



Women who LinkedIn: The gender networking gap among executives

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ABSTRACT

We investigate the patterns of executive networking on LinkedIn, a crucial platform for understanding the persistent gender disparities in leadership positions. Overcoming the challenges of accessing LinkedIn's network data, we have curated a comprehensive dataset of Spanish women and men executives. This unique dataset includes information about their connections and, more importantly, whom they do not connect with. At the baseline level, our findings indicate a prevalent tendency for preferential attachment, where individuals are more likely to connect with popular contacts. Additionally, there is a pronounced inclination towards homophily, characterized by forming connections based on gender, as well as shared organizational and academic affiliations. Building upon the tenets of Social Identity Theory, we identify significant gender differences on LinkedIn's executive networking. Women executives, positioned as out-group members within executive networks, suffer from a networking gender gap resulting in being under-connected and being connected with less popular individuals. However, our research methodology helps us uncover two different strategies women use to overcome this gap. They rely, more than men, on gender homophily to make contacts. Besides, women executives adopt recategorization strategies exhibiting a higher preference for contacts with shared organizational and academic affiliations than men. These findings disrupt two common assumptions: the fallacy of implied connections based on shared affiliations and the overlooked gender differences in networking pools, therefore exposing two previously unidentified gender data gaps.

1. Introduction

LinkedIn, hailed as the premier portal for job searching, is the world's largest social professional networking platform with more than 930 million members in more than 200 countries and territories worldwide.¹ But in today's digital age, LinkedIn is not just limited to an online job marketplace. The platform has evolved into an expansive professional ecosystem offering a myriad of opportunities for career development, visibility, content sharing, and professional networking. Indeed, a survey among LinkedIn users indicates that their key motivation for using the platform is "to strengthen one's professional network" (Woolf, 2023). These networking opportunities frequently yield tangible outcomes, such as coveted job offers, partnerships, and access to other valuable resources essential for career growth (Davis et al., 2020). Given this significance, LinkedIn emerges as a vital contributor to the United Nations' Sustainable Development Goal Target 5.5: ensuring women's full and effective participation and equal

opportunities for leadership at all levels of decision-making (United Nations, 2023).

Since Ibarra (1993)'s pioneering work about the social underpinnings behind gender disparities in networks, a vast body of research has predominantly focused in understanding offline network dynamics (e.g., Allemand et al., 2022; Bierema, 2005; Brands & Kilduff, 2014; Forret & Dougherty, 2004; Greguletz et al., 2019). In stark contrast, in this paper we steer the conversation towards the online realm employing a unique data collection strategy that allows us to observe real connections on LinkedIn. By analyzing not only executives' actual connections, but crucially, with whom they are not connected, we close a gender data gap that allows us to answer whether there are gender differences in executive online professional networking. Leveraging insights from the preferential attachment and homophily principles and Social Identity Theory (Tajfel & Turner, 1979), we investigate the interplay of gender dynamics within the digital corridors of LinkedIn to offer a novel perspective on how traditional offline

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¹ <https://about.linkedin.com>.

gendered group dynamics might be reproduced on online professional networking platforms.

Social networks (comprising connections with family, friends, colleagues, and more) are instrumental in job searching, often yielding more insights into career opportunities than formal channels (Franzen & Hangartner, 2006; Granovetter, 1973). For executives aiming to reach top leadership roles, cultivating these networks is considered essential (Allemand et al., 2022; Sharone, 2017; Sheridan & Milgate, 2005). Yet, women encounter distinct obstacles when navigating these networks. Empirical evidence suggests that women tend to gravitate towards smaller, more cohesive networks built on trust, which, while beneficial for interpersonal relations, might not always serve their professional aspirations effectively (Burt, 1998; Ibarra, 1992; Lutter, 2015; Moore, 1990; van Emmerik, 2006). Gender homophily –the propensity to form networks with those of the same gender– further complicates this. Such homophilous tendencies tend to limit women’s exposure to influential contacts crucial for career progression, as networks tend to be male-dominated (Belliveau, 2005; Gremmen et al., 2013; Ibarra, 1992; Kegen, 2013; Moore, 1990). Additionally, gendered modesty often leads women to undervalue their market worth, contrasting with the proactive stance generally exhibited by their male counterparts (Greguletz et al., 2019). Altogether, these tendencies tend to widen the gender gap in offline professional networking.

Online networking platforms, such as LinkedIn, have the potential to neutralize this gender networking gap. While traditional offline networks often restrict women to close-knit connections, the digitization of networking could significantly overturn this imbalance (Aten et al., 2017). Since the need for face-to-face interaction is no longer required, online networks can potentially help dismantle the physical, geographical, and social barriers that tend to marginalize women in offline networks. Hence, online networks have the potential to level the playing field in networking. Yet, it is of paramount importance to rigorously investigate whether this potential has indeed come to fruition in the online realm. If online platforms have indeed succeeded in leveling the playing field in networking, they can serve as powerful tools in advancing gender equality, especially in corporate top management positions, a sector historically marked by gender imbalances. However, if these platforms merely perpetuate offline gendered networking patterns, we stand at the risk of squandering an invaluable opportunity of progressing in terms of gender equality. The stakes are high, and the question is not merely academic but foundational to women’s professional trajectories.

Our research fills a critical void in management scholarship both theoretically and empirically. First, our work advances the understanding of social network theory and gender dynamics by shedding light on the strategies women executives employ to navigate the gender networking gap in shaping their online networks. In addition to the conventional expectations set by preferential attachment and homophily principles, which suggest that popular individuals attract more connections and that similarity fuels attraction, we theorize that women executives leverage more complex networking strategies. Due to the out-group status conferred by their gender, women executives adopt versatile strategies to connect with similarly positioned, less popular individuals in the network, and they also strategically recategorize their identities. This recategorization allows women to draw upon various identity markers, such as their alumni status or corporate affiliations, as superordinate categories beyond their gender bridging the gender networking gap in online professional contacts. Therefore, our theoretical contribution lies in expanding and refining concepts such as homophily and recategorization to encompass the complexities introduced by gender dynamics in online professional networking. Second, we make an empirical contribution by rigorously examining the networking connections of executives on LinkedIn. This is crucial for understanding the continuation of the gender gap in executive roles. Traditional social network research often faces the challenge of accurately identifying connections. This research is typically approached

through data collection strategies including surveys or by inferring connections from common attributes like zip codes, university affiliations, or company experience (e.g., Afzali et al., 2021; Aten et al., 2017; Balsam et al., 2017; Ferris et al., 2017). However, these methods may overlook crucial facts. Firstly, the absence of data on the pool of potential connections can skew the analysis of networking preferences (e.g., having 60% male connections in a group that is 80% male does not indicate a preference for male connections). And secondly, individuals may exhibit differences in preferences to connect with those sharing common affiliations. These shortcomings can impact our understanding of networking patterns, in particular as they relate to gender differences in networking. Our unique dataset and our empirical strategy permit us to narrow this gender data gap.

LinkedIn contains information on both the features of the individuals and their contacts. However, unlike other platforms such as X (formerly Twitter) or Facebook, web-scraping of connections is not permitted on LinkedIn nor it has in-house data downloaders (LinkedIn, 2024). This challenge has resulted in limited prior research on this critical subject (e.g., Aten et al., 2017; Kalhor et al., 2023; Kashyap & Verkroost, 2021). Thus, to address this gender data gap, we have devised an innovative sampling strategy centered on executives. We particularly focus on executives as this group of individuals is expected to actively engage in networking for professional reasons including promotions (Allemand et al., 2022; Sharone, 2017; Sheridan & Milgate, 2005). This expectation is such that many leadership programs have been developed to equip executives with the skills needed to improve their networking abilities (Cullen-Lester et al., 2017). Leveraging propensity score matching, we create a dataset of statistically comparable LinkedIn profiles of men and women executives. While downloading thousands of profiles and connections manually has been a labor-intensive task, it has resulted in an unparalleled and rich dataset. This unique dataset, in terms of size, scope, and completeness has empowered us to delve deep into the intricacies of networking patterns among executives on LinkedIn and what makes them (and especially women) more likely to connect on LinkedIn.

By investigating online networking patterns on the LinkedIn platform, our overarching goal is to determine whether the platform genuinely provides a level playing field for women executives in professional networking or not. Our findings suggest that traditional networking biases, such as preferential attachment (Barabási & Albert, 1999) and homophily (Lazarsfeld & Merton, 1954), are inadvertently perpetuated on LinkedIn. This is evident in the systemic challenges female executives encounter. Women, as out-group members, tend to have fewer connections and are more inclined to connect both with other women executives and less popular executives. Moreover, women executives demonstrate a stronger propensity, than men, to establish connections based on shared affiliations, such as having attended the same university or having worked at the same company. This can be seen as a bid to bridge the divide between their out-group membership and the elite in-group. These gender differences suggest that, by ignoring this gender data gap, networking studies may have overlooked important differences between women and men networking styles. These results also hold significant implications for organizational practices. As a growing number of talent acquisition decisions –especially for senior roles– rely heavily on information from online professional networking platforms (Davis et al., 2020; Ladkin & Buhalis, 2016; Ollington et al., 2013; Roulin & Levashina, 2019; Ruparel et al., 2020; Sharone, 2017; Woolf, 2023), understanding the biases in these platforms is of utter importance. Notably, most recruiters (87%) believe LinkedIn is most effective for vetting job candidates, and nine in 10 recruiters use LinkedIn to search for talent (Woolf, 2023). If organizational hiring and promotional decisions are influenced by networking patterns that are biased in favor of men, the existing gender disparities in top-tier roles will not only persist but could even worsen. As such, our study is both timely and relevant. By addressing these issues, we aim to prompt proactive measures, ensuring that the digital era of recruitment does not inadvertently solidify gender inequalities but instead paves the way for a more

equitable professional landscape.

2. Theoretical framework and hypothesis development

In this section, we present the theoretical framework surrounding the mechanisms underlying the networks formed by executives on LinkedIn, and we introduce our hypotheses. First, we introduce our baseline expectations, based on the preferential attachment principle (Barabási & Albert, 1999), the homophily principle (Lazarsfeld & Merton, 1954), and social identity theory (Tajfel, 1978; Tajfel & Turner, 1979). This baseline serves as a springboard to delve deeper into the gender gaps in networking patterns observed among executives. Next, we draw both from social identity theory (Tajfel, 1978; Tajfel & Turner, 1979) and recategorization theory, to theorize and hypothesize how women executives navigate the complexities of the online networking realm.

2.1. Baseline: executive online networking

2.1.1. Popularity attraction in executive online networking

The principle of preferential attachment (Barabási & Albert, 1999), fundamental to understanding social network dynamics, posits that individuals are inclined to form connections with popular network members due to two primary motivations: access to resources and reputational benefits. First, popular individuals within a network often hold significant informational, power, and resource advantages (Brass, 1985; Mehra et al., 2006; Yang et al., 2019). Thus, connecting to popular network members can grant direct access to the valuable resources these people hold (Klein et al., 2004). For executives, forming connections with these individuals is strategic, facilitating access to vital resources necessary for informed decision-making and securing competitive advantages. Second, connecting with popular members in the network can signal one's own social status (Burt, 1995, 1998; Klein et al., 2004). In environments where fast and reliable cues about an individual's credibility, competence, and skills are essential, people often resort to heuristics. Therefore, being connected to well-regarded network members signals an executive's own social status and credibility. This association with popular individuals not only enhances an executive's social standing within the network but also contributes to a positive feedback loop, increasing their attractiveness as a connection to others (Burt, 1998; Klein et al., 2004).

Despite the clear implications of preferential attachment in offline networks, it is unclear what this may mean for executive networks on LinkedIn. What we do know is that friendships formed on online social networking sites like Facebook (e.g., Rivera et al., 2010) and in virtual worlds (e.g., Utz & Jankowski, 2016) follow these preferential attachment patterns (Cirkovic et al., 2023). Given that executives are strategic people seeking ways to enhance their professional standing and resource base (van Dijck, 2013), it is likely that they may seek to build networks with popular fellow executives when engaging on online networking through sites like LinkedIn. Notably, popularity is readily visible through profile pages on online networking platforms through the number of followers, making popularity a tangible concept (Ollington et al., 2013). Connecting to those popular executives on LinkedIn, i.e., those with many followers, can provide access to the resources and information these executives may control, such as industry insights, potential business opportunities, and valuable knowledge all relevant for executive decision-making and strategic advantage (Anand et al., 2002). These popular executives shape business narratives, introduce disruptive strategies, and provide a bird's-eye view of emerging trends and opportunities, exemplifying leadership potential and making them invaluable actors within professional networks (Balkundi & Kilduff, 2005; Kim & Malek, 2017; Ladkin & Buhalis, 2016). Moreover, connecting with popular executives on LinkedIn can also serve as a mechanism for status enhancement with potential reputational benefits, where being associated with popular platform users can signal an executive's own credibility and influence. This matters as, within the

executive sphere, image management, promoting, and branding are key for career progression (Gorbatov et al., 2019; Rangarajan et al., 2017). Thus, executives may strive to connect with popular peers on LinkedIn driven by the pursuit of access to resources and social status. Furthermore, this preferential attachment dynamic may be further amplified on online networking platforms like LinkedIn, where those who are already popular tend to appear more frequently as connection recommendations (Castillo-de Mesa & Gómez-Jacinto, 2020; Soleimani et al., 2022; van Dijck, 2013). This heightened visibility enhances their allure, potentially drawing peers into establishing more connections with them, thereby perpetuating their cycle of network expansion.

In conclusion, the strategic importance of connections on LinkedIn's executive networks lends support to the principle of preferential attachment. We expect these patterns to be further reinforced by the platform's connection recommendations, which can amplify the presence of those who are already popular. Therefore, based on this understanding, we propose our first hypothesis:

Hypothesis 1. The likelihood of an executive having a connection with another executive on LinkedIn increases with the popularity of the other executive.

2.1.2. Homophily in executive online networking

According to social identity theory, individuals' attraction towards others is largely shaped by the categorization of the self and others into distinct social groups (Tajfel, 1978; Tajfel et al., 1971). That is, people are inclined to form associations and exhibit preference for members within their own social groups (in-groups), which are defined by shared demographic and social characteristics, leading to a stronger sense of identity and solidarity within these groups. In the networking realm, this proclivity of building connections with similar others, widely recognized as homophily,² has been extensively documented across various dimensions such as gender (e.g., Brass, 1985; Ibarra, 1992; McPherson et al., 2001; Moore, 1990), educational background (e.g., Hall, 2010; Tholen et al., 2013; Yang et al., 2019), and organizational affiliations (e.g., Bardon et al., 2014; Paluch et al., 2024). Homophilic connections tend to be driven by the pursuit of trust and reciprocity stemming from better communication, coordination, and more predictable behavior, all essential when forging professional relationships (e.g., Ertug et al., 2022; Ibarra, 1992; McPherson et al., 2001). These connections, in turn, have been associated with reduced turnover, better job evaluations, job prestige, and higher wages (e.g., Bardon et al., 2014; Chen & Volker, 2016; Hall, 2010; McPherson et al., 1992; Paluch et al., 2024; Tholen et al., 2013; Yang et al., 2019).

Gender plays a key role, not just as a demographic marker but as a basis for shared identity, experiences, and professional support especially in contexts marked by structural barriers that limit cross-gender networking opportunities (Fernandez & Campero, 2016; Ibarra, 1993). This is especially true in executive settings, where gender-segregated labor markets and men's dominance in higher organizational roles often prevent women from forming gender-diverse networks (Bierema, 2005; Cech & Blair-Loy, 2010; Fernandez & Campero, 2016). Since men in high places are in a position to build and strengthen their networks, these "old boys' networks" serve as barriers excluding women from networking opportunities with other men (Brass, 1985; Burzynska & Contreras, 2020; Mateos de Cabo et al., 2022). This constrains women from forming ties with fellow men executives, while facilitating men to form ties with other fellow men executives (Brands et al., 2022; Burzynska & Contreras, 2020; Fernandez & Campero, 2016; Mateos de Cabo et al., 2022; McDonald, 2011). Thus, whether it is by choice or due to structural barriers, there is a tendency to build gender-homophilous networks (Kossek et al., 2016).

² See Ertug et al. (2022); Lawrence and Shah (2020); McPherson et al. (2001), for a comprehensive review.

Furthermore, homophilic connections, based on having attended the same university or having worked at the same organization, underscore the structural advantages such connections can offer as a common ground for career mobility, advancement, and opportunity exploration (Hall, 2010; Yang et al., 2019). By connecting with fellow alumni, executives can more easily access instrumental help, such as exploring career opportunities, insights regarding “fit” with potential employers, getting job interviews, getting jobs, and engaging in business ventures (Barbulescu, 2015; Mael & Ashforth, 1992; Obukhova & Kleinbaum, 2022). People also tend to connect with (former) colleagues to seek new job placements, recruiting, finding business opportunities, broadening their client base, and gaining insights on fresh business prospects (Dachner & Makarius, 2022). Indeed, executives realize “that networking with former colleagues can lead to opportunities ranging from job offers to business prospects” (O’Sullivan, 2005). As such, this type of homophilic connections are often regarded as a social capital efficiency indicator (Chen & Volker, 2016).

While homophily provides a theoretical expectation for the patterns we observe when executives build their offline networks, where face-to-face interactions are the standard, it is unclear what this may mean for executive networks on LinkedIn. Although online networking platforms present the opportunity to meet a wide and varied range of people, these platforms also facilitate finding and connecting with others who share similar characteristics. Indeed, we know that networks formed on online combat games (e.g., Szell & Thurner, 2013), online social networks (e.g., Mazur & Richards, 2011; Volkovich et al., 2014), and Enterprise Social Media platforms (e.g., Di Tommaso et al., 2020) follow gender-homophilic patterns. We also know from a LinkedIn study based on self-reported data that people indicate having more gender-homophilous contacts (Aten et al., 2017). Therefore, we expect to observe at least gender-homophilic tendencies in the network formation processes of executive networks on LinkedIn.

Overall, we expect that sharing similar attributes like gender, having attended the same university, and having worked at the same organization can play an important role in shaping online executive networking patterns as they do in offline settings. First, executives may opt for homophilous connections due to their instrumental benefits (Feld & Carter, 1999; Friedkin, 1978; Sparrowe et al., 2001). As in the offline context, homophilous online connections on LinkedIn can offer specialized resources, advice, and support relevant to executives’ strategic professional goals. In this regard, the visibility of education and employment information on LinkedIn profiles makes it easier for executives to identify and connect with fellow alumni and former colleagues. Furthermore, gender, which can be more readily discerned from names and profile pictures on LinkedIn, may ease the creation of gender-homophilous connections. Particularly considering that LinkedIn networks may mirror labor market gendered structures (Utz & Breuer, 2019), we expect the inclination to connect with others based on the same gender, whether it is by chance or due to structural barriers, to mirror offline networking behaviors.

Second, the strategic formation of homophilous connections can also serve as a protective measure against the potential risks inherent in more heterogeneous networks, i.e., relational uncertainty, such as misuse of information or relational conflicts (McPherson et al., 2001). On a platform like LinkedIn, where the primary use of networks is instrumental, the trust engendered by homophilous ties is crucial for facilitating professional interactions (McPherson et al., 2001), like providing recommendations or job leads. Moreover, in online networking, where a single connection can grant access to one’s broader network (Ollington et al., 2013), the ability to verify and authenticate connections becomes critically important. Hence, homophilous connections can be essential for adding credibility and legitimacy to online relationships.

Finally, leveraging shared attributes such as gender, having attended the same university, or having worked at the same organization as heuristics simplifies the complex task of forming online networks on LinkedIn (Matthes et al., 2020). Given the platform’s extensive network

possibilities and the brisk pace of digital interactions, these commonalities can offer practical means to navigate through the multitude of potential connections fostering a sense of familiarity amid a vast sea of contacts.

Drawing from this intricate interplay between affiliation based on shared attributes, we propose the following hypotheses:

Hypothesis 2a. Executives are more likely to have connections on LinkedIn with other executives of the same gender.

Hypothesis 2b. Executives are more likely to have connections on LinkedIn with other executives who have attended the same university.

Hypothesis 2c. Executives are more likely to have connections on LinkedIn with other executives who have worked at the same company.

2.2. The gender gap in executive online networking

Due to the gendering of labor markets, women are a numerical minority in the power elites of organizations, particularly within executive circles (Benton, 2021; Kanter, 1977; Moore, 1990). This disparity has unfavorably placed women as out-group members with a lower in status within organizational hierarchies, rendering skewed perceptions of their professional competencies in comparison to men, the in-group members (Moore, 1988; Ridgeway, 2001; Ridgeway et al., 1998; Tajfel, 1978; Tajfel et al., 1971). For example, women’s accomplishments often go unnoticed or undervalued, whereas any missteps or failings tend to overshadow their contributions (Pettigrew & Tropp, 2006). As a result, women, even if qualified, are often excluded from professional circles, reducing their overall networking visibility and exposure (Kanter, 1977). On the other hand, men, who tend to perceive themselves as more capable and competent than women, can build network connections with others more easily (Woehler et al., 2021). The systemic lack of status and visibility women face in professional contexts can impede their ability to form and attract connections at the same rate as men do (Di Tommaso et al., 2020; Ibarra, 1992; Moore, 1988). Indeed, studies have found that women, as out-group members, tend to have fewer connections than men and are often marginalized in scientific collaboration networks (e.g., Bellotti et al., 2022; Ghiasi et al., 2015; Hanson et al., 2020), student networks (e.g., Mehra et al., 1998), and corporate networks (e.g., Burzynska & Contreras, 2020; Carroll & Teo, 1996; Grau et al., 2020; Kanter, 1977; Mateos de Cabo et al., 2022), just to mention a few.

Gender role expectations can further compound these challenges. Women perceived as communal may face backlash for engaging in networking behaviors seen as agentic (Brands et al., 2022). This can potentially limit their networking efforts and the size of their professional networks compared to men, who are seen more in line with agentic expectations (Eagly & Karau, 2002; Eagly & Steffen, 1984). Additionally, gendered norms around modesty may deter women executives from actively promoting their successes, a key component of networking (Brands et al., 2022; Greguletz et al., 2019; McGuire, 2000; Singh et al., 2002; Smith & Huntton, 2013; van Dijck, 2013). Since being able to access individuals with whom to connect and self-promotion are important for executive networking (Singh et al., 2002), women executives may build connections with fellow executives at lower rates than their male counterparts.

This backdrop raises questions about how these dynamics translate to online executive networks like LinkedIn. As we expect LinkedIn to mirror the gender segregation patterns observed in labor markets and to make gender more salient—through profile pictures and name on profiles—women executives may still be seen as out-group members. This can further reduce their networking capital in comparison to men (Baumann & Utz, 2021). As perceptions toward women’s competence may remain negatively skewed (Ridgeway, 2001; Ridgeway et al., 1998), LinkedIn users may be less likely to endorse and engage with them, hindering their visibility and opportunities to interface with

potential contacts (Roulin & Levashina, 2019). In addition, given that these platforms are arenas for professional self-promotion, gendered modesty can dissuade women executives from boasting about their achievements inhibiting their online networking efforts (Altenburger et al., 2017; Deshpande et al., 2020; Simon et al., 2023). As such, we expect women executives to face challenges when fostering their LinkedIn networks. Consequently, we hypothesize:

Hypothesis 3. Women executives are less likely than men executives to have a connection with another executive on LinkedIn.

2.3. Navigating the gender gap in executive online networking

2.3.1. Women's networking with less popular contacts

Due to women's out-group membership and resultant lower social standing within professional networks (Ibarra, 1992; Kanter, 1977), we expect women to have more connections with less prominent individuals than men. This trend can be traced back to the historically rooted and structurally embedded challenges that have consistently marginalized women from professional networking circles (Belliveau, 2005; Burt, 1998; Singh et al., 2010). Evidence of this systemic marginalization is supported by organizational studies, which find that women's networks tend to be substantially less integrated with prestigious individuals (McGuire, 2000; Mehra et al., 1998; Scott, 1996).

Several factors underscore this observed pattern. On the one hand, women, aware of their out-group membership and the challenges this membership poses for their networking endeavors, may be dissuaded to connect with more popular network members if they believe these efforts are less likely to succeed (Lin, 2001). Consequently, they may prefer engaging with less popular network members in anticipation of a presumably higher likelihood of forming connections with them. Furthermore, recognizing their own marginalization in networking circles, women's struggles may resonate with those faced by other out-group members viewing them as allies in a shared struggle (Ibarra, 1993). This affinity, coupled with women's communal orientation, which accentuates nurturing and supporting others, could push women to form bonds with these less popular individuals (Diekmann et al., 2010).

On the other hand, this pattern can be also attributed to the exclusion by popular network members. That is, exclusionary pressures leading to structural marginalization of underrepresented groups, including women, may stem from biases (Mehra et al., 1998). These biases include negative stereotypes toward out-group members and an exaggeration of differences by majority members, i.e., in-group members (Kanter, 1977). Since women, as out-group members, often occupy lower-ranking positions and control fewer resources, in comparison to men, they tend to be perceived as less competent (Ridgeway, 2001; Ridgeway et al., 1998). Therefore, popular network members may be less likely to establish connections with them.

Empirical evidence supports the notion that the structural marginality of women in professional networks is overdetermined, as it could be caused both by women's homophilic preferences toward less-popular individuals and exclusionary pressures from popular network members. To illustrate, research in corporate-government affairs suggests that women are more likely to engage with peers of equal or lower status, whereas men prefer to interact with high-status people, i.e., those in top-level positions (Scott, 1996). Women also tend to hold peripheral positions in elite circles (Moore, 1988), MBA student networks (Mehra et al., 1998), and in engineering collaboration networks (Ghiasi et al., 2015), due to the marginalization that they experience by network members who occupy more popular roles (Mehra et al., 1998). Also, network members tend to be less prone to invest in building relationships with women than they are with men, attributing this to beliefs that place women below men in social hierarchies (McGuire, 2002).

If women's networking experiences in offline settings mimic their online experiences, we might expect women executives to have more connections with less popular peers than men on LinkedIn. Homophilic

tendencies based on status, i.e., popularity and exclusionary mechanisms can explain this expectation. First, on LinkedIn, where the number of followers can signal status, women, as out-group members with lower status, may naturally gravitate towards forming connections with others who share similar status levels. We expect this inclination to reflect in social and professional executive spheres. Given that LinkedIn emphasizes professional achievements and visibility, women may find it more challenging to access or be sought out by higher-status connections, leading to a network predominantly composed of individuals with similar or lower status markers, such as fewer followers. Second, women may face structural barriers to entering or being included in higher-status networks. This disadvantage can manifest as exclusion from higher-status circles, potentially resulting in women's LinkedIn networks having more lower-status connections, as these are the ties that may be more readily available and welcoming to them. Specifically, these patterns could be unintentionally amplified on LinkedIn. As women engage with individuals who are less prominent, the platform's algorithms may continue to suggest contacts of similar status. This creates an algorithmic feedback loop, reinforcing existing networking patterns and potentially limiting women's opportunities to access a wider and more prestigious network (Soleimani et al., 2022). This scenario leads to the following hypothesis:

Hypothesis 4. Women executives are more likely than men executives to have connections with less popular individuals on LinkedIn.

2.3.2. Women's gender-homophilous networking: gendered networks strategies

Particularly in contexts where women are the numerical minority and out-group members, gender identity can serve as a basis to form supporting relations (Mehra et al., 1998). In other words, individuals often feel a sense of identity with those who have similar but relatively uncommon traits within a given context, like gender in executive circles. This can allow women executives to navigate the challenges they face in male-dominated executive networking spheres, like the "old boy's networks." By having more gender-homophilous connections, women can draw from the benefits homophilous ties can offer and they can also access unique gender-relevant resources crucial for their professional advancement, such as professional emotional support (Ibarra, 1992; van Emmerik, 2006), mentorship (Obukhova & Kleinbaum, 2022; Singh et al., 2010), and role models (Perriton, 2006). Notably, these connections tend to be characterized by their approachability and helpfulness, offering vital support for women's career development (Obukhova & Kleinbaum, 2022). This inclination towards gender-homophilous networking has received empirical supported in political settings (Wojcik & Mullenax, 2017) and student networks (Yang et al., 2019), where women legislators and female MBA students, respectively, tend to have more gender-homophilous networks, in comparison to men. Altogether, by having more gender-homophilous connections, women can counteract the limited resources and barriers they encounter in professional networking.

While women tend to have more gender-homophilous connections than men, it is unclear what this may mean for executive networks on LinkedIn. Notably, similar patterns have been observed in online networking settings. Particularly, women on an enterprise social media platform exhibit more gender-homophilous networks, relative to men, even after accounting for the availability of both genders (Di Tommaso et al., 2020). This suggests that it is likely for women on LinkedIn to also have more gender-homophilous connections than men. Just as women have been historically marginalized in offline corporate networking environments, this dynamic may very well extend to LinkedIn, where the pervasive influence of "old boys' networks" may still operate, albeit in less overt ways. This potential replication of offline dynamics suggests that women on LinkedIn might similarly lean towards forming connections with other women, seeking solidarity and support within their gender group. Moreover, the distinctiveness of their gender identity may

be stronger as digital platforms like LinkedIn, where profiles facilitate the identification of fellow female executives through names and pictures as well as information about whether they are executives. These features allow women to directly identify fellow female executives, without the need for formal introductions, potentially making engagement within gender groups even more accessible than in offline contexts. In this manner, women may be able to tap into a larger female pool of potential mentors and role models, thereby enhancing their ability to draw on these essential supports for career development.

Last, considering the vast potential for connections such platforms offer, women may prefer to establish networks with other women to reduce relational uncertainty. Gender-homophilous networks offer more predictable relationships, enhance communication, and build trust (Greguletz et al., 2019). Consequently, it is reasonable to expect a higher level of gender-homophilous connections among women executives on LinkedIn compared to their male counterparts. This tendency may not be merely a reaction to exclusion, i.e., push out, but a strategic way to overcoming marginalization and aiding professional growth within the corporate realm, i.e., opt out (Kossek et al., 2016). Given this backdrop, we propose our next hypothesis:

Hypothesis 5. Women executives are more likely than men executives to have connections on LinkedIn with other executives of the same gender.

2.3.3. Women's in-group-out-group bridging: recategorization strategies

In light of their exclusion from male-centric networks, women executives may adopt a recategorization strategy by redefining themselves in ways that foster acceptance within the broader executive community. According to Self-Categorization Theory (Turner et al., 1987), individuals may adjust and recategorize their identities. For women executives striving to establish or sustain their presence within elite, often male-centric networks, having the “right” identity can be particularly important as a way to compensate the perceived handicap associated with their gender (Moore, 1988). Indeed, Hogg and Terry (2000) elaborate on the challenges numerical minorities, like women executives, face in matching organizational prototypes, such as speech, dress, and interaction styles, making it hard for them to be seen as competent leaders. This emphasizes the strategic necessity for women to adjust their identity to facilitate their integration into broader and more exclusive groups. Thus, by aligning their identity along organizational and educational affiliations that transcend gender, women executives can bridge otherwise impenetrable networks, like the “old boys’ network.” To illustrate, Zhu et al. (2014) argue that women directors are more likely to be recategorized as in-group members and appointed to boards to the extent that their educational backgrounds and functional areas of expertise are shared with those of the focal board. Thus, women’s recategorization as in-group members can facilitate their inclusion in traditionally male-dominated spaces. Moreover, Hall and Crisp (2005) suggest that employing multiple criteria for recategorization, such as organizational and educational ties, can reduce in-group favoritism and out-group biases. Thus, by emphasizing common affiliations, women executives can navigate professional networks more effectively, reducing that initial lack of affinity and addressing intergroup bias. Last, women appear to strategically rely more on alumni networks than men do to overcome professional barriers (Obukhova & Kleinbaum, 2022).

In conclusion, as the terrain of professional online networking evolves, women executives may craft adaptive strategies to bridge the divide between exclusive circles, particularly the “old boys’ network” and their professional aspirations. They may lean into cross-cutting traits like shared affiliations through companies and universities, emphasizing shared professional journeys beyond gender-specific narratives. We expect to observe these recategorization strategies on LinkedIn as well. On this platform, women executives can adjust their profiles to emphasize aspects of their professional identity that resonate

with the broader executive community. This can include highlighting education and corporate affiliations. By foregrounding these shared identities, women can transcend gender-based categorizations, fostering acceptance within circles that might otherwise be inaccessible due to out-group biases. Moreover, women executives can strategically use the platform to reconnect with alumni, highlight shared educational experiences, and engage in alumni groups. Notably, LinkedIn facilitates this process by providing tools to find and connect with alumni or former colleagues, like adding a note to invitations where shared affiliations are stressed. This can improve the likelihood of others accepting invitations making it easier for women to build and strengthen these networks online. In this context, the research by White et al. (2020) aligns with these observations. They show that contact interventions in online settings can significantly improve intergroup relations and reduce bias, suggesting that platforms like LinkedIn can play a crucial role in reinforcing recategorization strategies. Interestingly, LinkedIn might inadvertently strengthen these recategorization efforts through their algorithmic recommendations. With these observations in mind, we put forth the following hypotheses:

Hypothesis 6a. Women executives are more likely than men executives to have connections on LinkedIn with other executives who have attended the same university.

Hypothesis 6b. Women executives are more likely than men executives to have connections on LinkedIn with other executives who have worked at the same company.

3. Empirical strategy and data collection

Although previous research using LinkedIn data has been able to use millions of user profiles, they have mostly done this through LinkedIn’s advertising platform (e.g., Kalhor et al., 2023; Kashyap & Verkroost, 2021). This approach, based on the size of the potential audience available for specific market segments, is a useful tool for human resources analyses but it has its limitations too. First, it is limited in that it provides LinkedIn profiles matching a precise description. Second, and most important for our study, it does not contain any information on the connections or network configurations among LinkedIn users. Closest to our paper is Kalhor et al. (2023) who have conducted a study on LinkedIn users and segment their sample in those having contacts with five IT companies and those without such contacts. However, this study does not include any information about actual connections among users. This clear data gap is generally tackled in the literature by either using surveys among LinkedIn users (e.g., Aten et al., 2017), or by assuming that connections exist if people share a common background like being in the same location (e.g., Afzali et al., 2021) and having the same experience or education (e.g., Balsam et al., 2017; Ferris et al., 2017). However, while both of these approaches serve as workarounds to alleviate this data gap, they are incomplete and unfeasible for the purpose of our research, where we are interested in the strategies women apply to overcome their gender networking gap. That is, these assumptions are not suitable for explaining whether indeed, having a shared background implies having an actual connection. Moreover, when explaining the presence of homophilic connections, it is also important to control for the availability of potential connections (McPherson et al., 2001). This is certainly not feasible if network data is gathered through surveys, where only information about existing ties is typically collected. Therefore, we close this data gap using a different approach: using actual connections among a pool of potential connections of executives on LinkedIn.

Given the impracticality of downloading the entire LinkedIn network data, we devised a data sampling strategy. In our sampling strategy we focused on gathering data for a homogeneous set of executives. We particularly focused on executives as this group of individuals is expected to actively engage in networking for professional reasons including promotions (Ibarra & Hunter, 2007; van Dijk, 2013). But most importantly, effective networking can allow executives to be part

of the elite corporate network where key information about jobs, job recruitment, and corporate governance strategies are discussed and exchanged (Davis & Greve, 1997; Forret & Dougherty, 2004; Ibarra & Hunter, 2007). Therefore, by focusing on executives we target a population that is expected to value and be active not only in offline networking, but also in online networking. Our sampling strategy is depicted in Fig. 1.

The first step in our sampling strategy involved locating a seed of women executives, i.e., the focal group. This process began with a targeted search using the hashtag #soypromociona to locate women in executive roles (Martínez-Martínez et al., 2021). The use of this hashtag search permitted us to identify a group of homogeneous, Spanish women executives who have participated in a leadership program particularly tailored for high potential women in management (Martínez-Martínez et al., 2021). This search yielded a pool of 494 profiles. Since our research goal lies beyond collecting data on the LinkedIn profiles of these executives to also include their connections, it was key that both the profiles of the executives in the focal group and their connections, i.e., the contact group, were visible and accessible. On LinkedIn, the only way to have this access is by establishing direct connections with them. Therefore, we used a systematic sampling approach with the 494 women executives' profiles. A connection request was sent to the first woman listed on each LinkedIn search results page (which displays ten results per page), followed by the second woman on each page, and so on, until 86 women were contacted. Of these, 70 responded affirmatively. Subsequently, from the confirmed connections, 54 granted us access to view their contacts.

We then applied a systematic sampling approach to identify the contacts of the women in the focal group to create the contact group. We visited the LinkedIn profiles of each of the women in the focal group and selected the first contact on each contact page—where pages display ten contacts—, we identified 3550 unique contacts. Overall, the contact group comprised 40% women and 60% men, after duplicates were eliminated.

The third step consisted of extracting the profile data. Due to LinkedIn's restrictions against automated scraping (LinkedIn, 2024), we collected the data manually from 3604 profiles (the 54 profiles belonging to the women in the focal group plus the 3550 profiles of those in the contact group). Specifically, we collected data about gender, age, work experience, roles held, number of positions as manager/director, overseas experience, and educational qualifications. Additionally, we collected data on the number of followers, as well as university and company affiliations.

Lastly, to investigate whether there are gender differences in online professional networking, we needed to ensure that the characteristics of men and women in the focal group were as similar as possible. With this approach, we minimized the possibility of endogeneity rising from other factors not relevant to our research question and hypotheses. Therefore, in the fourth step, we employed propensity score matching to identify men from the contact group who were statistically comparable to the women in the focal group. We used a Probit model, as shown in equation (1).

$$P(\text{Focal}_j) = \Phi(\beta_0 + \beta_1 \cdot \text{age}_j + \beta_2 \cdot \text{age}_j^2 + \beta_3 \cdot \text{experience}_j + \beta_4 \cdot \text{experience}_j^2 + \beta_5 \cdot \text{numroles}_j + \beta_6 \cdot \text{numroles}_j^2 + \beta_7 \cdot \text{abroad}_j + \beta_8 \cdot \text{director}_j + \beta_9 \cdot \text{manager}_j + \beta_{10} \cdot \text{postgraduate}_j + \beta_{11} \cdot \text{master}_j + u_j) \quad (1)$$

Table 1 displays the results from the propensity score matching along with the sample averages and mean differences for all variables broken down by gender for both the full sample and the focal group. Important in this table is the averages and mean differences between men and women in the focal group. While there were some differences between the characteristics of men and women executives in the full sample,

these differences were no longer statistically significant within the focal group for women and men due to the matching process. See the last column in Table 1.

Since we needed to access the contacts of the men in the focal group as well, the fifth step consisted in connecting with those men with the closest propensity matching scores to the focal women, i.e., $P(\text{Focal}_j = 1 | \text{man}) = P(\text{Focal}_j = 1 | \text{woman}, \text{Focal}_j = 1)$, through LinkedIn. An iterative approach was followed to ensure statistical equivalence between the women and men in the focal group in terms of both group size and attributes. Connection requests were sent in batches to potential male counterparts based on their scores. This iterative process ultimately resulted in 53 men for the focal group. The statistical matching between the men and women in the focal groups is reported in Table 1.

In the sixth step, a systematic sampling approach was used to identify the contacts of the men in the focal group to include in the contact group, as we did with women. After removing duplicate profiles, we obtained 2646 profiles that constitute the men's contact group. The seventh step consisted of, once more, manually downloading the relevant variables of those individuals in the men's contact group, as we did in the third step for women.

After identifying both the focal and the contact groups, we needed to determine which members of the contact group were connected with those in the focal group. The focal group included 107 individuals, while the contact group was comprised of 6197 individuals.³ Thus, the number of potential connections between these individuals amounted to 663,079 (calculated as $107 \cdot 6197$). To identify which of these potential connections were actual connections, we conducted a manual search once again. This eighth step was informed by the fact that members of the focal group are direct contacts of one of this paper's authors. Therefore, we visited the profile of each one of the 6197 members of the contact group, looked for shared contacts, and identified the members of the focal group among these shared contacts. Despite being exceedingly time-consuming, this method is the only viable option for collecting this specific data. Through this process, we found that about 3% of the potential connections, or 20,938 connections, were actual connections.

From the profiles of the people belonging to either the focal or contact group, we searched whether any two individuals had worked at the same company. Collectively, these groups held 53,732 company positions across 29,003 different companies. Out of these, there were 9131 instances where someone from the contact group and someone from the focal group had worked at the same company. Likewise, we also validated if any two individuals had studied at the same university. For both groups, we documented 24,508 university-related experiences across 6274 different universities or colleges. Among them, there were 97,062 instances where individuals from the contact and focal groups had studied at the same institution (see Table 2).

4. The model

The hypotheses introduced in Section 2 all relate to the likelihood of any two executives (i.e., a focal executive and one from the contact group) being connected to one another (See Fig. 2). To empirically test these hypotheses, we estimated a series of Logit regressions. The dependent variable is the probability that executive i from the focal group is connected with executive j from the contact group, denoted as $P[i \text{ knows } j]$. Thus, the base model used for empirically testing hypotheses 1 and 2a-2c is specified as follows:

$$\log\left(\frac{P[i \text{ knows } j]}{1 - P[i \text{ knows } j]}\right) = \alpha + \beta \cdot \text{Popularity}_j + \Gamma \cdot \text{Similarity}_{ij} + \epsilon_{ij} \quad (2)$$

For Hypothesis 1 (preferential attachment), we proxy popularity with the natural logarithm of the number of followers executive j has on

³ This number reflects 3604 from the first batch, subtracting the 53 men in the focal group, and adding 2646 from the second batch.

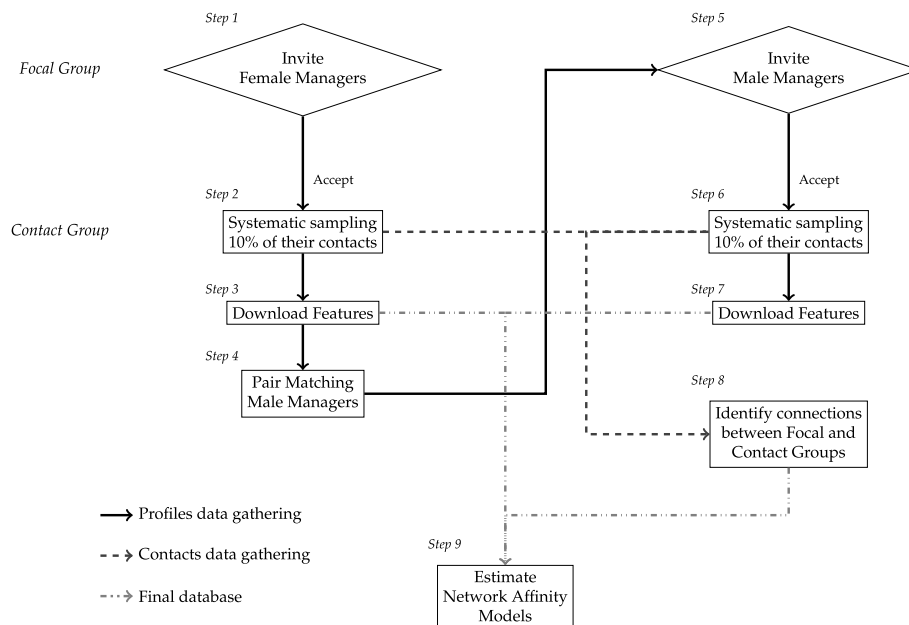


Fig. 1. Research design.

Table 1

Focal men sample selection. Propensity score matching.

Variable	Model		Full Sample averages			Focal Group averages		
	Coeff.		Men	Women	t-test	Men	Women	t-test
age	0.909 (0.227)	***	37.01	37.04	−0.040	45.75	46.46	−0.853
age ²	−0.001 (0.002)	***	1782.2	1730.8	1.303	2112.0	2176.5	−0.843
experience	0.001 (0.018)		39.68	34.20	7.672	34.79	35.39	−0.400
experience ²	−0.000 (0.000)		2196.0	1479.1	5.718	1348.6	1436.0	−0.399
#roles	0.035 (0.057)		7.94	7.45	3.098	8.00	7.72	0.385
#roles ²	−0.001 (0.002)		89.42	72.99	3.036	77.77	73.20	0.332
experience abroad	−0.174 (0.155)		0.35	0.30	3.462	0.283	0.241	0.493
postgrade	−0.534 (0.466)		0.034	0.051	−2.34	0.019	0.019	0.013
master	−0.301 (0.136)	**	0.460	0.419	2.336	0.358	0.370	−0.127
director role	0.275 (0.158)	*	0.599	0.552	2.733	0.811	0.759	0.651
manager role	−0.392 (0.144)	***	0.575	0.537	2.242	0.490	0.463	0.283
cons	−22.125 (5.23)							
# observations	1677		2203	1362		53	54	
LR χ^2	68.38	***						

***, **, * indicates the 1%, 5%, 10% level of statistical significance. The left column reports the coefficient estimates from a Probit model on the probability of being part of the focal group. The dependent variable is equal to one for the 54 women executives we have identified as the focal group, while it is equal to zero for the men that are part of their contact group. The independent variables are the *age* of the individual, as well as the squared value; the years of working *experience*, as well as the squared value; the *number of roles* that the individual has had; a dummy variable *experience abroad* for those that have worked outside of Spain; *postgrade* for those with university studies beyond a bachelor's degree; *master* for those with a master's degree; *director role* for those who have had working experience as a director; *manager* for those who have had working experience as a manager. *Full sample averages* are the averages for each variable among men and women in the contact group of the women in the focal group, while *Focal Group averages* are the averages for male and female members of the focal group. In both cases, we also report the *t* tests for equal means between both groups.

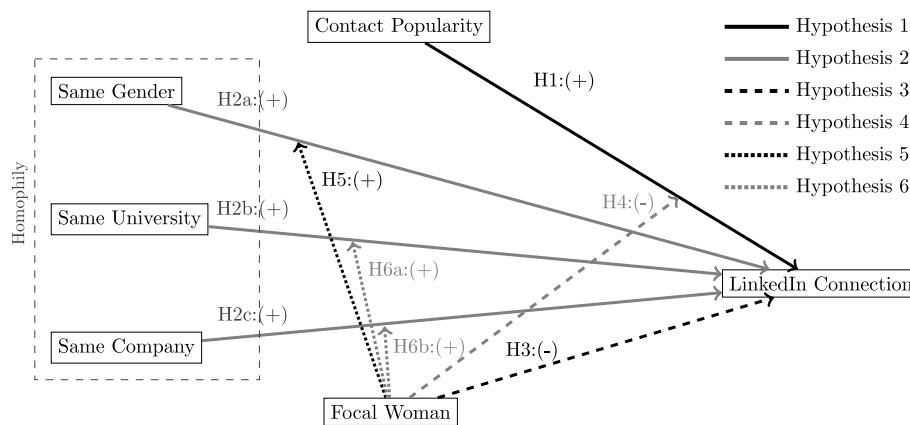
LinkedIn. This measurement represents a departure from studies about preferential attachment that tend to measure popularity with the number of contacts (e.g., Barabási & Albert, 1999). We purposefully use the number of followers to circumvent potential endogeneity problems

between the number of contacts and our dependent variable. Since Hypothesis 1 postulates that executives would be more likely to connect the more popular the potential contact is, we expect β to be statistically significant and larger than zero. Similarity_{ij} is a vector capturing shared

Table 2
Descriptives.

		Mean	Min	Max	1	2	3	4	5	6
1	Linked	0.032	0.000	1.000	0.175	−0.019	0.080	0.036	0.056	0.121
2	Woman	0.505	0.000	1.000	.	0.500	0.000	−0.310	0.118	−0.002
3	Popularity	7.926	0.000	12.130	0.004	.	1.411	−0.001	0.008	−0.009
4	Same gender	0.498	0.000	1.000	0.050	.	−0.154	0.500	0.006	0.006
5	Same university	0.147	0.000	1.000	0.077	.	0.006	0.101	0.354	0.030
6	Same company	0.014	0.000	1.000	0.155	.	−0.011	0.008	0.021	0.117

Linked is a dummy variable that it is equal to one if focal individual *i* and contact individual *j* are linked in LinkedIn, and zero otherwise. The Popularity of contact individual *j* is measured by the natural logarithm of the number of followers of the contact individual *j*. Woman is a dummy variable that is equal to one if the focal individual *i* is a Woman, and zero otherwise. Same Gender is a dummy variable that is equal to one if both the executive in the Focal and in the Contact group have the same gender, and zero otherwise. University(Company) is a dummy variable equal to one if both individuals *i* and *j* have studied in the same university (worked at the same company), and zero otherwise. The correlation matrix has the standard deviations in the main diagonal, the pairwise correlation coefficients for the full sample in the upper triangle, and the pairwise correlation coefficients for the subsample of focal women in the lower triangle.

**Fig. 2.** Theoretical model.

attributes between executives *i* and *j*. These shared attributes encompass being of the same gender, having attended the same university, and having worked at the same company. In line with hypotheses 2a–2c, we expect the likelihood to connect to increase with similarity. Therefore, we expect the elements in vector Γ to be positive and statistically significant.

Finally, to investigate any gender differences in terms of popularity (Hypothesis 4), gender homophily (Hypothesis 5), and recategorization (Hypotheses 6a and 6b), we introduce interaction terms for both Popularity_{*j*} and Similarity_{*ij*} (i.e., Same Gender, Same University, Same Company) with the gender corresponding to the focal executive *i*, *w_i*. This renders equation (4),

$$\log\left(\frac{P[i \text{ knows } j]}{1 - P[i \text{ knows } j]}\right) = \alpha + \beta \cdot \text{Popularity}_j + \Gamma \cdot \text{Similarity}_{ij} + \alpha_w \cdot w_i + \beta_w \cdot \text{Popularity}_j \cdot w_i + \Gamma_w \cdot \text{Similarity}_{ij} \cdot w_i + \epsilon_{ij}, \quad (4)$$

Since equation (2) provides a baseline to model the probability of any two executives being connected on LinkedIn regardless of their gender, we have modified this baseline model to test Hypothesis 3, i.e., the gender gap in executive online networking. That is, we have included a dummy variable, *w_i*, that is equal to one if the focal executive is a woman and zero if it is a man. We thus estimate a new Logit model as depicted by equation (3),

$$\log\left(\frac{P[i \text{ knows } j]}{1 - P[i \text{ knows } j]}\right) = \alpha + \alpha_w \cdot w_i + \beta \cdot \text{Popularity}_j + \Gamma \cdot \text{Similarity}_{ij} + \epsilon_{ij}. \quad (3)$$

According to Hypothesis 3, women would be less likely to connect with individuals in the contact group. In equation (3), this would be the case if $\alpha_w < 0$.

This extended model facilitates the testing of our remaining hypotheses. β_w gauges the reduced propensities among women executives to connect with popular executives. In line with Hypothesis 4, we expect $\beta_w < 0$. For Hypothesis 5, we expect the coefficient estimate corresponding to the interaction term between *w_i* and $\gamma_{w,gender}$, to be larger than zero. The recategorization hypotheses (6a and 6b) can be evaluated through the coefficient corresponding to the interaction terms between the other two variables, $\gamma_{w,university} > 0$ and $\gamma_{w,company} > 0$.

5. Results

Table 3 presents our results. Model I displays the results from estimating equation (2); Model II displays the results from estimating equation (3); and Model III displays the results from estimating equation

Table 3
Logit model on likelihood to connect.

		Model I		Model II		Model III	
		Coeff	OR	Coeff	OR	Coeff	OR
α_w	Woman			−0.161*** [0.016]	0.851*** [0.013]	2.345*** [0.110]	10.432*** [1.151]
β	Popularity	0.433*** [0.006]	1.543*** [0.010]	0.432*** [0.006]	1.540*** [0.010]	0.625*** [0.009]	1.868*** [0.016]
β_w	Popularity · Woman					−0.359*** [0.013]	0.698*** [0.009]
γ_{gender}	Same gender	0.430*** [0.015]	1.537*** [0.022]	0.371*** [0.016]	1.450*** [0.023]	−0.073** [0.021]	0.930** [0.020]
$\gamma_{w,gender}$	Same gender · Woman					0.702*** [0.030]	2.018*** [0.061]
$\gamma_{university}$	Same university	0.715*** [0.017]	2.044*** [0.034]	0.741*** [0.017]	2.099*** [0.035]	0.532*** [0.026]	1.703*** [0.045]
$\gamma_{w,university}$	Same university · Woman					0.325*** [0.035]	1.384*** [0.048]
$\gamma_{company}$	Same company	2.248*** [0.028]	9.470*** [0.262]	2.246*** [0.028]	9.446*** [0.261]	1.956*** [0.042]	7.068*** [0.295]
$\gamma_{w,company}$	Same company · Woman					0.607*** [0.056]	1.835*** [0.103]
	Constant	−7.465*** [0.055]	0.001*** [0.000]	−7.344*** [0.056]	0.001*** [0.000]	−8.640*** [0.077]	0.000*** [0.000]
	Observations	663081		663081		663081	
	$LR\chi^2$	12318.86 ***		12426.02***		14085.68***	

***, **, * indicates the 0.01%, 0.1%, 1% level of statistical significance. The dependent variable in the Logit model is a dummy variable that it is equal to one if focal executive i and contact executive j are linked on LinkedIn, and zero otherwise. The *Popularity* of contact executive j is measured by the natural logarithm of their number of followers. *Woman* is a dummy variable that is equal to one if the focal executive i is a woman, and zero otherwise. *Same gender* is a dummy variable that is equal to one if both the executive in the focal and in the contact group are of the same gender, and zero otherwise. *University(Company)* is a dummy variable equal to one if both executives i and j have studied at the same university (worked at the same company), and zero otherwise. For each model, we report both the estimated coefficients, and the corresponding odds ratios (the relative change in the probabilities, when the corresponding variable moves from 0 to 1).

(4). The results in Model I support [Hypothesis 1](#). Specifically, the connections in the LinkedIn network appear to follow the preferential attachment principle indicating a higher likelihood of executives having connections with those who already command significant popularity. As observed in Model I in [Table 3](#), the coefficient β , which captures the individuals' preferential attachment to popular network members, is significantly positive ($\beta = 0.433$) with an odds ratio equal to 1.543. These results suggest that when the number of followers double,⁴ the odds of having a connection increase by 54.3%.

The results reported by Model I in [Table 3](#) also lend empirical support to our homophily hypotheses. The coefficient for gender-homophilous connections ([Hypothesis 2a](#)), captured by γ_{gender} , is positive with a value equal to 0.430. This indicates that when executives share the same gender, they are 53.7% more likely to have a connection on LinkedIn, i.e., the odds ratio is equal to 1.537. For [Hypothesis 2b](#), we draw our attention to the coefficient for shared academic background which is represented by $\gamma_{university}$. This coefficient is equal to 0.715 and it is statistically significant. The odds ratio of this coefficient is equal to 2.044, and this suggests that executives who have studied at the same academic institution are more than twice as likely to be connected on LinkedIn. Most relevant, the results reveal a robust tendency to have connections with those who have worked at the same company, [Hypothesis 2c](#). The corresponding coefficient, $\gamma_{company}$, is equal to 2.248. This indicates that executives having worked at the same organization are more than nine times more inclined to have a connection, i.e., the odds ratio is equal to 9.470.

Model II in [Table 3](#) corresponds to equation (3), where we test for [Hypothesis 3](#), the gender networking gap. The estimated coefficient α_w is equal to −0.161. With an odds ratio of 0.851, this value suggests that women in the focal group are, on average, 14.9% less likely than men to have connections with people in the contact group. This finding thereby supports [Hypothesis 3](#).

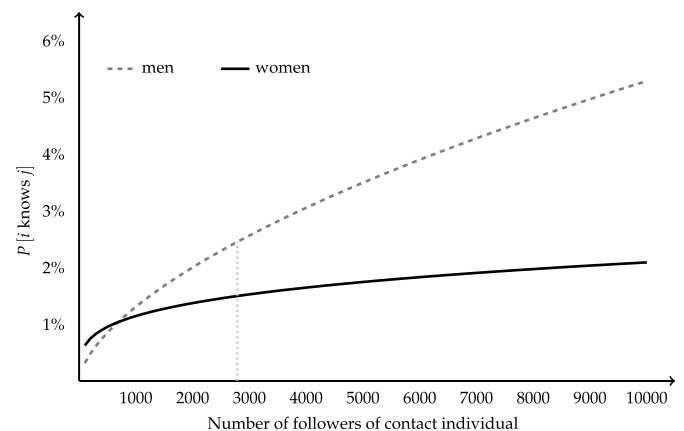


Fig. 3. Likelihood to connect to an executive depending on their followers (popularity), for men focal executives (gray dashed) and women focal executives (black line), following estimations of model 4 ([Table 3](#)). The base case is for a situation where both the focal and contact individual are from different universities, companies, and gender. (For interpretation of the references to colour in this figure legend, the reader is referred to the Web version of this article.)

When analyzing the strategies women executives in the focal group use to navigate the gender gap in networking, distinct patterns emerge as the results corresponding to equation (4) in Model III in [Table 3](#) show. The preferential attachment driven by popularity is notably more pronounced for men, as predicted by [Hypothesis 4](#). Within the focal group, the coefficient for men stands at $\beta = 0.625$. In contrast, for women this value corresponds to $\beta + \beta_w = 0.625 - 0.359 = 0.266$. [Fig. 3](#) further exemplifies these differences. The probability of a man executive having a connection with another executive with a median follower count, corresponding to 2,800, is equal to 2.46%; whereas for women it is just 1.45%. This disparity amplifies when the follower count is 10,000. In

⁴ Since popularity is measured as a logarithm, if it goes from 1 to 2.

this scenario, the probability of having a connection for men executives more than doubles to 5.30%; while for women it rises modestly to 2.1%. By contrast, in scenarios where contacts lack any followers, women in the focal group exhibit a higher inclination to connect with a probability of 0.2%, compared to men's 0.02%. These results support the notion that women tend to connect with less popular executives than men.

Regarding the gender differences in homophilic connections, focal men executives do not display a preference to connect with executives of the same gender ($\gamma_{\text{gender}} = -0.073$). In stark contrast, women in the focal group exhibit a pronounced gender homophily. With a coefficient estimate equal to 0.629 ($\gamma_{\text{gender}} + \gamma_{w,\text{gender}} = -0.073 + 0.702 = 0.629$), it suggests that women are 87.70% (odds ratio equal to $0.930 \times 2.018 = 1.877$) more likely to have connections with other women than with men. This result provides robust evidence in support of [Hypothesis 6a](#).

Moreover, our results robustly support both [Hypothesis 6a](#) and [Hypothesis 6b](#). With an odds ratio equal to 1.384 for $\gamma_{w,\text{university}}$, having studied at the same university matters more for women than it does for men (38.4%) when it comes to having connections on LinkedIn. The coefficient estimate for men is equal to 0.532, $\gamma_{\text{university}}$, and 0.857 for women, $\gamma_{\text{university}} + \gamma_{w,\text{university}}$. When considering having worked at the same company, the disparities become even more pronounced: the likelihood of being connected increases by 83.5% more for women than for men when they have worked at the same company. These results compellingly support both [Hypothesis 6a](#) and [Hypothesis 6b](#).

Finally, it is important to take into account that although the coefficient estimate for α_w is larger than zero in Model III, this parameter does not have the same meaning as it does in Model II, and it cannot be used to test [Hypothesis 3](#). A positive coefficient estimate α_w in Model III represents the likelihood of a woman in the focal group having a higher likelihood of having connections with people in the contact group that have *no followers*. This is a specific corner case and it is depicted in [Fig. 3](#) in the left extreme of the curves. The underlying reason for α_w having different signs in Models II and III lies in the structural differences between the two Models. In Model III, introducing interactions between 'Woman' and other variables results in a scenario where the 'Woman' variable indicates the change in the intercept when all other variables are zero. This does not genuinely convey the effect of being a woman on the likelihood of having connections on LinkedIn, as it is conditioned by a particular set of circumstances. On the other hand, Model II, devoid of interactions, allows us to interpret the coefficient for 'Woman' as the average effect of being a woman on the likelihood of having connections on LinkedIn, uninfluenced by the values of other variables.

6. Discussion

In this paper, we investigated executive networking on LinkedIn, pinpointing if, and how, offline gender networking gap disparities translate or even amplify into the digital sphere. Our findings are relevant since LinkedIn is not merely a professional networking tool, but it has actually metamorphosed into a consequential arena wherein executives, human resources professionals, and headhunters converge to display and scout organizational prowess ([Roulin & Levashina, 2019](#)). As we contrast LinkedIn with other online platforms, the adage: "LinkedIn is what gets you hired, while Twitter is what gets you fired" captures its unique professional significance. While research using X (formerly Twitter) data is rather extensive and extends to many areas from networking patterns to sentiment analysis (e.g., [Choi & Park, 2015](#); [Kwon et al., 2014](#); [Leeftang et al., 2014](#)), research using LinkedIn data remains rather scant. This is primarily due to its stringent policy against data extraction via bots or web-scraping ([Ruparel et al., 2020](#)).

Bridging this gap, our manual data curation –although labor intensive– is a rare foray into this digital territory. This approach allows us to not only observe the connections that are formed among executives but also those that are not formed, shedding light on two principal types of gender data gaps. First, we challenge the assumption in the literature that shared affiliations, through universities or companies, imply

networking connections (e.g., [Afzali et al., 2021](#); [Aten et al., 2017](#); [Balsam et al., 2017](#); [Ferris et al., 2017](#)). Our findings reveal substantial gender differences in these connection patterns, with women more likely to reach out to those with common affiliations. Secondly, by controlling for the heterogeneity among potential contacts, we uncover another gender data gap. With men significantly outnumbering women among both top executives and on LinkedIn, a failure to account for this skewed availability masks the real extent of gender homophily that characterizes women's networking behavior. Therefore, prior research that fails to consider these distinctions in affiliation and gender homophily inadvertently neglects both gender data gaps. Our study, contributes to a better understanding of the gender dynamics at play within professional networking by shedding light on these overlooked disparities.

A primary discovery of our study the preference among executives to connect with popular counterparts, a trend underscored by the principle of preferential attachment, suggesting a pursuit for resource access and social status enhancement ([Burt, 1995, 1998](#); [Klein et al., 2004](#)). This inclination towards forming strategic connections is rooted in the benefits associated with popular peers, facilitating direct access to valuable resources and the opportunity to signal one's own social status. Such gender biases extend onto LinkedIn, where the visibility of metrics such as followers and connections can exacerbate these trends ([Soleimani et al., 2022](#)).

Our study further explores the concept of homophily ([Lazarsfeld & Merton, 1954](#)) and uses a Social Identity Theory ([Tajfel, 1978](#); [Tajfel & Turner, 1979](#)) lens to explain executives' tendency to gravitate towards similar others. This is particularly evident with gender homophily which tends to facilitate access to work-related information, support and mentorship ([Ibarra, 1992](#); [Obukhova & Kleinbaum, 2022](#); [Perriton, 2006](#); [Singh et al., 2010](#); [van Emmerik, 2006](#)). The significance of organizational and educational backgrounds in networking is also emphasized, suggesting that such affiliations can serve for career mobility and opportunity. On LinkedIn, the visibility of educational and employment details on profiles may simplify the formation of connections with similar others, effectively replicating offline networking patterns while potentially reducing the risks associated with heterogeneous online networks. The salience of gender, readily identifiable through names and profile pictures, facilitates the formation of gender-homophilous connections, thereby reducing relational uncertainty—a significant advantage in digital environments.

Our study elaborates on the networking challenges women executives often face due to their out-group membership, according to Social Identity Theory. Such challenges can pose substantial roadblocks to their professional trajectories mirroring historical barriers women have faced in accessing centers of power ([Kanter, 1977](#); [Moore, 1990](#)) and highlighting the persistence of women executive's out-group membership. Despite these obstacles, women executives demonstrate resilience by adopting strategies to enhance visibility and connectivity. According to our findings, these strategies include forming connections with less popular individuals within their intra-group and leveraging gender-homophilous networks. This pronounced inclination towards forming connections with those of similar status levels on LinkedIn may be intensified by algorithmic feedback loops, potentially limiting their access to a wider, prestigious network yet offering a sense of belonging and mutual support. The formation of gender-homophilous networks on LinkedIn is facilitated by the platform's features that make gender identity more salient, such as names, pictures, and executive positions displayed on profiles.

We also find evidence supporting the notion that women executives rely on recategorization strategies to navigate into elite executive networks. Following Self-Categorization Theory ([Turner et al., 1987](#)), women can foster acceptance within traditionally inaccessible circles by emphasizing shared affiliations that transcend gender, such as having worked at the same companies or having attended the same university. On LinkedIn, where company and university affiliations are prominently displayed on profiles, women can more easily use these affiliations to

foster acceptance within traditionally inaccessible circles. Furthermore, LinkedIn's algorithmic recommendations could unintentionally enhance this process of affiliation-based homophily. However, a notable caveat of this strategy may be that affiliations with non-elite entities might result in networks of lower diversity and status, underscoring the importance of strategic networking choices.

6.1. Policy implications

In summary, our study highlights the stark disparities women executives face in online professional networking. Positioned as out-group members, women executives grapple with the challenge of being under-connected in a landscape that prizes vast and influential networks. These challenges often prompt them to gravitate toward their in-group, leading to less-diverse online contacts and a pronounced tilt towards women-centric networking. In a bid to bridge this gap, women executives adopt recategorization strategies, underlining shared company and academic affiliations. This tactic, aimed at merging their gender-specific identity with the overarching executive identity, has various implications on platforms like LinkedIn. If these affiliations do not resonate with the elite in-group, who may be associated with more elite institutions, the effort might inadvertently deepen the divide. This networking gap is especially concerning given the important role of social capital in ascending to top leadership positions. Since the online networking gaps can be influenced by offline networking patterns, we propose interventions spanning both offline and online arenas.

6.1.1. Strategies for organizations to bridge the gender gap in online networking

Corporations play an important role in shaping networking dynamics and can help enhance the role of women executives in these networks by sponsoring them into prominent roles at offline events. For example, companies can engage women as keynote speakers, panelists, or special guests. As taking a prominent role at speaking engagements is a form of networking (Forret & Dougherty, 2004), this practice can support women's visibility and can enable companies to break the cycle of women being relegated to the periphery of professional gatherings. Furthermore, corporations can support women's networking through mentorship and sponsorship programs. These programs can enable women to leverage the networks of more established professionals, potentially accessing opportunities that were previously beyond reach. Inspired by the concept of borrowing the social capital of seasoned leaders for career development (Raider & Burt, 1996), these programs can act as a crucial mechanism for improving women's networking outcomes.

In addition to these programs, corporations can host diverse networking events, both online and offline, to foster connections between women executives and industry leaders. Online events accommodate varying schedules, making participation more accessible. Conversely, offline events present invaluable opportunities for women to meet high-profile individuals within the executive realm, facilitating connections that are less likely to occur online. This combination of events can significantly increase the potential for expanding networks on LinkedIn. Simultaneously, it is vital for corporations to publicly recognize and celebrate the achievements of their women executives on LinkedIn through posts and corporate publications. This visibility not only acknowledges women's professional contributions but also amplifies them to a wider audience, leveraging LinkedIn's networking power. By sharing news articles, success stories, or accolades, companies not only elevate women executives' profiles but also demonstrate a commitment to gender diversity. Together, these strategies, while enhancing women's visibility on LinkedIn, they also diversify their professional networks with significant connections.

Altogether, these strategies can play a key role in bridging the gender data gap in online professional networking. Consequently, by recognizing and amplifying women's achievements and potential,

corporations can contribute to women's networking opportunities and their networking capital. In this manner, corporations have a role to play in supporting women to bridge the gender networking gap.

6.1.2. Strategies for LinkedIn to bridge the gender gap in online networking

Digital platforms, with their underlying algorithms, wield considerable power in shaping networking patterns (Soleimani et al., 2022). LinkedIn's current algorithms, based on shared affiliations or mutual connections, may unintentionally exacerbate the networking challenges women executives face by potentially sidelining out-group individuals. To prevent these algorithms from perpetuating these disparities, a re-calibration is essential.

We propose a comprehensive revision of these algorithms to enable broader and more varied networking opportunities. Moving beyond the emphasis on shared workplaces or academic backgrounds (Castillo-de Mesa & Gómez-Jacinto, 2020), we suggest incorporating a wider range of attributes, such as mutual skills, interests, job functions, prospective clientele, potential suppliers, and more. Such a shift, made possible by significant advancements in artificial intelligence, can promise to revolutionize the networking landscape for women, moving beyond surface-level commonalities to more meaningful connections. Furthermore, integrating dashboard-based analytics could offer insights into network dynamics, alerting users to potential homogeneity within their networks and suggesting corrective actions (Di Tommaso et al., 2020). This could include notifications when a user's network shows signs of becoming overly homogeneous. Additionally, recommendation systems could be refined to discourage the formation of non-overlapping sub-groups, ensuring a more interconnected and diverse networking environment (Di Tommaso et al., 2020). These enhancements, leveraging the latest AI technologies, are not only technologically feasible, but essential for cultivating a more inclusive and supportive networking ecosystem on platforms like LinkedIn.

6.2. Limitations and further research

Certainly, the limitations of our research cannot be disregarded. To begin with, the limited size of the focal group in our study might constitute a source of concern. Despite this, we have been able to establish highly significant statistical relationships among the various variables under investigation. This can be attributed to the substantial size of the contact group, and as a result, the multitude of potential combinations between focal and contact pairs. However, the exponential increase in the number of possible connections poses a challenge in handling larger samples, especially until platforms like LinkedIn allow for automated web scraping tools for gathering data on connections among users.

A further limitation of our research relates to the types of variables we have collected. Ideally, our dataset would have included information on interests, skills, and recommendations found in LinkedIn profiles, as noted by Rui (2018). However, our manual data collection has restricted the scope of our study. Future research can incorporate this additional data. Despite these constraints, we successfully compiled three critical variable sets reflecting essential executive characteristics, such as gender, common university education, and shared company employment.

The geographical focus of our study on Spanish executives might be considered a limitation. However, the implications of our findings likely extend beyond this specific demographic. The involvement of the Spanish labor market participants in multinational corporations (with 80% of our focal sample executives have experience in multinational firms) suggests that the networking patterns we identify in our study might transcend national cultural contexts. This assumption gains support in the context of LinkedIn, where global corporate culture influences professional networking behaviors more than national identity does. Supporting this, Lewis and Tockey (2020) found that networking differences between men and women in Spain paralleled those in

countries like the US and Germany, suggesting generalizability of our observed networking patterns. Moreover, given that some of our findings align with earlier findings conducted on other online social media platforms like Facebook (e.g., Cirkovic et al., 2023; Kwon et al., 2014; van Dijck, 2013), Tuenti (e.g., Volkovich et al., 2014), Enterprise Media Systems (e.g., Di Tommaso et al., 2020), among others, is evidence of the broader potential applicability of our findings beyond LinkedIn. However, a valuable future avenue for research would be to test these findings across different cultural contexts to further validate the external validity of our results.

Another limitation is that while we observe the connections that exist among users, it is more challenging to determine who initiates the connections on LinkedIn (i.e., who sends the invitation vs. who accepts it). Addressing this issue may require the use of experiments. One potential experimental design involves creating LinkedIn profiles for two fictitious executives, identical in every aspect except for their gender, and then sending connection requests to actual executives to monitor acceptance rates, akin to CV studies (e.g., Steinpreis et al., 1999). However, the ethical implications of deceiving real users necessitate transparent experimental approaches. An ethical alternative could involve informing participants that they are part of a study, outlining the research goals, and clarifying that the profiles initiating connections are not real. This approach ensures participants' informed consent and preserves the integrity of the research. Additionally, a survey-based experiment could be conducted where participants are presented with various profiles (either real or fictitious) and asked about their likelihood of initiating connections. This method could be particularly effective with MBA students or similar groups, offering insights into networking preferences and biases without ethical compromises.

And finally, one of the limitations of our analysis is its static nature. A follow-up study can incorporate a dynamic dimension by investigating the new connections formed among the focal group compared to the initial connections, the possible ties among initial connections, and the impact these connections may have on career advancement.

In addition to these future research avenues, there are several areas that warrant further exploration. Firstly, LinkedIn has undergone a strategic shift in recent years, expanding its role from a mere recruitment platform and as means of connecting professionals, to something more similar to Facebook or X (formerly Twitter), where users engage in conversations and share information. The aforementioned shift in LinkedIn's strategy opens up new avenues for research, allowing for comparison of the behavior among LinkedIn users to that of other platforms. This is of particular significance given the unique design of LinkedIn (Voorveld et al., 2018), which seeks to eliminate fake profiles and the characteristics of its users, who are professionals highly engaged with the platform and tend to avoid politically or personally charged discourse that could potentially harm their professional reputation. Secondly, it would be beneficial to examine the differences and similarities between LinkedIn and real-life professional networks, as well as the various alternative uses that professionals make of these networks (e.g., complementary, alternative, substitute). This would help to clarify the role and value of LinkedIn for executives.

7. Conclusion

To conclude, our study on the networking patterns among executives on LinkedIn sheds light on the intricate dynamics women executives face while navigating this online networking landscape. Despite dealing with a setting where offline gendered dynamics are replicated, women tend to demonstrate strategic adaptability. On the one hand, women often turn to similar others for networking purposes. This approach inadvertently results in having less popular online contacts and more gender-homophilous networks. Although comforting, the LinkedIn networks women executives tend to form may lack the diversity and reach for breaking into the more influential circles, such as the "old boys' network." On the other hand, women actively employ recategorization

strategies to navigate beyond the networks that can constrain their opportunities. They do so by highlighting commonalities beyond gender, such as corporate alumni and alumni ties to bridge gaps and foster acceptance within elite networks.

All in all, this study provides an essential understanding of the strategic networking decisions and obstacles women face in online professional networking, perpetuating and amplifying the offline gendered patterns in networking, highlighting the importance of the gender data gap. Our findings and recommendations do not focus on "fixing women;" instead, they serve as an urgent call to action for online platforms, recruiters, managers, leaders, and scholars. We urge these stakeholders to address this pervasive gender data gap, leveraging our findings as a foundation for systemic change. It is imperative to act now to dismantle the barriers impeding women's inclusion in networking circles key to their professional advancement and to cultivate an inclusive and equitable professional ecosystem for all.

CRediT authorship contribution statement

Gabriela Contreras: Writing – review & editing, Writing – original draft, Software, Methodology, Investigation, Funding acquisition, Formal analysis, Data curation, Conceptualization. **Ruth Mateos de Cabo:** Writing – review & editing, Writing – original draft, Resources, Project administration, Methodology, Investigation, Funding acquisition, Formal analysis, Data curation, Conceptualization. **Ricardo Gimeno:** Writing – review & editing, Writing – original draft, Visualization, Software, Methodology, Investigation, Formal analysis, Data curation, Conceptualization.

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