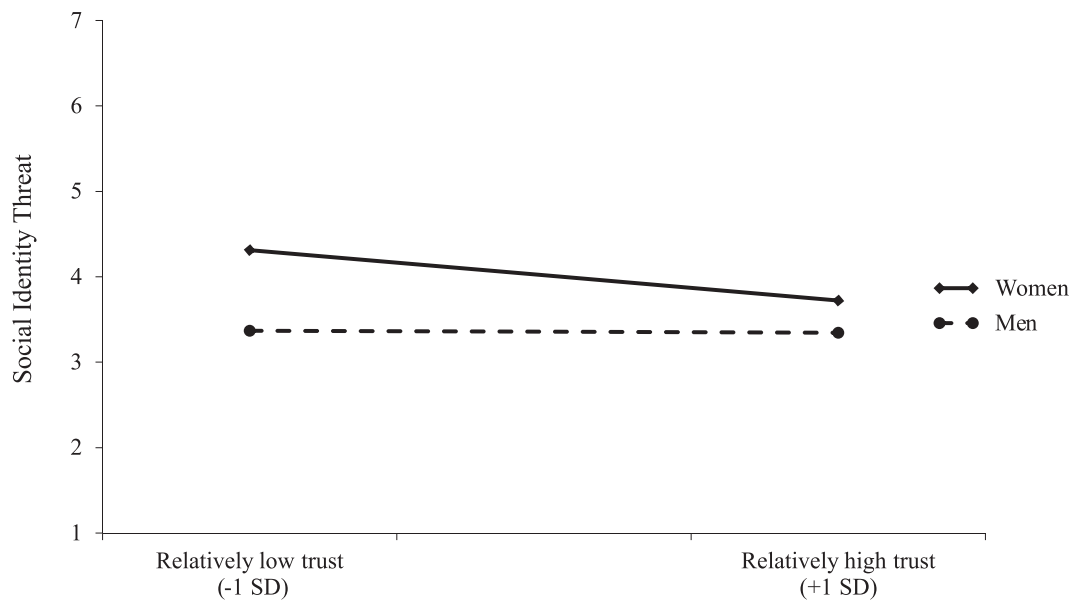
By focusing on women’s psychological experiences as entrepreneurs, we also contribute to the study of entrepreneurship more broadly. Founders of early-stage ventures face a liability of newness (Stinchcombe 1965), which requires

resources and support to overcome. Prior work has focused on the acquisition of financial resources (Huang and Pearce 2015; MacMillan et al. 1985; Tyebjee and Bruno 1984) or social capital (e.g., mentoring, advice, and introductions; Aarstad et al. 2010; Huang and Knight 2017; Walker et al. 1997), both of which reduce the barriers to success for entrepreneurs. However, psychological barriers, such as those that decrease entrepreneurs’ motivation and self-efficacy, can also affect a venture’s success and survival. Indeed, a founder’s ability to execute is one of the most salient considerations for success (Huang 2018), and our work suggests that psychological barriers to success may be just as potent as resource barriers in determining this ability.

Our work also builds our understanding of the micro-foundations of social networks by offering a theoretical account of how individual identity and social structure interact. Both social psychology and social network theory have long recognized that individuals’ identities are inextricably intertwined with their relationships. Indeed, identity is inherently relational—individuals can only articulate their sense of self by drawing similarities and contrasts with other people (Howard 2000). There are numerous dyadic accounts of the identity construction process (e.g., identity negotiation, Swann Jr. et al. 2009; symbolic interactionism, Serpe and Stryker 2011), and likewise, our knowledge—theoretical and empirical—of the group basis of identity is detailed and robust (Hogg 2016). In contrast, we have few (if any) perspectives of how the structure and patterning of individuals’ immediate social networks—that is, those interactions which constitute the majority of their professional and social lives—affect their identities.

Our account of the interplay between interconnectedness and social identity threat remedies this neglect in several ways. First, by focusing on the structural patterning of ties surrounding individuals, we provide empirical evidence that beyond the dyadic interactions in which identities are explicitly negotiated (Hall et al. 2015; Logel et al. 2009), identities are also affected by dynamics that are inherent in the wider social structure surrounding individuals. As such, we show that social network structure can reshape individuals’ experience of their gender identity, reducing the sense of vulnerability and need for constant vigilance to threats that otherwise burden women in entrepreneurship, despite not changing the extant landscape of actual threats or bias in the entrepreneurial ecosystem.

We also contribute to the micro-foundational perspective on gender inequality that arises in open social networks. Prior research has highlighted that a particular type of open network, namely a broker network, can in and of itself be a source of social identity threat to women because this network is male-typed (Brands and Kilduff 2014; Brands and Mehra 2019). Our work builds on this work in two important ways. First, whereas prior work focused on network perceptions, the current work focuses on network structure. Indeed, Brands and Mehra (2019) directly test whether network perceptions or actual network structure drive women’s reactions to being in a brokerage role in their friendship networks, finding that actual network structure is not a significant predictor of gender differences in performance, whether modeled alone (Studies 1 and 2) or in tandem with network perceptions (Study 2)<sup>11</sup>. In contrast, we found that the actual network structure affected women’s experience of social



**FIGURE 2** | Study 2: Plot of the interaction between trust (mean-centered) and gender predicting social identity threat.

identity threat, in a field-standard measure of network relations and in an experiment in which we randomly assigned individuals to interact in either a closed or an open social network. We suggest that this is because, in addition to individuals' perceptions of their network structure, relational elements that are endogenous to social structure, such as trust, can also affect women's experience of social identity threat in a domain (regardless of whether they accurately perceive their networks, or otherwise).

Further, whereas prior work has focused on expressive relationships, and in particular, friendship networks, we focus on instrumental relationships (i.e., those in which the primary basis of interaction is resource exchange). The theoretical assumption that underpins prior work on gender and brokerage is that because friendship is a communal relationship, it magnifies the perceived communality violation inherent in women's occupation of agentic brokerage roles and thus their sense of threat when they perceive themselves to broker between their network of friends (Brands and Mehra 2019; Brands and Kilduff 2014). However, in instrumental networks, agentic behavior "directed toward building and maintaining network relationships with specific network contacts and motivated by whether they have access to specific interpersonal resources" (Porter and Woo 2015, 1481) is normative (Clark and Mills 2012). The results of our work show that even in this normative context, women still report experiencing social identity threat—in this case directed toward the professional domain of entrepreneurship instead of the broker role—contingent upon the degree of closure in their social networks. We found this even when setting up a conservative test in Study 2, by explicitly directing individuals across conditions that the networking exercise was designed to help grow their skills, a motivational approach established in social psychological research to reduce the experience of social identity threat (Good et al. 2012; Stout and Dasgupta 2013).

Our research also challenges the dominant perspective in social identity threat research, which focuses on how cues in the immediate environment can both activate and attenuate experiences of

identity threat. According to this perspective, salient features of the environment have the power to shape individuals' experience of social identity threat to the extent that they are noticed by the individual and encoded as confirming (or not) that she is being judged through the lens of negative stereotypes (Cohen and Garcia 2008). Consequently, the limited research that has been conducted on social relations more broadly and social identity threat research has focused on individuals' immediate interactions and relationships, because these are the experiences that will be most salient in their cognitive assessments of the immediate environment (e.g., Logel et al. 2009; Walton and Cohen 2011). However, an individual's sense of self within a context is not constructed solely through his or her interactions with others in the immediate environment. Social network theory and research inform us that the *patterns* of relationships between people in context also shape the self-concept (Ibarra et al. 2005). This led us to propose the previously unidentified possibility that social network structures, and the relational norms that they give rise to, may shape individuals' experience of social identity threat. Therefore, in this research, we shifted from the situational cues approach to theorize that the structural elements of an individual's social environment may act directly on an individual's experience of identity threat. This approach expands the scope of social identity threat research beyond an individual's response to situational cues to consider the ways in which the wider social dynamics surrounding an entrepreneur may shape her experience of social identity threat.

In this way, our research provides a new direction for theoretical development in the study of social identity threat. By definition, social identity threat involves concern about being judged by others in a domain. However, so far, the literature typically has been curiously "anti-social" by failing to specify who in the domain might be judging, failing to differentiate between different members of the domain, and failing to examine the wider social dynamics between those members (see Shapiro 2011, for a notable exception). The results of our present examination suggest that these distinctions are extremely relevant—an individual's social

network can realize, or undermine, the experience of social identity threat within the domain as a whole. Our results highlight the utility of the social network perspective as an organizing framework for social identity threat research by investigating how social network structures and the intangible resources that flow through them may reshape the psychological experience of the self, even in performance contexts where broader social stereotypes endure.

## 5.2 | Limitations and Future Research

The goal of our research was to demonstrate evidence of the focal effect in a sample of entrepreneurs who would reasonably and predictably vary in social identity threat experiences. Although we were able to test and find support for our hypotheses in two gender-balanced samples, our samples lacked the racial diversity needed to examine racial group differences, or to examine network structure effects at the intersection of race and gender (e.g., Black women). Given that racial minority groups make up the largest growing populations among entrepreneurs in the United States (Kelley et al. 2021; Liu and Parilla 2020) and continue to face significant disadvantages in entrepreneurship (Vallejo and Canizales 2023; Fairlie et al. 2022), there is an imperative for research that addresses the critical role race plays in entrepreneurship (Bruton et al. 2023). Future work might consider investigating whether racial groups associated with negative stereotypes in entrepreneurship would similarly benefit from closed social networks, or whether long-standing racial gaps in trust (Smith 2010) would instead prevent racial minority entrepreneurs from realizing the interpersonal advantages of an interconnected network structure.

Furthermore, it is important to acknowledge that whereas the current studies focus on gender, social identities do not exist alone in a vacuum. People have multiple intersecting social identities that become salient in different ways depending on various individual and environmental factors (Petsko et al. 2022). These identity intersections are likely to have a significant impact on entrepreneurial outcomes. Indeed, recent trends report that Black women are starting businesses at higher rates compared to White women and White men (Kelley et al. 2021), suggesting different push and pull factors for different combinations of social identities. Furthermore, although our empirical studies demonstrate that, on average, women experience more social identity threat than men, men still report experiencing some—albeit low—levels of social identity threat. We speculate that this could be attributed to the possible representation of men in our samples with an intersecting disadvantaged identity in the entrepreneurial domain (e.g., men from a low socioeconomic status background or gay men)—a speculation that goes beyond the scope of the current research but points to exciting directions for future research.

A final, important avenue for future research would be to examine the interplay of network structure and stereotypes on both social identity threat and gender bias in tandem. As noted, gender stereotypes about entrepreneurs lead both to women experiencing heightened concerns about experiencing biased treatment, and to others treating women in gender-biased ways. Our research focused on women's experiences, finding that closed networks were associated with reduced concerns about receiving

gender-biased treatment from their network members. However, we do not have insight into whether women actually do experience less gender-biased treatment in interconnected networks. It is possible that interconnected networks lead to more biased treatment, less biased treatment, or have no effect on network members' propensity to treat others in gender-biased ways. Thus, this is an important question for future research, which could evaluate whether the trust afforded by a closed network is actualized. Given the limitations of our design, our findings do not support a causal relationship between women's experience of trust and social identity threat. Future research in this vein should consider manipulating trust in order to offer supportive evidence of the mechanism we theorize in the present research.

## 5.3 | Practical Implications

Our work may appear to have straightforward implications for women in entrepreneurship; however, we hesitate to prescribe that women entrepreneurs should build an interconnected network because although such a network buffers women from the experience of chronic social identity threat, open networks afford resources and opportunities that dense networks do not (Burt and Oppen 2017). Thus, we tentatively suggest that women may strive to adopt an approach to networking that allows them to reap both the resource benefits of an open network and the identity benefits of a closed network. Fortunately, existing research points to several strategies that entrepreneurs could adopt to achieve this. Women entrepreneurs could take a bifurcated approach to networking, building a closed network of expressive contacts and an open network of instrumental contacts (Ibarra 1992, 1993), building their ventures in a closed network before moving to an open network strategy (i.e., the cocoon strategy; Burt 2019; Burt and Oppen 2017), or oscillating between closed and open networks over time (Burt and Merluzzi 2016). Some tactics for creating closed networks include creating a community of practice, joining industry-specific associations, participating in invite-only events, or forming strategic partnerships with complementary businesses. To create open networks, strategies include attending conferences, joining online communities, or leveraging social media platforms.

Individual approaches to networking may be particularly effective when combined with institutional interventions that (1) seek to reduce social identity threat by altering various environmental cues (Brockner and Sherman 2019; Walton 2014) as well as (2) aim to shape the networks of aspiring entrepreneurs. For example, it could be especially helpful for organizations to build communities of practice (for closed network development) and establish larger conferences (to foster open networks), while at the same time adopting an empathic mindset intervention (Okonofua et al. 2016) that encourages a climate in which colleagues deliver constructive feedback (e.g., during idea brainstorming and workshopping) in a context of mutual respect and trust as opposed to criticism and judgment.

## 6 | Conclusion

The chronic threat of being judged through the lens of negative stereotypes curbs women's ambitions in entrepreneurship.

Our research highlights an important yet over-looked structural feature of the social environment that has the power to buffer women against the social identity threat they face—namely, the interconnectedness of their social networks. To gain a better understanding of the differing trajectories taken by women and men entrepreneurs, we urge scholars to examine more closely the features in entrepreneurs' social networks that can shape their success and ambitions.

### Conflicts of Interest

The authors declare no conflicts of interest.

### Data Availability Statement

The anonymized data that supports the findings of this study are available in the following OSF link: [https://osf.io/689d7/?view\\_only=fce771691bdf421791d6cc4b7ab96f2b](https://osf.io/689d7/?view_only=fce771691bdf421791d6cc4b7ab96f2b).

### Endnotes

<sup>1</sup>It should be noted that this same process could facilitate the development of *distrust* through the sharing of negative interpersonal information. Indeed, empirical work in organizational settings points to an early amplification of reputational information, such that the valence of the initial gossip that circulates about a person—positive or negative—tends to be echoed across the network (Burt 2001). This means that over time, reputations tend to skew positive or negative, with accompanying trust or distrust of the focal actor. However, we theorize that the accumulation of distrust is less likely to occur in the entrepreneurial context of our study, because the networks that we study are unbound by any formal organization or institution. Rather, the networks we study are discretionary in the truest sense of the word: If an individual strongly distrusts another individual, it is unlikely that they would continue to engage in a professional relationship with them.

<sup>2</sup>We initially surveyed 323 (136 men, 184 women, 3 participants did not report gender) entrepreneurs, with 167 individuals indicating that they had 0 or 1 person in their professional network, meaning that it was not possible to calculate a density score for them. This left us with a final sample of 150 (56 men, 94 women) entrepreneurs. It may seem surprising that so many participants from our initial sample indicated that they had only 0 or 1 person in their professional network, but this is common for early-stage entrepreneurs, who often restrict their definition of professional network to those who are directly embedded in the entrepreneurship ecosystem and can provide resources from within this arena (Huang and Knight 2017). To ensure there was no evidence of selection bias between participants who were included and excluded from the final sample, we performed a nonresponse bias analysis comparing the nonrespondents to the respondents (see Iorio, 2022, for a similar approach). A binomial regression model, with the dependent variable taking a value of one in case of a response and zero otherwise, showed that the probability of a participant responding did not relate to any of the available demographic variables, suggesting there was no evidence of selection bias in our final sample.

<sup>3</sup>This study received IRB approval (REC389: Entrepreneurs' and Investors' Social Networks). The data were collected in 2016. No incentives were offered to participants.

<sup>4</sup>Participants were able to indicate multiple ethnicities.

<sup>5</sup>We must note that we also included a measure of incorporation, which could be considered a proxy for persistence in the entrepreneurship domain. Because many factors could influence an entrepreneur's decision to incorporate their venture, we emphasize that we treat our findings on this variable as purely exploratory. To foster open

science and encourage future investigations, we report our findings in Supplemental Online Materials.

<sup>6</sup>This study received IRB approval (REC18-0384: Entrepreneurial Teams and Startup Investment Decisions). The data were collected in 2019. No incentives were offered for participation.

<sup>7</sup>We were not able to collect race or ethnicity data from the participants.

<sup>8</sup>Cluster randomization occurs when participants within a given group (i.e., cluster) are randomly assigned to different experimental conditions as a group rather than as individual participants (Bloom 2005; Crano et al. 2014).

<sup>9</sup>The content of all three sessions was otherwise identical.

<sup>10</sup>We note that at the conventional level of significance (i.e., 95% confidence interval), the index of moderated mediation was not statistically significant ( $-0.04$ , 95% CI  $[-0.0970, 0.0061]$ ). This is likely because field experiments produce smaller effect sizes compared to tightly controlled lab settings (Prentice and Miller 1992; Shadish et al. 2002; Song et al. 2018). For this reason, we report the index of moderated mediation at 90% confidence intervals. Compared to the 95% confidence interval, the 90% confidence interval provides a less conservative estimate of the true effect in the population (Shadish et al. 2002).

<sup>11</sup>Brands and Mehra (2019) include an additional study in which they experimentally manipulate perceptions of brokerage through a vignette study. This design cannot distinguish between actual and perceived networks because it involves a hypothetical scenario. Thus, it cannot speak to the question of whether perceived or actual networks account for gender differences in brokerage.

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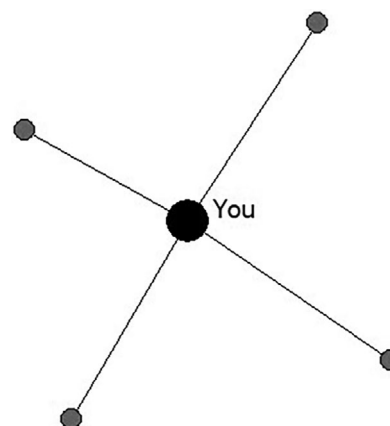
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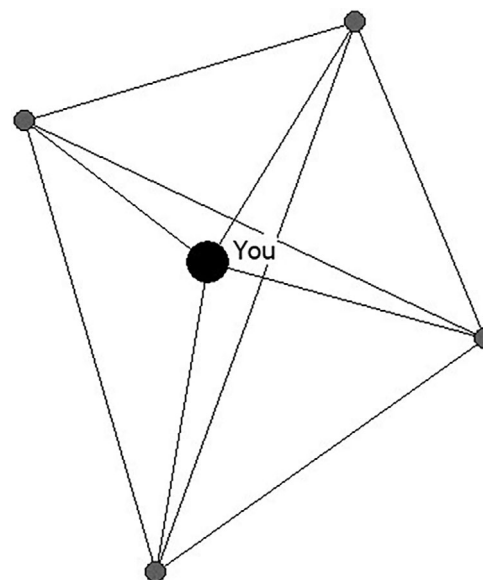
## Appendix

### Study 2: Network Diagrams

#### Open network condition



#### Closed network condition



## Supporting Information

Additional supporting information can be found online in the Supporting Information section.