

Forthcoming in *Social Networks*

THE NETWORKS AND SUCCESS OF FEMALE ENTREPRENEURS IN CHINA

December 2018 © Ronald S. Burt
University of Chicago Booth School of Business, Chicago, IL 60637
Tel: +1 312-953-4089, ron.burt@chicagobooth.edu

ACKNOWLEDGEMENT: I am grateful to the University of Chicago Booth School of Business for financial support during the work reported here. I am grateful to the Jan Wallanders and Tom Hedelius Foundation for the grant to Sonja Opper that funded the fieldwork in China providing the data analyzed here, to Sonja Opper, Jie Ren, and a conscientious *Social Networks* reviewer for comments, and to Na Zou and Ke Zeng for assistance coding event descriptions into kinds. This preprint manuscript is available at: <http://faculty.chicagobooth.edu/ronald.burt/research>.

THE NETWORKS AND SUCCESS OF FEMALE ENTREPRENEURS IN CHINA

Abstract

Despite population opinion in China favoring men over women, data on a large probability sample of Chinese entrepreneurs show that men and women build similar network structures on average, experience similar distributions of network advantage, achieve similar levels of business success, and experience similar performance returns to their network advantage. Digging into network content, male and female entrepreneurs have similarly close and trusting relations with similar kinds of contacts, with one exception, gender homophily: men are more likely than women to operate in a network composed entirely of men, while women operate more often than men in a network containing multiple female contacts. There is also gender pattern in contacts, reflecting conservative attitudes in the broader society: Women are the object of more interaction on technical matters out of the public eye, while men are the preferred contact for representation (men and women more often cite male contacts for help in founding the business, dealing with suppliers, and dealing with customers). The gender pattern is more obvious in the business contacts of men than in the business contacts of women, and more linked with business success for men. In sum, there is gender pattern to the networks around male and female entrepreneurs, but the network theory of advantage from access to structural holes similarly predicts the success of male and female entrepreneurs regardless of gender.

The functional form of the success-network association in Figure 1 can vary with alternative network measures, but alternatives typically support the fact that people in closed networks are disadvantaged (Burt, Kilduff, and Tasselli, 2013; Burt, 2019). Relative success is measured on the vertical axis as a z-score. A score of zero indicates a manager whose success is what would be expected in his or her study population for someone with his or her characteristics. Positive numbers indicate managers ahead of expected, and negative numbers indicate managers below expected. To the left on the horizontal axis are the so-called “network brokers,” people whose networks reach across the structural holes separating groups, which gives the broker information advantages of breadth, timing, and arbitrage (illustrated by the sociogram of a person’s network below the left side of the horizontal axis). To the right are people embedded in a closed network of strongly interconnected colleagues (illustrated by the sociogram at the bottom right of the horizontal axis). The network metric across the horizontal in Figure 1 is network constraint, which measures the extent to which a person’s social contacts are limited to one group (Burt, 1992). The data plotted in Figure 1 are average values of the horizontal and vertical axes within five-point intervals on the horizontal axis within each study population. The solid dots describe a thousand managers in Asia, primarily China.¹ The hollow squares describe a thousand managers in Europe.² The hollow circles describe two thousand managers

¹These data come from two studies, each of which discusses variables held constant to compute relative performance for the vertical axis in Figure 1: Burt (2010) for 258 managers in an Asian software company, and Burt and Burzynska (2017) for the 700 Chinese CEOs of entrepreneurial ventures analyzed here. Data on individuals are averaged in Figure 1 for each of the two study populations separately within five-point intervals of network constraint (30 Asia data points are plotted in Figure 1).

²These data come from three E.U. organizations: 60 managers in a chemical company (Burt, Hogarth, and Michaud, 2000), 654 managers in a financial services organization (Burt, 2018), and 380 managers in a healthcare organization. Network and performance data on managers in the healthcare organization are not described in a published report, but networks were obtained with the web survey used in Burt (2010) and performance is measured by annual performance evaluations, adjusted for individual differences as salary is adjusted in Burt (2010).

in American companies.³ As predicted by network theory, and reported in published studies of the populations, a manager's relative success decreases as his or her network becomes more closed.

———— Figure 1 About Here ————

Figure 1 sets the frame for this paper, which is about the role that gender plays in the success association with access to structural holes. Women are treated as second-class citizens, outsiders, in some populations such that their returns to network advantage depend on being sponsored by a male network broker inside the population (e.g., Burt, 1998; 2010: Chap. 7). But the network structure through which the women succeed is not about gender so much as it is about being deemed an outsider. Outsider status in some populations comes from being too young to be accepted as a broker, or in some populations being suspect because of one's prior organizational affiliation, or in some populations from being a women. The key point is that women as outsiders are an exception, not the rule. The usual case is that women benefit from large, open networks just as men do (e.g., Groysberg, 2010; Lutter, 2015; and 779 of the 4,137 people summarized in Figure 1 are women).⁴

For a severe test of gender differences, I go to a study population in which people are conservative about women in business. I go to China. Women are more accepted

Data on individuals are averaged in Figure 1 for each of the three organizations separately within five-point intervals of network constraint (29 E.U. data points are plotted in Figure 1).

³These data come from seven U.S. organizations: 170 male managers from a computer manufacturer (Burt, 1992), 283 HR managers in a commercial bank, 531 investment bankers, 354 stock analysts in a financial organization (Burt, 2010), 455 supply chain managers in an electronics firm (Burt, 2004), 113 software engineers (Burt, 2018), and 179 managers in an electronics organization. Network and performance data for the electronics organization are not described in a published report, but the network data were gathered by a web survey like the one used with the supply chain managers and performance is measured by annual performance evaluations adjusted with background data from company personnel records. Data on individuals are averaged in Figure 1 for each of the organizations separately within five-point intervals of network constraint (81 U.S. data points are plotted in Figure 1).

⁴It deserves mention that women in one of the U.S. study populations (described in Burt, 1998), are not included in the Figure 1 graph because women in that population were treated as outsiders in that their success was contingent on borrowing the network of a well-connected senior male colleague.

now as leaders than they were years ago, but China continues to be relatively “male-oriented” in the sense of expecting, and being more comfortable with, men rather than women in leadership roles. This will be obvious to some, anathema to others, so, to set up the coming analysis, consider Figure 2. The figure displays responses from two World Values Surveys (Inglehart et al., 2014): one with a national probability sample of Chinese adults in 2013, and the other with a national probability sample of American adults in 2011. The Chinese agree more strongly that “men make better business executives than women do,” that “men make better political leaders than women do,” that “a university education is more important for a boy than for a girl,” and “men should have more right to a job than women when jobs are scarce.” More specifically, people in China are more likely to strongly agree (6.70 loglinear test statistic) and agree (14.32 test statistic) with the opinion that men make better business executives. Without arguing the pros or the cons of these opinions, I merely highlight them to back up the claim that if gender matters for the Figure 1 success association with network advantage, it should be apparent in China.

————— Figure 2 About Here —————

The paper is in four parts. After introducing a large probability sample of Chinese entrepreneurs to be studied, I show that entrepreneur gender is independent of network advantage and business success. I then dig into the substance of the networks and find three characteristics: (1) largely similar kinds of contacts and relationships in the networks around men and women, (2) gender homophily in the form of men more likely to have networks composed entirely of men, and women more likely to have multiple women among their business contacts, and (3) similar use of male and female contacts consistent with the male-oriented opinions expressed in Figure 2. The first and second points are familiar from early studies of small samples in the West (e.g., Aldrich, Reese, and Dubini, 1989; Cromie and Birley, 1992), here documented with relatively detailed network and success data on a large probability sample in a very different social context. My main point is that none of the observed gender patterning matters for the network-success association in Figure 1. The results show that male and female

entrepreneurs in China similarly have, and benefit from, network advantage regardless of gender patterning in their networks.

It might seem odd to publish a paper that reports no gender difference, but here are two considerations: (1) There are numerous published reports of gender differences in management networks, but my experience is that gender rarely makes a difference in management networks once job, seniority, and available colleagues are held constant (again, 779 of the 4,137 managers in Figure 1 are women). There are organizations in which gender matters, however, and in those organizations, it can matter a lot. Therein lies the potential problem: if we only publish papers on gender differences in the places where they occur, we exaggerate the importance of gender in organizations. (2) Still, there is limited surprise value to finding another organization in which gender is irrelevant to the network-success association in Figure 1. There is value, however, in finding the absence of gender difference in a population that is demonstrably sexist. That is my objective in this paper and my reason for including Figure 2. Despite gender equality being politically correct in China, old attitudes about gender continue, perhaps diminished, but still discernable (Ji and Wu, 2018 is a portal into literature). In the West, Chinese society would be viewed as sexist. It is documented in Figure 2, visible in everyday life to me as an outsider, and a frequent complaint to me from female managers and professors in China. The results to be presented show gender differences in the reasons why men and women are cited as contacts — men get cited for help representing the entrepreneur to the outside world while women get cited for internal tasks out of the public eye. What I do not find is gender difference in the returns to brokerage. In other words, Chinese women who break out of formal organizations to create their own can prosper just like men in the broader, relatively sexist society. Of course, the gender neutrality might be limited to entrepreneurs, or to the East Coast population from which the probability sample is drawn. Either way, the broader question is for subsequent research.

DATA

The data to be analyzed come from a 2012 survey of 700 CEOs, primarily founder entrepreneurs, selected as a stratified random sample of private enterprises in five manufacturing industries within three provinces around the Yangtze River Delta: China's financial center, Shanghai, with Nanjing the capital of Jiangsu Province to the north, and Hangzhou the capital of Zhejiang Province to the south. The three provinces account in 2013 for 20.2% of China's gross domestic product, and 31.9% of China's imports and exports. The surveyed Chinese entrepreneurs are 700 of the 958 Asian managers summarized in Figure 1. The sample businesses were founded around the turn of the century on average (Nee & Opper, 2012: Chap. 2, and Bian, 2019: Chap. 4, provide succinct overview of business foundings in the recent history of the Chinese economy). Two thirds (65%) of the founders paid all start-up costs with their own money. Most of the other third were primary investors (29% of all founders paid less than all of their start-up costs, but they paid an average of 58%).

The network around each respondent is measured in the usual way by asking for the names of key contacts (people helpful in building and operating the business), then asking about the substance of the respondent's relations with each contact, and the strength of connections between contacts (Burt and Burzynska, 2017: Appendix). Such survey questions are routine in network survey research (Marsden, 2011; Perry, Pescosollido and Borgatti, 2018), in network surveys of management populations in particular (Burt, 2010: pp. 281ff.), and have precedent in China (Ruan, 1998, the 2003 Chinese General Social Survey, Bian and Li, 2012; Xiao and Tsui, 2007; Batjargal et al., 2013). The survey instrument and materials are available in the original English (see acknowledgement note). Scaling the survey data for network metrics is discussed by Burt and Burzynska (2017: Appendix). Varying from three to 12 contacts around a median of six, each respondent's network is a matrix of symmetric connections with and among contacts.

NO GENDER DIFFERENCE IN NETWORK ADVANTAGE

Figure 3 shows how network constraint — the measure of network advantage across the horizontal axis in Figure 1 — is distributed for men and women. Dark bars to the left in Figure 3 show how raw scores are distributed. The distributions are similar for men and women, differing neither in average level of constraint (means of 56.8 versus 55.9 for men versus women, 0.62 t-test, $P \sim .54$), nor in variance (standard deviations of 14.0 versus 14.7 for men versus women, 0.91 $F_{(584,114)}$, $P \sim .49$), nor in general shape of the network distribution. Network size and density are important components in the summary index, network constraint. Previous research in the West has shown women to have networks smaller than men (Ibarra, 1992), larger than men (Obukhova and Kleinbaum, 2018), and about the same as men (Brass, 1985; Moore, 1990). Across the Chinese entrepreneurs, there is no gender difference in the number of business contacts cited by men versus women (6.37 versus 6.41 respectively, 0.25 t-test, $P \sim .80$), nor in the density of relations among contacts cited (46.9 vs. 46.9 for men vs. women, 0.01 t-test, $P \sim 1.00$), nor in aggregate network structure (distinguished as broker, clique, moderate and extreme partner networks, 5.46 chi-square, 3 d.f., $P \sim .14$; Burt, 2019).

————— Figure 3 About Here —————

Businesses were drawn at random for the survey within three sampling strata: city, industry, and firm size (Burt and Burzynska, 2017: Appendix). There are no statistically significant differences between the seven sample cities in the tendency for women to be CEO (10.90 chi-square, 6 d.f., $P \sim .09$; highest in Ningbo, where 23% of sample CEOs are women, lowest in Changzhou and Wenzhou, 11%), and women are proportionally CEO in the sampling strata of small, moderate, and large businesses (0.60 chi-square, 2 d.f., $P \sim .74$). There are gender differences by industry (31.59 chi-square, 4 d.f., $P < .001$). A logit model predicting female CEOs from dummy variables distinguishing the five sample industries show that women are especially likely to be CEO of sample businesses in textiles (28.8%, 3.27 logit z-score, $P \sim .001$), and unlikely to be CEO of

sample machinery businesses (7.2%, -2.04 logit z-score, $P \sim .04$). In the other three industries (electronics, drug manufacturing, and transport equipment), women are CEO as often as would be expected if gender were independent of industry. I use industry fixed effects in the analysis.

To be sure the gender differences in network structure are not obscured by the sampling strata, the white bars in Figure 3 show how network constraint is distributed for men and woman — after constraint is adjusted for a respondent's industry, city, and the three sampling strata of firm size. Network constraint is regressed over 12 dummy variables distinguishing the sampling strata, and the residual is studentized to define a z-score measure of adjusted constraint. Zero on the horizontal axes to the right in Figure 3 indicates a respondent whose network constraint is typical for his or her industry, city, and firm size. The distribution of adjusted network constraint scores more closely approximates a normal bell curve, but again the distributions are similar for men and women, differing neither in average level of adjusted constraint (.01 versus. -.03 respectively, 0.34 t-test, $P \sim .73$), nor in variance (respectively, 1.00 vs. 1.01 standard deviation, 0.98 $F_{(572,114)}$, $P \sim .54$).

NO GENDER DIFFERENCE IN BACKGROUND ADVANTAGE

The sample is defined to be random within industry, firm size, and city categories. It is not random with respect to gender. Given the relatively sexist attitudes reported in Figure 2, there could be selection biases that result in female entrepreneurs being more able people than male peers. Perhaps the women come from socially advantaged parents, or are better educated, or have more experience.

The results in Table 1 allay concerns about selection bias. There is no gender difference in the tendency for about half of the entrepreneurs to have a father who was a farmer or common laborer. Neither is there gender difference in father's education, with about 10% having a father who graduated from college. Turning to the entrepreneurs, there is no gender difference in education, with about a quarter of them

having a college education. There is a statistically significant tendency for the women to be about two years younger than men (men were born in 1966 on average versus 1968 for women, $P \sim .003$). I do not see an advantage in being two years younger, given the lack of gender difference in education and work experience documented in Table 1, but it is a difference.

———— Table 1 About Here ————

There are no gender differences in the jobs men and women had before they took on their current job as head of the private enterprise. They have similar industry backgrounds, with most coming from a prior job in the same industry (60.5% of men, 57.5% of women, $P \sim .59$). They have similar backgrounds in terms of management responsibility, with most coming from what they understand to be middle or senior management jobs (71.8% of men, 73.0% of women, 0.08 chi-square with 2 d.f., $P \sim .96$). Distinguishing middle from senior management only makes the lack of gender difference more striking (0.07 chi-square with 3 d.f., $P \sim .995$).

Shifting to the current situation, there is no gender difference in tending to be married ($P \sim .49$), the year when the current firm was founded ($P \sim .27$), or whether the firm is a family firm ($P \sim .43$). I use the common definition of owner-operated firms in which the respondent's spouse or children are employees (e.g., Miller et al., 2007). By this criterion, 254 of the 700 businesses are family firms. As another indicator of strong family presence, I also looked at the percent of the respondent's network contacts who are family. Women have a slightly higher percent family in their networks, but there is so much variation across entrepreneurs that the gender difference is negligible ($P \sim .14$). Women are negligibly less likely to be the person who founded the current firm (81.0% of men, 73.9% of women, $P \sim .08$), but that difference is diminished well past concern if I hold constant the younger age of women (-1.31 logit z-score for no gender difference in being founder, $P \sim .19$).

The lack of gender differences indicates selection bias, but not one that threatens this study. Lin (2001:103) uses data on a city-based national probability sample of adults in China to report that women have less education, lower job ranks, and less

expansive networks — and his estimates are more optimistic than census figures on the population (Lin reports 31.3% men and 20.4% women with college or more education versus population figures of 11.1% and 10.1% respectively according to the 2013 *China Statistical Yearbook*). The background and network similarities between men and women reported here means that the female entrepreneurs are not advantaged over male entrepreneurs, but they are certainly advantaged over women in the broader population.

NO GENDER DIFFERENCE IN NETWORK-SUCCESS ASSOCIATION

Success for the entrepreneurs is measured as a self-made man can be argued to experience it: (1) a lot of money passes through his hands, (2) jobs can be given to deserving friends, new contacts, or members of their families, and (3) the company signals technological sophistication by holding its own patents. The vertical axis in Figure 1 is a z-score defined by the principal component of all three indicators (Burt and Burzynska, 2017: 229, report the network association with each success indicator). There is a $-.79$ correlation between success and log network constraint in Figure 1.⁵ The association remains strong at the individual level with controls for various individual and business differences (Burt and Burzynska, 2017; Burt and Oppen, 2017). Consistent with the Figure 1 result, Batjargal offers a portfolio of studies reporting greater success for Chinese entrepreneurs who have larger networks richer in structural holes (Batjargal, 2007a; 2007b; 2010; Batjargal et al., 2013). Merluzzi (2013) reports similar results on Chinese and other Asian managers in a large software company, and Bian and Wang (2016) report cross-sector relations being helpful for raising start-up

⁵In the spirit of Jencks, Perman, and Rainwater (1988) success is measured terms of the felt success provided by doing well as an entrepreneur, a condition certainly related to earnings but more than just profit. Still, it is good to know that the network association with success is also evident if success is measured only in terms of profit (Burt and Oppen, 2017:534 n 11).

capital by self-employed respondents in an area probability survey of eight large cities in China.

———— Figure 4 About Here ————

Figure 4 shows how business success is distributed for men and women. Dark bars to the left in Figure 4 show the distribution of raw scores. The distributions are similar for men and women, with clustering in the middle, and both extending further to the right than the left showing more variation in high success than in low success. The distributions do not differ in average level of success (means of 0.02 versus -0.08 for men versus women, 0.93 t-test, $P \sim .35$), nor in variance (standard deviations of 1.02 versus 0.91 for men versus women, 1.24 $F_{(584,114)}$, $P \sim .16$).

The white bars in Figure 4 show how business success is distributed after success is adjusted for sampling strata and success prediction. Observed success is regressed over 17 predictors: the 12 dummy variables distinguishing sampling strata, plus four organization variables associated with business success, and network advantage reverse measured by network constraint. The four organization variables are (1) founder still serves as CEO, (2) years the business has been in operation, (3) has research and development employees, and (4) did well when the business was initially launched (Burt and Burzynska, 2017: 229; Burt and Opper, 2017: 521). Women are no more likely than men on these four variables to run successful organizations.⁶ Success residuals from the 17-variable prediction are studentized to define a z-score measure of adjusted business success which is plotted to the right in Figure 4.⁷ Zero on the horizontal axes to the right indicates a respondent whose level of business success is

⁶Women are 16.4% of the sample, 15.2% of the founder CEOs (3.02 chi-square for no difference, 1 d.f., $P \sim .08$), and 15.1% of the businesses with R&D departments are run by women (0.97 chi-square for no difference, 1 d.f., $P \sim .33$). The average age of businesses run by women is 11.4 years, which is similar to the 12.0 for men (1.25 t-test for no difference, $P \sim .21$). Men and women run businesses that were similarly successful in their initial year as a private enterprise (1.56 t-test for no difference, $P \sim .12$).

⁷For readers interested in more detail, the 17-variable prediction is the first five predictors in Table 8 plus fixed effects for the 12 sampling strata (five industries, seven cities, and three size categories).

typical for his or her industry, city, size, organization, and network. The adjusted success scores have a more normal distribution than the raw scores, and again, men and woman have the same average level (means of 0.01 versus -0.06 respectively, 0.66 t-test, $P \sim .51$), and variation around predicted success (1.02 versus 0.91 standard deviations for men versus women, 1.27 $F_{(567,114)}$, $P \sim .12$). The lack of a gender difference here corroborates earlier analyses reporting that gender does not improve success prediction directly, or in interaction with the network predictor (Burt and Burzynska, 2017: 247, note 3; Zhao and Burt, 2018: note 12).⁸

GENDER PATTERNS WITHIN THE NETWORKS

Entrepreneur gender being independent of the network-success association in Figure 1 does not preclude felt gender differences within the networks. I begin with the kinds of people found in the networks.

Kinds of People

Respondents were presented with a card listing kinds of contacts in Table 2. A cited contact could be a member of the respondent's family, a classmate from school, a neighbor, a member of the Chinese Communist Party, and so on. For each contact, respondents were asked to cite all the options that applied (any to all of the listed roles could apply to any one cited contact).

I draw two conclusions from Table 2. First, few business contacts come from the traditional sources of family, neighborhood, school, or party. The first two columns in Table 2 give the average number of row contacts cited by column respondents. For example, one in four men cited a classmate. Women were twice as likely to cite a classmate. The difference is statistically significant ($P < .01$), but the substantive point

⁸Burt and Opper (2017: 534, note 11) show that the network prediction of success also holds if success is measured by return on assets. They do not test for a gender effect. I estimated their prediction adding gender as a direct predictor of return on assets, and as an interaction with network constraint to test that men and women enjoy the same returns to network advantage. Neither gender predictor is statistically significant (0.02 $F_{(2,680)}$, $P \sim .98$).

is that few classmates get cited as contacts. Continuing down the rows in the table, the fractional means show that the listed kinds of contacts are fewer than one per respondent. Even family, the touchstone for traditional Chinese society, provides only one contact for every two respondents (.52 and .60 means in Table 2). And I already reported in Table 1 that women are no more likely than men to run a family business.

The most likely contact is a person with none of the listed characteristics, labeled “None of the Above” in Table 2 (82% of contacts cited by men, 79% of contacts cited by women). As Burt and Burzynska (2017: 511) summarize: “The majority of entrepreneurs found help outside the family, indeed outside the usually-suspected sources of social support in China, such as childhood friends, classmates, neighbors, or connections to other institutions such as the military or the Communist Party.” To that summary I can now add that “None of the Above” contacts are about equally present in networks around men and women.⁹

Homophily is the second point I take from the results. Women are more likely than men to cite other women as business contacts ($P < .001$ in bottom row of Table 2). It is well known that relations are more likely between socially similar people, especially between people who feel similarly a minority in their social situation (McPherson, Smith-Lovin, and Cook, 2001).

⁹Table 2 is missing two kinds of contacts often mentioned in entrepreneurship research: co-workers and venture capitalists. I expect venture capitalists and other finance sources to be important to technology entrepreneurs, and more important in today’s Chinese economy than they were at the turn of the century. However, the sample businesses here are well away from the technology frontier, early in the rise of Chinese private enterprise. Two thirds (65%) of the founders paid all start-up costs with their own money. Only 6% of founders used none of their own money for the start-up (and for those few, formal bank loans covered 65% of start-up costs). To identify co-workers, the survey included the word “colleague” in the list of contact attributes. Respondents labeled 79% of the “None of the Above” contacts as colleagues. The problem is that respondents using the label “colleague” for people who work in their current company (colleagues at your current university), people with whom they formerly worked in the same company (colleagues at a prior university), and people involved in collaborative activities (colleagues in your projects or research area). Subsequent surveys with the entrepreneurs are more precise, but the “colleague” label in the 2012 survey is put aside as ambiguous.

At the same time, gender homophily is not ubiquitous. Female entrepreneurs do not surround themselves with other women. The bottom row of Table 2 shows that men cite one woman on average as a business contact. Women only cite a fraction more (1.07 cited by men, 1.70 cited by women). The small, if statistically significant, difference between men and women is consistent with contradictory reports in the West. Men and women display high levels of gender homophily (Brass, 1985; Brashears, 2008), with women in the national population citing slightly more family (1.5 versus 1.8 family members cited by men versus women, Moore, 1990), but women are less likely to cite female colleagues for support relations (Ibarra, 1992, 1997). Women report more cooperation in a team composed solely of other women (relative to men reporting on a team composed solely of men, Chapman and O'Reilly, 2004:203), but women are more likely than men to cite another woman as her most difficult colleague, though less so for women in a network composed of many other women (Merluzzi, 2017).

———— Table 2 and Figure 5 About Here ————

Figure 5 clarifies the substance of gender homophily in the Chinese networks. Respondents are distinguished on the horizontal axis by the number of women they cite. The vertical axis is the percent of male versus female respondents at each level. For example, networks containing no female contacts surround 223 sample men and 26 sample women. One person cited more than five female contacts. She cited seven. She is in the "Five +" category.

The modal response in the survey is to cite no woman. Loglinear test statistics in the inset table (Goodman, 1970) show that networks containing only men are more likely around male than female entrepreneurs (-4.13 test statistic, $P < .001$). At the same time, there are a substantial number of women who have networks composed entirely of men (22.6%). Of course, I expect men to be a majority in each network because men are a majority in the business population: The data describe a probability sample of businesses in which 82% of cited contacts are men (3,643 of 4,464), and 83% of the respondents who cite them are men (585 of 700).

Turning to the female contacts who do get cited, Figure 5 shows that male and female entrepreneurs are about equally likely to cite one or two women as contacts (.59 test statistic for no difference between men and women citing “One” or “Two” female contacts, $P \sim .56$). It is rare to see a network containing more than two female contacts (-6.04 test statistic), but when it happens, it is more likely around a female than a male entrepreneur (4.55 test statistic for “Three or More” women contacts, $P < .001$).

In sum, the typical network contains one or two female contacts. Men are more likely than women to have networks composed entirely of other men, and women are more likely than men to have networks containing more than two women.

Kinds of Relationships

Given gender homophily, does the substance of relations between men differ from the substance of relations between women, or between men and women? For example, do men have longer histories with one another — with the attractive correlates of long-term relationships? Are women citing other women they have known for many years, but forced by more recent entry into business to rely on male contacts who are relatively recent acquaintances — with the unattractive correlates of immature relationships?

Table 3 illustrates how I propose to answer such questions. The first three columns of Table 3 display the gender homophily established in Table 2. Men cite other men, and women cite other women, more often than would be expected if citations were independent of gender (26.91 chi-square adjusted as in Table 2 for autocorrelation between contacts cited by the same respondent, 1 d.f., $P < .001$). The fourth column in Table 3 reports average years known. Men have known the men they cite for an average 10.52 years. They have known the women they cite for about the same length of time, 10.61 years, and so on. I test differences in years known in the first row of Table 4 by regressing years known across three dummy variables: respondent is a man citing a woman, respondent is a woman citing a man, and respondent is a woman citing another woman. Relations between men are the reference category. Men citing other men on average knew one another for 10.52 years, which is the intercept for the

prediction equation, and the mean in the first row of Table 3. Men knew the women they cited for a negligible .09 years longer (which is the mean for men citing women in Table 3, 10.61 years, minus the mean for men citing other men, 10.52 years, which has a 0.25 test statistic in Table 4). Women citing men had known one another for negligibly less time than men citing other men, -.43 years (-0.96 t-test). Women citing other women had known one another for about a year longer than men citing other men (1.03 coefficient). In short, years known do not vary significantly with respondent and contact gender (1.49 test statistic in final column of Table 3, $P \sim .22$).¹⁰ This is not a test of gender homophily. Gender homophily is obvious in the third column of Table 3, but years known do not vary significantly by gender mix down the rows of the fourth column in Table 3, and the lack of significance is documented in the first row of Table 4.

———— Table 3 and Table 4 About Here ————

Turning to other kinds of relations, respondents were asked to describe how close they felt to each contact, their level of trust in each contact, and how often they met each contact. Emotional closeness varies slightly with gender (10.33 chi-square in Table 4, $P \sim .02$) in that closeness on average is similar between men, men citing women, and women citing other women, but women feel less close to their cited male contacts (-2.06 test statistic). Trust is independent of gender (5.97 chi-square, $P \sim .11$), which is consistent with detailed analyses elsewhere (Burt and Burzynska, 2017: 242; Burt, Bian, and Opper, 2018: 21).¹¹ I am confident that gender differences could be

¹⁰Trust and emotional closeness increase with the log of years known (Burt, Bian, and Opper, 2018: 17), but log years known is also independent of gender if predicted from the three dummy variables in the first row of Table 4 (1.49 summary test statistic increases to 2.39, $P \sim .07$).

¹¹The data here concern the probability and strength of relations. There is no evidence of male and female entrepreneurs using different rhetoric to describe their relationships (Cliff, Langton, and Aldrich, 2005; Hechavarría et al., 2018). There is reason to suspect they do. Burt, Bian, and Opper (2018: 242) report no evidence of gender homophily in trust, as I report here, but they go deeper than I can here do to show that women are more prone to the trust associated with *guanxi* ties. People on average are more likely to trust a contact with whom they share mutual friends, which is usually interpreted as evidence of the reputation cost a contact would incur if mutual friends discovered his or her bad behavior (e.g., Granovetter,

found by distinguishing more specific qualities in relationships (Bu and Roy, 2005), but the duration, emotional closeness, and frequency distinctions in Table 4 are the usual characteristics used to distinguish strong from weak relationships.

Frequency is the network content in Table 4 most patterned by gender. The fourth row of the table contains results for an ordinal logit model predicting four levels of frequency between respondent and contact: daily, weekly, monthly, or less. Contact between men is no more or less frequent than it is between women, or between women and the men they cite. The one strong association in the row is men saying they have frequent contact with their female contacts (4.53 test statistic, $P < .001$). Specifically, men are likely to have daily contact with the women they cite: the tendency for daily contact with women is strong in the fifth row of Table 4 (4.19 test statistic), and negligible in the sixth row where frequency is compared only across weekly, monthly, and less frequent contact (1.79 test statistic). The frequent contact with women is not men citing their wives: men have disproportionate daily contact with women within and beyond the respondent's family.¹² Nor are these relations with a woman hired as an executive assistant: men have disproportionate daily contact with women within and beyond the firm.¹³

Explanation lies less in male behavior than in a general tendency for both men and women to have more frequent interaction with female contacts. The tendency in Table

1985; Burt, 2005: Chap. 4). Burt, Bian and Opper show that the Chinese women studied here, more often than men, trust without the protection of mutual friends, relying instead on years of interaction with a contact. Women's emphasis on personal history over social norms could be because they do not, or cannot, rely as much in Chinese society on social norms inhibiting bad behavior from male contacts. I can go no further with the data at hand, but the finding is an intriguing note for future work on gendered business relations.

¹²The 4.19 test statistic in Table 4 for daily contact between men and their female contacts is 3.83 ($P < .001$) if I exclude from the estimation relations with the respondent's nuclear family, and still a statistically significant 3.08 ($P \sim .002$) if I exclude all relations with relatives.

¹³The 4.19 test statistic in Table 4 for daily contact between men and their female contacts is 4.52 ($P < .001$) if I exclude from the estimation relations with the contact cited as the respondent's most valuable employee, and remarkably remains statistically significant with half as many observations if I exclude all relations with people labelled "colleagues" (4.52 test statistic, see footnote 8 on the broad usage of the "colleague" label).

4 for women to have frequent contact with other women is almost statistically significant (1.95 test statistic, $P \sim .05$). The ordinal logit equation in the fourth row of Table 4 can be expressed as a negligible tendency for women to interact more frequently on average with their contacts (-1.19 test statistic), a strong tendency for respondents on average to interact more frequently with women (4.53 test statistic, $P < .001$), and a negligible tendency for frequency to depend, above and beyond the preceding, on specific gender mix (in this case, men citing women; 0.42 test statistic). Consistent with Table 4, the tendency for respondents on average to have more frequent interaction with female contacts is concentrated in daily interaction: Women are disproportionately the object of daily interaction (4.19 test statistic, $P < .001$), but there are no gender differences in who gets cited for weekly, monthly, or less frequent interaction (1.79 test statistic, $P \sim .07$).¹⁴

Network History

The network data were gathered so as to provide a modest window on the history of each network. The network survey included usual questions asking respondents to name key contacts for their current business activity, but also questions asking about contacts most valued during significant events in the history of the business. Following Burt and Burzynska (2017), I discuss the former as “current” contacts and the latter as “event” contacts. Figure 6 displays an example sequence of significant events in the history of a business. The instrument begins with the year in which the entrepreneur registered his or her business as a private enterprise, which is the “founding” event in the first year of the business’ history. The respondent is then asked to identify up to five subsequent events that were especially significant for the business. Event significance

¹⁴A still more complete disaggregation is to run a loglinear model of the three-way table of contact gender, respondent gender, and daily contact (respectively variables A, B, and C). There is a strong gender homophily association (6.13 test statistic for AB interaction). There is a strong tendency for women to be cited as daily contacts (4.91 test statistic for AC interaction). The remaining associations are negligible (1.47 and 0.88 test statistics respectively for BC and ABC interactions).

is not defined for the respondent. The goal is to capture what the respondent deems significant, not what observers deem significant. The respondent is asked to focus on events important in the “history of the company development.” The respondent in Figure 6 said he secured a large overseas customer in the second year of the business, and found a reliable primary supplier in the third. All went well until the plant explosion in the seventh year, after which the entrepreneur worked through a financial crisis in the 10th year, and was in the 13th year the object of a government investigation into a pollutant discharge from his plant. After recording the events, the respondent is asked for each event: “Who was the person most valuable to you during that event?” A total of 4,163 events were recorded from the 700 interviews (most respondents named the upper limit of five events), for which 2,905 contacts were cited as most valued (several contacts were named as most valued on more than one event). About half the event contacts were also cited as current contacts (Burt and Opper, 2017: 503).

Table 5 shows the gender mix behind event citations. The primary result is the tendency for men and women to avoid women as valued contacts in launching a business — with respect to founding (-6.50 test statistic for men citing women), and managing the first significant event (-3.96 test statistic for men citing women). After the business is through its first significant event, subsequent citations are independent of gender (associations fail to reject the “no gender differences” test in Table 6). In the final year, the year of the survey, women are no more or less likely than men to cite, or be cited as, a current contact (1.29 chi-square, 3 d.f., $P \sim .73$).¹⁵

To the extent that the business environment is male-oriented — in terms of men outnumbering women participants, but also in terms of men more likely to control resources — it makes sense that entrepreneurs more often turn to men for help.

¹⁵There is still gender homophily. Using the loglinear model in the previous footnote, with variable C now distinguishing people cited as current contacts, there is a strong tendency for gender homophily (-5.86 test statistic for AB interaction), no gender difference in being cited as a current contact (0.46 test statistic for AC interaction), no gender difference in citing current contacts (0.38 test statistic for BC interaction), and no three-way interaction (-0.63 test statistic for ABC interaction).

———— Figure 6 and Table 5 About Here ————

But that cannot be the whole explanation. If it were, then entrepreneurs would more often turn to men for help in managing any significant event. Table 5 shows that the preference for male contacts is limited to the founding and initial significant event.

I suspect the explanation lies in social status. Details on kinds of relations distinguish contacts cited for help in launching the business — for founding the business and managing the first significant event — from all subsequent contacts: The launch contacts are most likely to be family, known to the respondent for more than 20 years, especially close emotionally to the respondent, and the object of maximum trust (Burt and Opper, 2017: 509). In other words, an entrepreneur has, in some measure, the social standing, the status, of the people who help launch the business. That status is akin to status derived from the kind of person for whom one works, or the kind of person who chaired one's dissertation committee. Men are certainly the majority in the business environment, and more likely to control needed resources, but they are also more respectable sources of help with the identity defining launch of a business.

Status is also relevant to the second pattern in Table 5: the tendency to avoid female contacts is stronger for men (-6.50 test statistic for men in the first row of Table 5 versus -3.87 for women; -3.96 test statistic for men in the second row versus -2.19 for women). This illustrates a familiar observation in sociology: people less prominent in a population are less regulated by the population's social norms (e.g., Park, 1928, on immigrant innovation in trying to fit into a new environment, through Phillips, 2011, on innovation more likely at the periphery of the music establishment). Men might be more socially accepted as an entrepreneur in the Chinese business environment, but the flip side of that coin is a loss of face for those who visibly turn to a low-status person — a female — for help in launching their business. Women turning to other women are less subject to that loss of face. The pattern was also visible in Table 4 where men are well above the threshold for statistical significance in citing women as frequent contacts, while women are just below the threshold (respectively 4.53 versus 1.95 test statistics). The image of a business leader surrounded by busy female assistants is captured by

especially frequent interaction with women, an image to which men conform more than women.

Status is further apparent in the events for which men and women are cited. Table 6 shows nine categories into which Burt and Opper (2017: 504-510) affinitize significant events based on respondent descriptions. Events are ordered in Table 6 by the business year in which they were cited on average. Supplier, customer, and finance issues are cited on average in the first five or six years in the life of a sample business. Technology and general market issues are cited on average toward the end of the first decade. There are no gender differences in who cites each of the nine categories (6.56 chi-square [not in table] for no difference across the rows in the “Women Citing” column of Table 6, 8 d.f., $P \sim .58$). The differences are in who gets cited. Continuing the status theme from Table 5, male and female entrepreneurs avoid citing women for help in founding the business (-6.84 test statistic, $P < .001$, and first row of Table 5, tests not reported in table), for help with a supplier issue (-1.97 test statistic, $P \sim .05$), and especially for help with a customer issue (-3.27 test statistic, $P \sim .001$). Male contacts are preferred for representing the company. The two kinds of events for which women are disproportionately cited are insider issues of finance (2.13 test statistic, $P \sim .03$) and production technology (3.03 test statistic, $P \sim .002$).¹⁶

The results in Table 7 summarize my primary inference from the details in Table 6: Men are the preferred contact for events that represent the entrepreneur to peers (consistent with results on Western managers showing men perceived as more influential, Brass, 1985; more likely to be perceived to be network brokers, Brands and Kilduff, 2014, and more likely to be perceived as charismatic when central in a hierarchical network, Brands, Menges and Kilduff, 2015). Rows in Table 7 distinguish the gender mix between respondent and contact during a significant event, and the first

¹⁶These two sentences are based on logit equations predicting the row kind of event from the gender of the respondent citing the event, and the gender of the person cited as valued during the event, with standard errors adjusted up for autocorrelation between contacts cited by the same respondent.

column of numbers is the frequency with which each mixture occurs. There are 4,163 observations in total (700 respondents citing an average of 5.95 events, founding plus an upper limit of five subsequent events). The first column shows the strong tendency for men to cite other men and women to cite other women (with one degree of freedom, the chi-square for no gender homophily is 37.86 from the frequencies in Table 7, and 17.40 when adjusted down for autocorrelation between events and contacts cited by the same respondent [“cluster” option in Stata], both of which reject the no gender homophily null hypothesis at well beyond the .001 level of confidence).

The subsequent two columns in Table 7 show the tendency for each gender mix to be used in an event that represents the respondent to peers, first by showing the percent of row relations used for representation events, and second with a loglinear model predicting use in a representation event (with effects scaled relative to the tendency for men to cite other men to represent them). The summary point in Table 7 is that men and women similarly prefer male contacts to represent them to peers (-0.13 test statistic for no difference, $P \sim .90$), and men are more likely than women to avoid female representation (-6.63 test statistic for men avoiding female representation versus -2.83 for women avoiding female representation).

Three kinds of events are coded in Table 7 as representation events: founding the business, locating or managing suppliers, and locating or managing customers. These are events in the first three rows of Table 6, events for which female contacts are used significantly less often than male contacts. Of the many alternative ways to affinitize the cited events, representation to the outside world was not a consideration when events were coded for their content (Burt and Opper, 2017). However, given the strong results in Table 7, representation to the outside world should be considered in future research.¹⁷

¹⁷Working with the content categories in Table 6, I began with a three-category contrast between (1) representation events in the first three categories, versus (3) technical service events in finance (largely bookkeeping), government (largely filling out the correct forms correctly), or production technology (installation and efficient operation of equipment), versus (2)

SO WHAT?

The results in Table 8 show that, in this world of Chinese manufacturing entrepreneurs, men and women benefit similarly from network advantage, regardless of observed gender patterning in their networks (see Renzulli, Aldrich, and Moody, 2000, for a similar research design to study how networks matter for who starts a small business in the North Carolina Research Triangle area).

Model A is a baseline from previous work. Business success (Figure 4) decreases with network constraint as illustrated in Figure 1, is lower in businesses still run by the founder, higher in businesses that have been in operation for more years, higher in businesses that have an R&D department, and higher for businesses that were already successful in the first year they operated as a private enterprise (Burt and Burzynska, 2017: 232; Burt and Opper, 2017: 521). The dummy variable in the sixth row of the table distinguishes female entrepreneurs. As illustrated in Figure 3 and Figure 4, gender is independent of the success association with network advantage: Women are negligibly less successful than men (-0.11 test statistic for no difference between men and women), and the performance association with network constraint is negligibly stronger for women (-0.37 test statistic). A summary test at the bottom of Table 8 fails to reject the null hypothesis that the gender variables add nothing to the prediction ($F_{(2,688)}, P \sim .45$).

———— Table 8 and Figure 7 About Here ————

other events somewhere in between the other two. The three categories of technical service events are the Table 6 categories in which women are the most likely to be valued contacts. The contact valued in these events has expertise or contacts useful to the entrepreneur, but help can be performed away from the public eye. An ordinal logit equation predicting the three-category contrast from the four gender mixtures in Table 7 yields the same conclusions: men avoid female contacts (-6.65 test statistic), women prefer male contacts about as much as men do (0.27), and women avoid female contacts, but less vigorously than men avoid them (-3.73). Female contacts were used relatively often in both the second and third category, so a contrast between representation events versus other events captures the association, so that is what I use to summarize in Table 7.

Turning from the entrepreneur to his or her contacts, large, open networks are associated with success as illustrated in Figure 1, contain more female contacts,¹⁸ which are more numerous around female entrepreneurs as illustrated in Figure 5. Model B in Table 8 adds measures for the extent to which an entrepreneur has female contacts: no female contacts, one female contact, or multiple female contacts (-1, 0, 1 respectively). There is no direct association with success (0.31 test statistic), and the success association with network advantage is negligibly stronger for entrepreneurs with multiple female contacts (-1.20 test statistic). Again, the summary test at the bottom of Table 8 for the null hypothesis that the four gender variables add nothing fails to reject the null (0.78 $F_{(4,686)}$, $P \sim .54$; as does a test for the two added variables: 0.77 $F_{(2,686)}$, $P \sim .46$, and a test for the two added variables excluding the respondent gender variables from the prediction: 0.99 $F_{(2,688)}$, $P \sim .37$). I re-estimated Model B for men only (since more female contacts represent greater gender homophily for female entrepreneurs and less gender homophily for men), but obtained the same negligible association with the three levels of female contacts (0.91 $F_{(2,573)}$, $P \sim .40$). In part, the irrelevance of gender homophily to success in Table 8 could be due to the study population being entrepreneurs. The usual network study of gender homophily is conducted in a large corporation, where men hold most of the high-status jobs, so homophily and contact status are positively correlated for men and negatively for women (Ibarra, 1992; Gray and James, 2007). The negative correlation need not apply to female entrepreneurs turning to other women as business contacts since the entrepreneurs are not limited to the few women atop any one particular organization.

In Model C I add measures to distinguish networks by the use to which female contacts are put. Based on the preference for male contacts to represent the entrepreneur documented in Table 7, the “Female Contacts Not Used for Representation Events” variable in Table 8 is the three-level contrast displayed in

¹⁸A probit regression equation predicting number of female contacts in a network from network constraint in Figure 1 yields a -6.20 test statistic, $P < .001$).

Figure 7. Business success is on the vertical axis. The first category on the horizontal axis contains entrepreneurs who primarily cite female contacts as their most valued contacts for representation events, that is, most valued in founding the business, locating or managing suppliers, or locating or managing customers. These are entrepreneurs who make counter-normative use of female contacts, relying on female contacts in kinds of events for which the broader society prefers men. There are 50 male entrepreneurs in this category. They have the lowest average success of any group in Figure 7. At the other extreme are entrepreneurs who have multiple female contacts in their network, but the contacts are primarily used for non-representation events resolved outside the public eye.¹⁹ There are 173 male entrepreneurs in this category. They have the highest average success of any group in Figure 7. The three categories on the horizontal define an ordinal measure of the extent to which an entrepreneur uses his or her female contacts in a normative way, avoiding them for representation events and employing them for other events. If success is regressed across the three-level contrast, there is a statistically significant association for men (2.22 t-test) and a negligible association for women (0.35 t-test) — as illustrated by the two lines of average scores in Figure 7. Men outnumber women sufficiently to create a positive association across all 700 sample entrepreneurs (2.15 t-test, $P \sim .03$). However, the three-level variable is also correlated with network constraint — network brokers (low on constraint) turn to female contacts for non-representation events (-3.64 t-test for constraint regressed over the three-level contrast in Figure 7, $P < .001$) — such that the three-level contrast adds nothing to the success prediction in Model C. The summary test at the bottom of Table 8 for the null hypothesis that the six gender

¹⁹The term “primarily” in this and the earlier sentence to the primary use to which female contacts are put. The first category in Figure 7 contains 44 entrepreneurs who cited only one female contact as most valued in a representation event, but that was the only woman in their network, so 100% of their female contacts were used for a representation event. The third category in Figure 7 contains 75 entrepreneurs who cited one female contact as most valued in a representational event, but they cited two other female contacts used in non-representation events, so 33% or less of their female contacts were used for representational events.

variables add nothing fails to reject the null ($0.63 F_{(6,684)}$, $P \sim .71$; as does a test based on just adding to Model A the contrast in Figure 7 plus an interaction with entrepreneur network and gender: $0.84 F_{(5,685)}$, $P \sim .52$).

No performance difference between men and women adds to results contradicting early research supporting what some termed a “female underperformance hypothesis” of weaker performance from ventures run by women (see Jennings and Brush, 2013: 669, 671-673, for recent review). I close dismissing three spurious explanations. (1) Industry is a suspect explanation from past research showing that men start business in more lucrative industries. A high proportion of the sample women run businesses that produce pharmaceuticals, and average success is higher for that industry, which could obscure low relative performance by women. But the largest proportion of the sample women run textiles businesses, where success is below average. Regardless, I use industry fixed effects throughout the analysis, so industry differences do not explain the lack of a gender association with performance. (2) Underperformance not visible in the cross-sectional data could be apparent in performance over several years (Batjargal et al., 2018). However, Zhao and Burt (2018) show that the Table 8 businesses with network advantage in 2012 are more likely to survive into 2017, and they find no gender difference in survival’s probability or the survival association with network advantage. (3) In keeping with local life in the study population, I measure success in terms of employees, sales, and intellectual property, but a business that provides a good local life could generate poor financial performance, which would constitute underperformance of a kind (Jennings and Brush, 2013). However, my conclusions from Table 8 are the same if I replace the business success measure in Table 8 with profit: network advantaged firms are more profitable in Model A (-2.40 t-test with log network constraint), and the two gender adjustments add nothing to the prediction (0.11

$F_{(2,688)}$, $P \sim .90$). The more complex gender adjustments in Model B and C are also negligible (respectively $0.19 F_{(4,686)}$ and $0.25 F_{(6,684)}$, P for both is greater than $.9$).²⁰

CONCLUSION

High-quality survey data on a large probability sample of Chinese entrepreneurs shows that men and women — on average — build similar network structures, experience similar distributions of network advantage, achieve similar levels of business success, and experience similar performance returns to their network advantage (Figures 3 and 4). Digging into network content reveals three characteristics: First, male and female entrepreneurs have similarly close and trusting relations with similar kinds of contacts (Tables 1 and 3). Second, there is substantial gender homophily in the form of men more likely than women to operate in a network composed entirely of other men, while women operate more often than men in a network containing multiple female contacts (Figure 5). Third, there is gender pattern in the use of contacts that reflects conservative opinion in the broader society (Figure 2): Women are the object of more frequent interaction (Table 4) with respect to technical matters out of the public eye (clerical and administrative government work, bookkeeping, production technology, Tables 5 and 6). Men are the preferred contact for representation in the public eye in that both men and women more often cite male contacts as most valued in founding the business, dealing with suppliers, and dealing with customers (Tables 4 and 6). These normative patterns are more obvious in the business contacts of men than they are in the business contacts of women (Tables 3, 4, and 6), and more linked with business success for men (Figure 7). In sum, there is gender pattern to the networks around male and female entrepreneurs in China, but my central point is that the network theory of advantage from access to structural holes similarly predicts the business success of

²⁰Specifically, I regress business net income in 2011 (in yuan) across the predictors for each model in Table 8, with “Level of Success at Founding” replaced by the business log assets (in yuan) for 2011.

male and female entrepreneurs regardless of gender (summarized in Table 8 and illustrated in Figure 1).

REFERENCES

- Aldrich, Howard E., Pat Ray Reese, and Paola Dubini. 1989. Women on the verge of a breakthrough: networking among entrepreneurs in the United States and Italy. *Entrepreneurship & Regional Development*, 1(4), 339-356.
- Batjargal, Bat. 2007a. Comparative social capital: networks of entrepreneurs and venture capitalists in China and Russia. *Management and Organization Review*, 3(3), 397-419.
- Batjargal, Bat. 2007b. Internet entrepreneurship: social capital, human capital, and performance of internet ventures in China. *Research Policy*, 36(5), 605-618.
- Batjargal, Bat. 2010. The effects of network's structural holes: polycentric institutions, product portfolio, and new venture growth in China and Russia. *Strategic Entrepreneurship Journal*, 4(2), 146-163.
- Batjargal, Bat, Michael A. Hitt, Anne S. Tsui, Jean-Luc Arregle, Justin W. Webb, Toyah L. Miller. 2013. Institutional polycentrism, entrepreneur's social networks, and new venture growth. *Academy of Management Journal*, 56(4), 1024-1049.
- Batjargal, Bat, Justin Webb, Jean-Luc Arregle, Anne S. Tsui, Michael A. Hitt, and Toyah Miller. 2018. The moderating influence of national culture on female and male entrepreneurs' social network size and new venture growth. Working paper, Oklahoma State University.
- Bian, Yanjie. 2019. *Quanxi, How China Works*. Cambridge, UK: Polity Press.
- Bian, Yanjie, and Lulu Li. 2012. The Chinese General Social Survey (2003-8). *Chinese Sociological Review*, 45(1), 70-97.
- Bian, Yanjie and Wenbin Wang. 2016. The social capital for self-employment in transitional China. In Wang, Jenn-Hwan and Hsung, Ray-May, *Rethinking Social Capital and Entrepreneurship in Greater China* (pp. 21-35). New York: Routledge.

- Brands, Raina A. and Martin Kilduff. 2014. Just like a woman? Effects of gender-biased perceptions of friendship network brokerage on attributions and performance. *Organization Science* 25(5): 1530-1548.
- Brands, Raina, Jochen I. Menges and Martin Kilduff. 2015. The leader-in-social-network schema: perceptions of network structure affect gendered attributions of charisma. *Organization Science* 26(4): 1210-1225.
- Brashears, Matthew E. 2008. Gender and homophily: differences in male and female association in Blau space. *Social Science Research* 37(2): 400-415.
- Brass, Daniel J. 1985. Men's and women's networks: a study of interaction patterns and influence in an organization. *Academy of Management Journal* 28(2): 327-343.
- Bu, Nailin, and Jean-Paul Roy. 2005. Career success networks in China: sex differences in network composition and social exchange practices. *Asia Pacific Journal of Management*, 22(4), 381-403.
- Burt, Ronald S. 1992. *Structural Holes*. Cambridge, MA: Harvard University Press.
- Burt, Ronald S. 1998. The gender of social capital. *Rationality and Society*, 10(1), 5-46.
- Burt, Ronald S. 2004. Structural holes and good ideas. *American Journal of Sociology*, 110(2), 349-399.
- Burt, Ronald S. 2005. *Brokerage and Closure*. Oxford: Oxford University Press.
- Burt, Ronald S. 2010. *Neighbor Networks*. Oxford: Oxford University Press.
- Burt, Ronald S. 2018. Life course and network advantage in organizations: peak and transitional ages," Pp. 67-87 in *Social Networks and the Life Course*, edited by Duane Francis Alwin, Diane H. Felmlee, and Derek Kreager. Basel, Switzerland: Springer.
- Burt, Ronald S. 2019. Network disadvantaged entrepreneurs: density, hierarchy, and success in China and the West. *Entrepreneurship Theory and Practice* 43(1): 19-50.
- Burt, Ronald S., Yanjie Bian, and Sonja Opper. 2018. More or less *guanxi*: trust is 80% network, 10% individual differences. *Social Networks*, 54(July), 12-25.

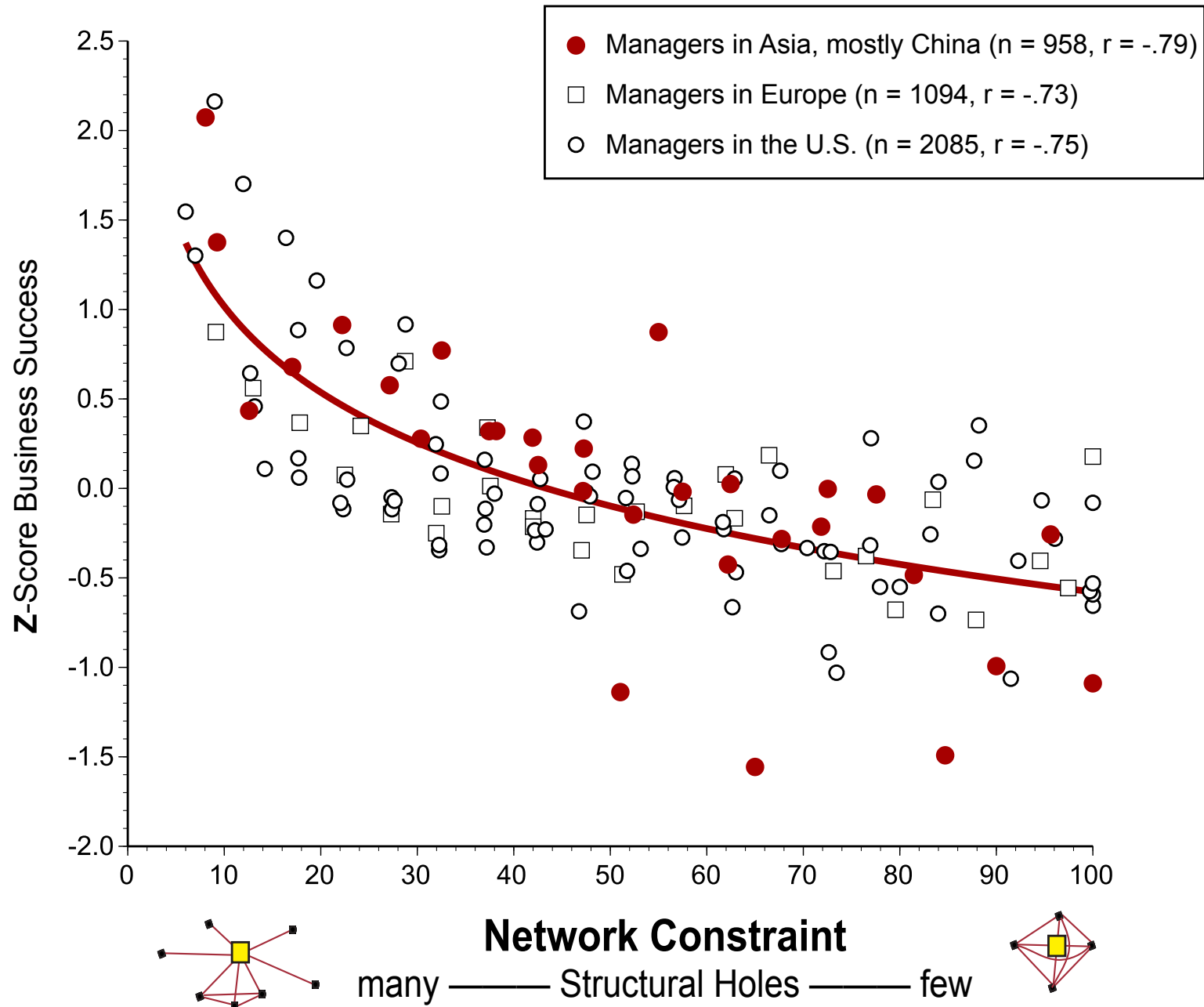
- Burt, Ronald S. and Katarzyna Burzynska. 2017. Chinese entrepreneurs, social networks, and *guanxi*. *Management and Organization Review*, 12(2), 221-260.
- Burt, Ronald S., Hogarth, Robin M. and Michaud, Claude. 2000. The social capital of French and American managers. *Organization Science*, 11(2), 123-147.
- Burt, Ronald S., Martin Kilduff, and Stefano Tasselli. 2013. Social network analysis: foundations and frontiers on network advantage. *Annual Review of Psychology*, 64, 537-547.
- Burt, Ronald S. and Sonja Opper. 2017. Early network events in the later success of Chinese entrepreneurs. *Management and Organization Review*, 12(3), 497-537.
- Chapman, Jennifer A. and Charles A. O'Reilly. 2004. Asymmetric reactions to work group sex diversity among men and women. *Academy of Management Journal* 47(2): 193-208.
- Cliff, Jennifer E., Nancy Langton, and Howard E. Aldrich. 2005. Walking the talk? Gendered rhetoric vs. action in small firms. *Organization Studies*, 26(1), 63-91.
- Cromie, Stan and Sue Birley. 1992. Networking by female business owners in Northern Ireland. *Journal of Business Venturing*, 7(3), 237-251.
- Goodman, Leo A. 1970. The multivariate analysis of qualitative data: interactions among multiple classifications. *Journal of the American Statistical Association*, 65(329), 226-256.
- Granovetter, Mark. 1985. Economic action, social structure, and embeddedness. *American Journal of Sociology*, 91(3), 481-510.
- Gray, Mia and Al James. 2007. Connecting gender and economic competitiveness: lessons from Cambridge's high-tech regional economy. *Environment and Planning A*, 39(2), 417-436.
- Groysberg, Boris. 2010. *Chasing Stars*. Princeton, NJ: Princeton University Press.
- Hechavarría, Diana M., Siri A. Terjesen, Pekka Stenholm, Malin Brännback, and Stefan Lång. 2018. More than words: do gendered linguistic structures widen the gender gap in entrepreneurial activity? *Entrepreneurship Theory and Practice*, 42(5): 797-817.

- Ibarra, Herminia. 1992. Homophily and differential returns: sex differences in network structure and access in an advertising firm. *Administrative Science Quarterly*, 37(3), 422-447.
- Ibarra, Herminia. 1997. Paving an alternative route: gender differences in managerial networks. *Social Psychology Quarterly* 60(1): 91-102.
- Inglehart, Ronald, Christian Haerpfer, Alejandro Moreno, Christian Welzel, Kseniya Kizilova, Juan Diez-Medrano, Marta Lagos, Pippa Norris, Eduard Ponarin and Bi Puranen et al. (eds.). 2014. *World Values Survey: Round Six - Country-Pooled Datafile Version*: <http://www.worldvaluessurvey.org/WVSDocumentationWV6.jsp>. Madrid: JD Systems Institute.
- Jenks, Christopher, Lauri Perman, and Lee Rainwater. 1988. What is a good job? A new measure of labor-market success. *American Journal of Sociology* 93(6):1322-1357.
- Jennings, Jennifer E. and Candida G. Brush. 2013. Research on women entrepreneurs: challenges to (and from) the broader entrepreneurship literature? *Academy of Management Annals*, 7, 663-715.
- Ji, Yingchun and Xiaogang Wu. 2018. New gender dynamics in post-reform China: family, education, and labor market. *Chinese Sociological Review* 50(3): 231-239.
- Lin, Nan. 2001. *Social Capital*. New York: Cambridge University Press.
- Lutter, Mark. 2015. Do women suffer from network closure? The moderating effect of social capital on gender inequality in a project-based labor market, 1929-2010. *American Sociological Review*, 80(2), 329-358.
- Marsden, Peter V. 2011. Survey methods for network data. Pp. 370-388 in *The SAGE Handbook of Social Network Analysis*, edited by John P. Scott and Peter J. Carrington. Thousand Oaks, CA: Sage.
- McPherson, Miller, Lynn Smith-Lovin, and James M. Cook. 2001. Birds of a feather: homophily in social networks. *Annual Review of Sociology*, 27, 415-444.
- Merluzzi, Jennifer. 2013. Social capital in Asia: investigating returns to brokerage in collectivistic national cultures. *Social Science Research*, 42(3), 882-892.

- Merluzzi, Jennifer. 2017. Gender and negative network ties: exploring difficult work relationships within and across gender. *Organization Science* 28(4): 636-652.
- Miller, Danny, Isabelle Le Breton-Miller, Richard Lester, and Albert A. Canella Jr. 2007. Are family firms really superior performers? *Journal of Corporate Finance*, 13(5), 829-858.
- Moore, Gwen. 1990. Structural determinants of men's and women's personal networks. *American Sociological Review* 55(5): 726-735.
- Nee, Victor and Sonja Opper. 2012. *Capitalism from Below*. Cambridge, MA: Harvard University Press.
- Obukhova, Elena and Adam M. Kleinbaum. 2018. Opportunity, choice, and the gender networking deficit. Working paper, Desautels Faculty of Management, McGill University.
- Park, Robert E. 1928. Human migration and the marginal man. *American Journal of Sociology*, 33(6), 881-893.
- Perry, Brea L., Bernice A. Pescosolido, and Stephen P. Borgatti. 2018. *Egocentric Network Analysis*. Cambridge, UK: Cambridge University Press.
- Phillips, Damon J. 2011. Jazz and the disconnected city: city structural disconnectedness and the emergence of a jazz canon, 1897-1933. *American Journal of Sociology*, 117(2), 420-483.
- Renzulli, Linda A., Howard Aldrich, and James Moody. 2000. Family matters: gender, networks, and entrepreneurial outcomes. *Social Forces*, 79(2), 523-546.
- Ruan, Danching. 1998. The content of the General Social Survey discussion networks: an exploration of General Social Survey discussion name generator in a Chinese context. *Social Networks*, 20(3), 247-264.
- Xiao, Zhixing and Anne S. Tsui. 2007. When brokers may not work: the cultural contingency of social capital in Chinese high-tech firms. *Administrative Science Quarterly*, 52(1), 1-31.
- Zhao, Chenlin and Ronald S. Burt. 2018. A note on business survival and social network. *Management and Organization Review*, 14(2), 377-394.

Figure 1. Returns to Brokerage in Asia, Europe, and the U.S.

Data are averaged within intervals of the network metric.



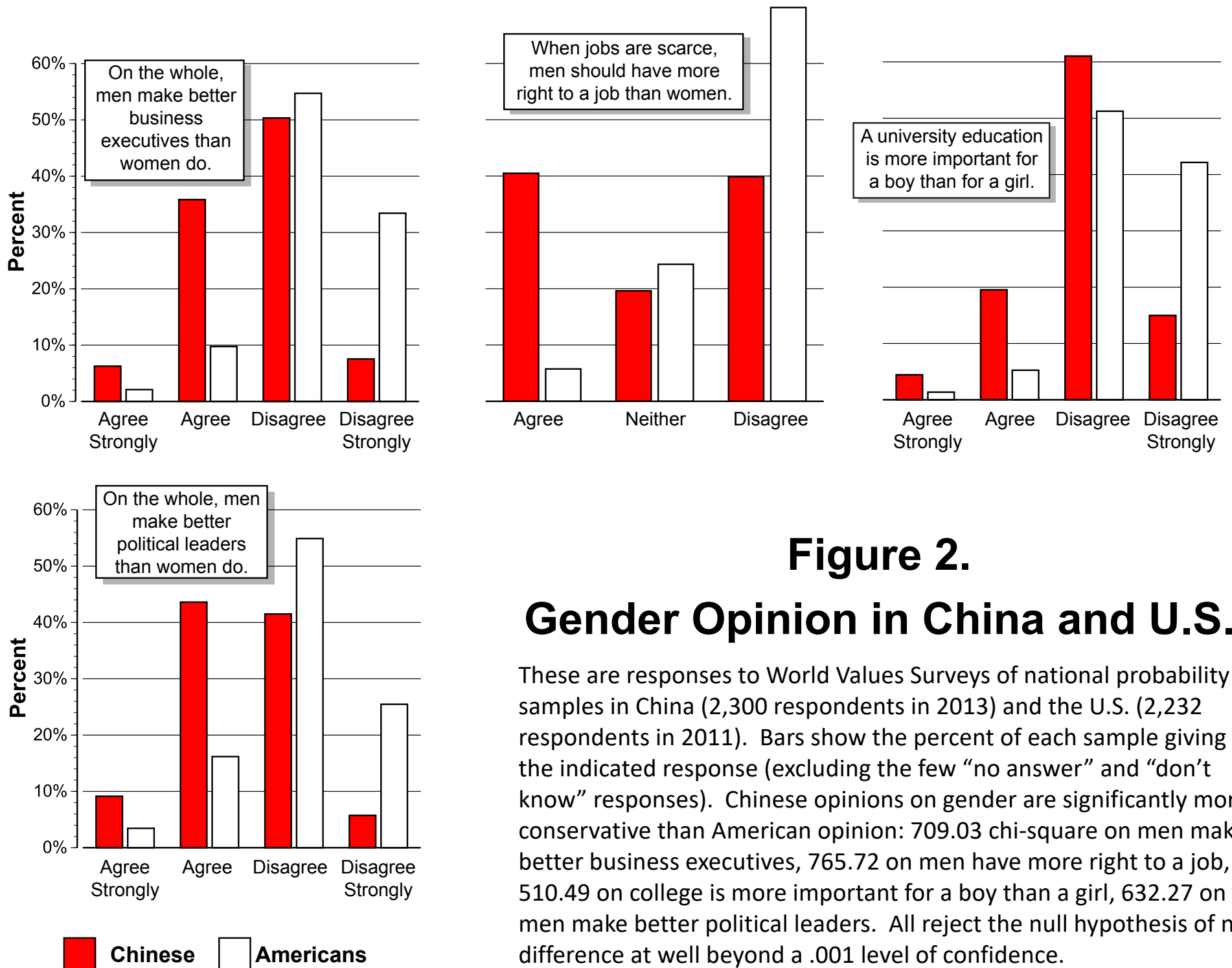


Figure 2.

Gender Opinion in China and U.S.

These are responses to World Values Surveys of national probability samples in China (2,300 respondents in 2013) and the U.S. (2,232 respondents in 2011). Bars show the percent of each sample giving the indicated response (excluding the few “no answer” and “don’t know” responses). Chinese opinions on gender are significantly more conservative than American opinion: 709.03 chi-square on men make better business executives, 765.72 on men have more right to a job, 510.49 on college is more important for a boy than a girl, 632.27 on men make better political leaders. All reject the null hypothesis of no difference at well beyond a .001 level of confidence.

Figure 3. Men and Women Build Similar Network Structures

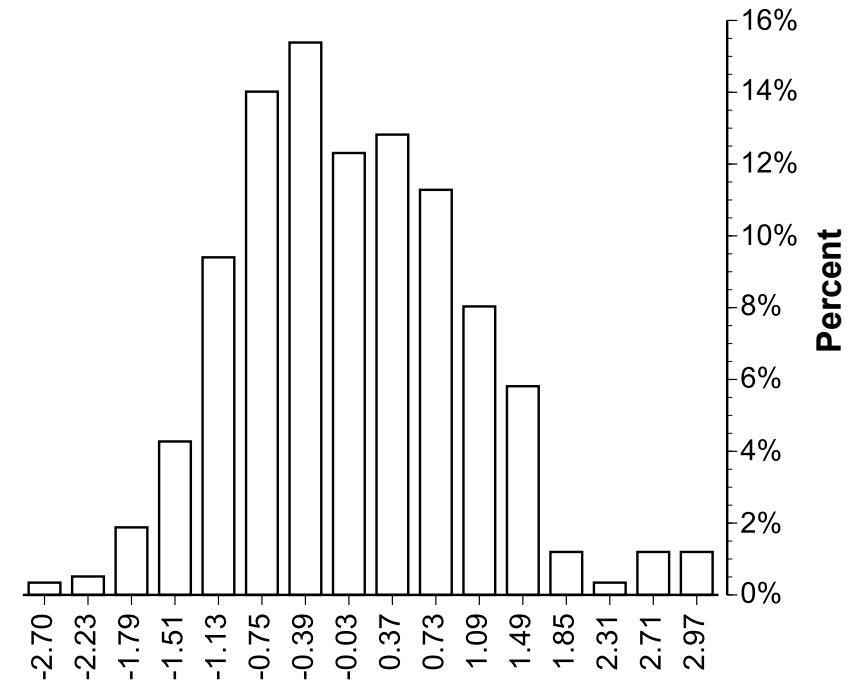
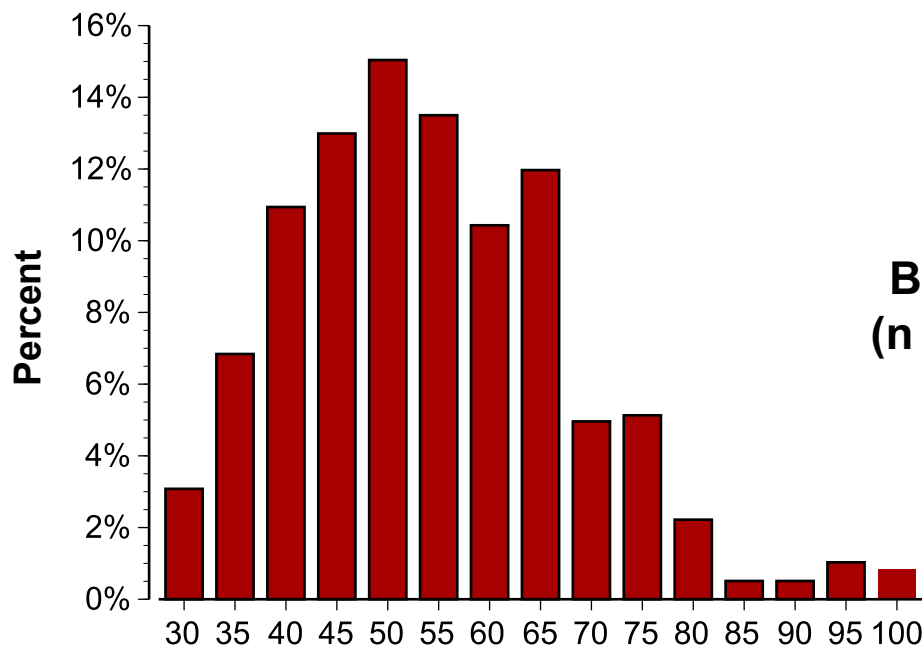
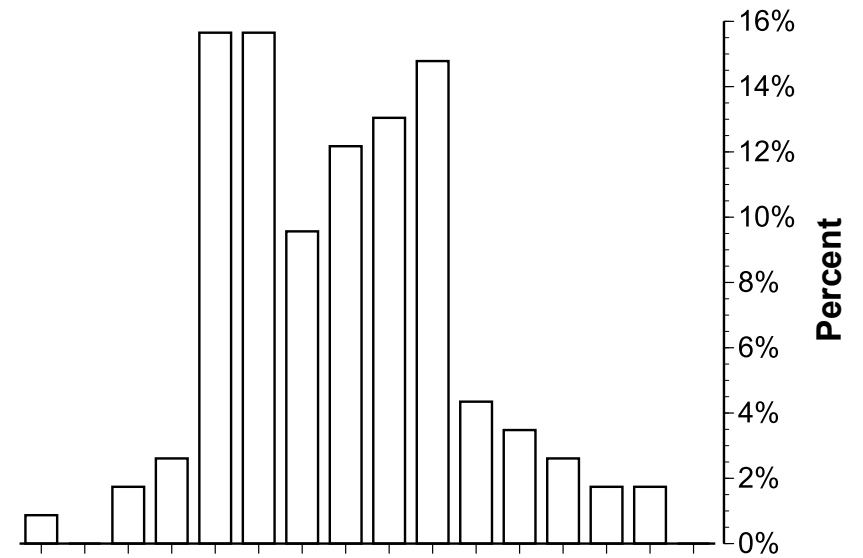
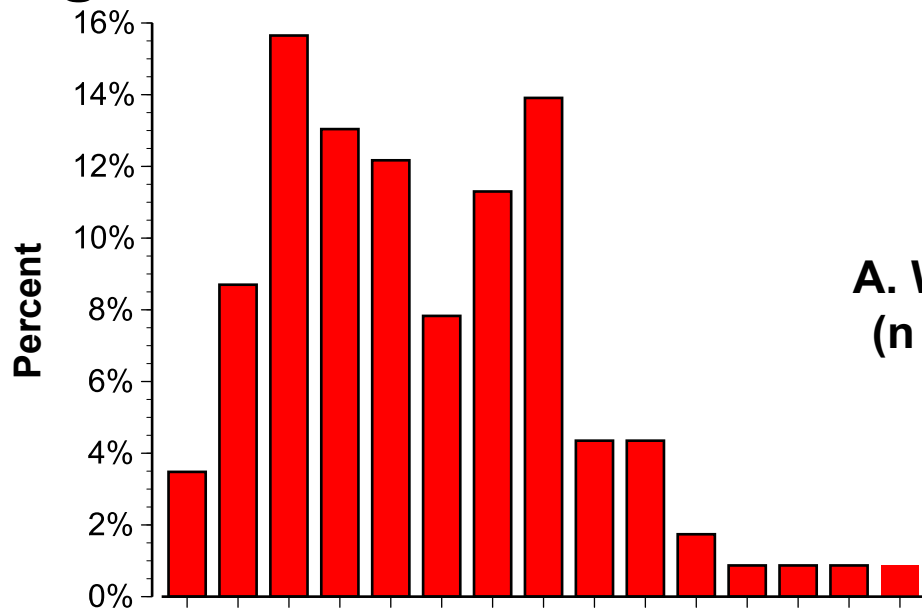


Figure 4. And Enjoy Similar Levels of Business Success

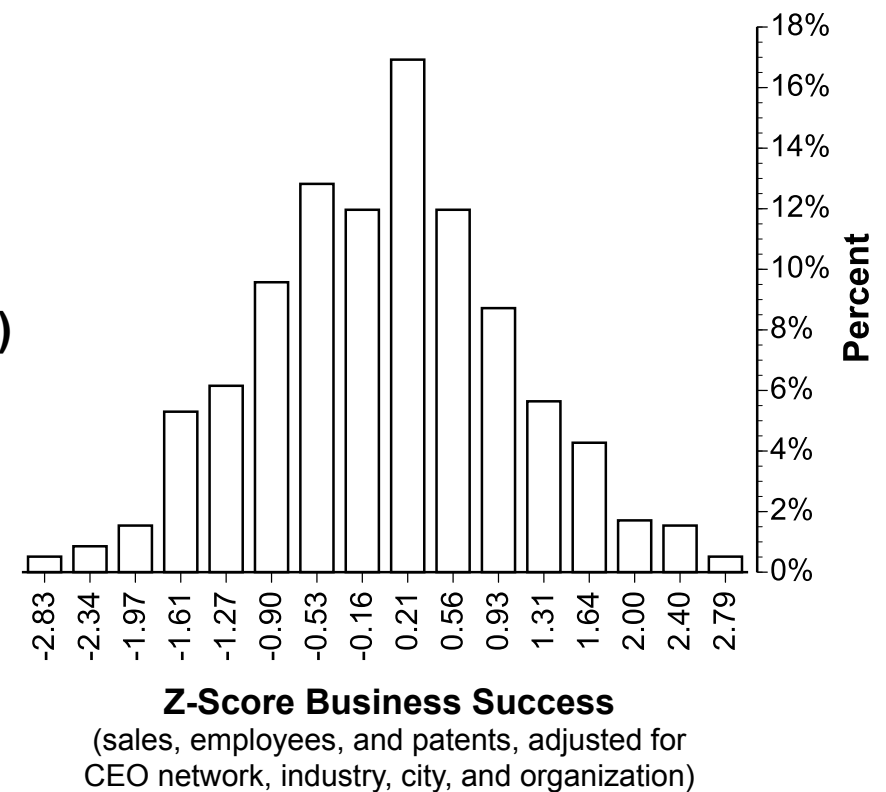
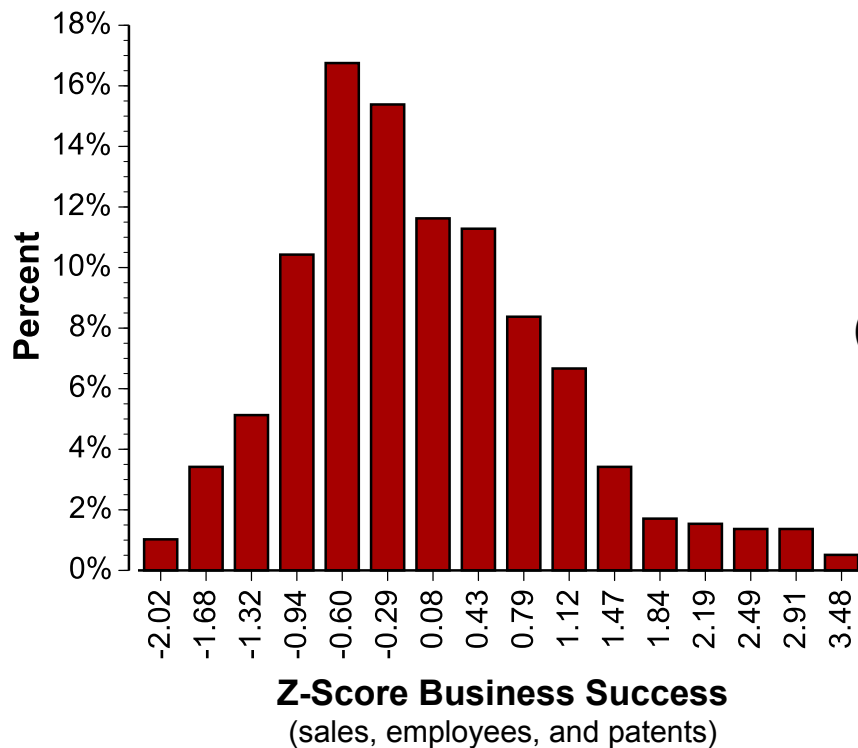
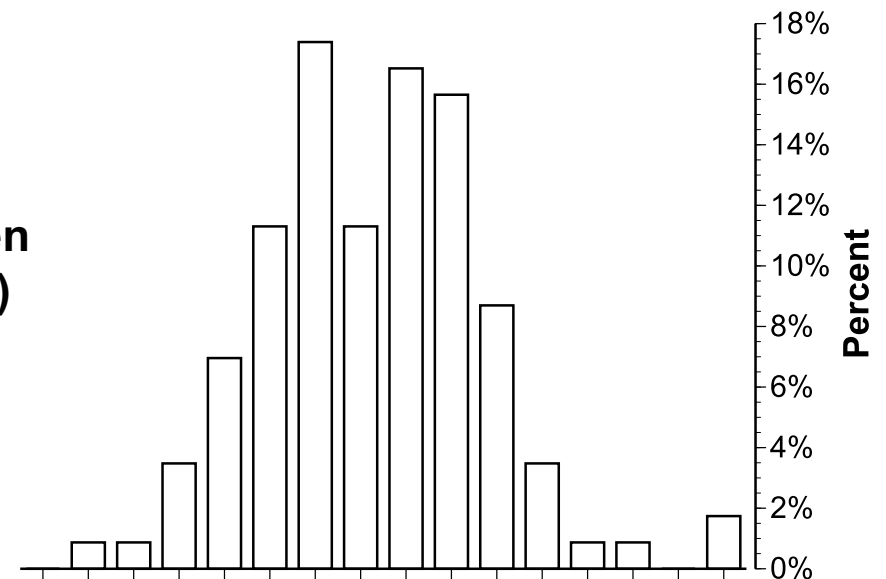
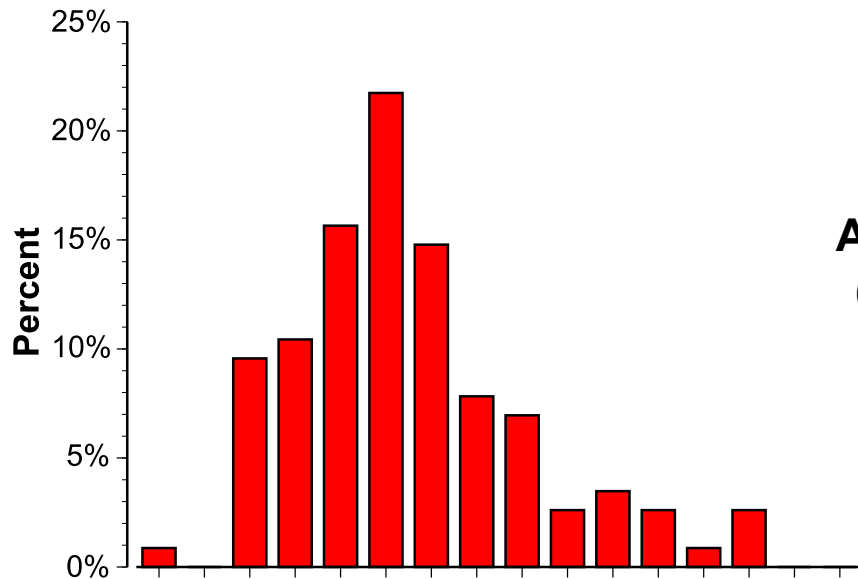
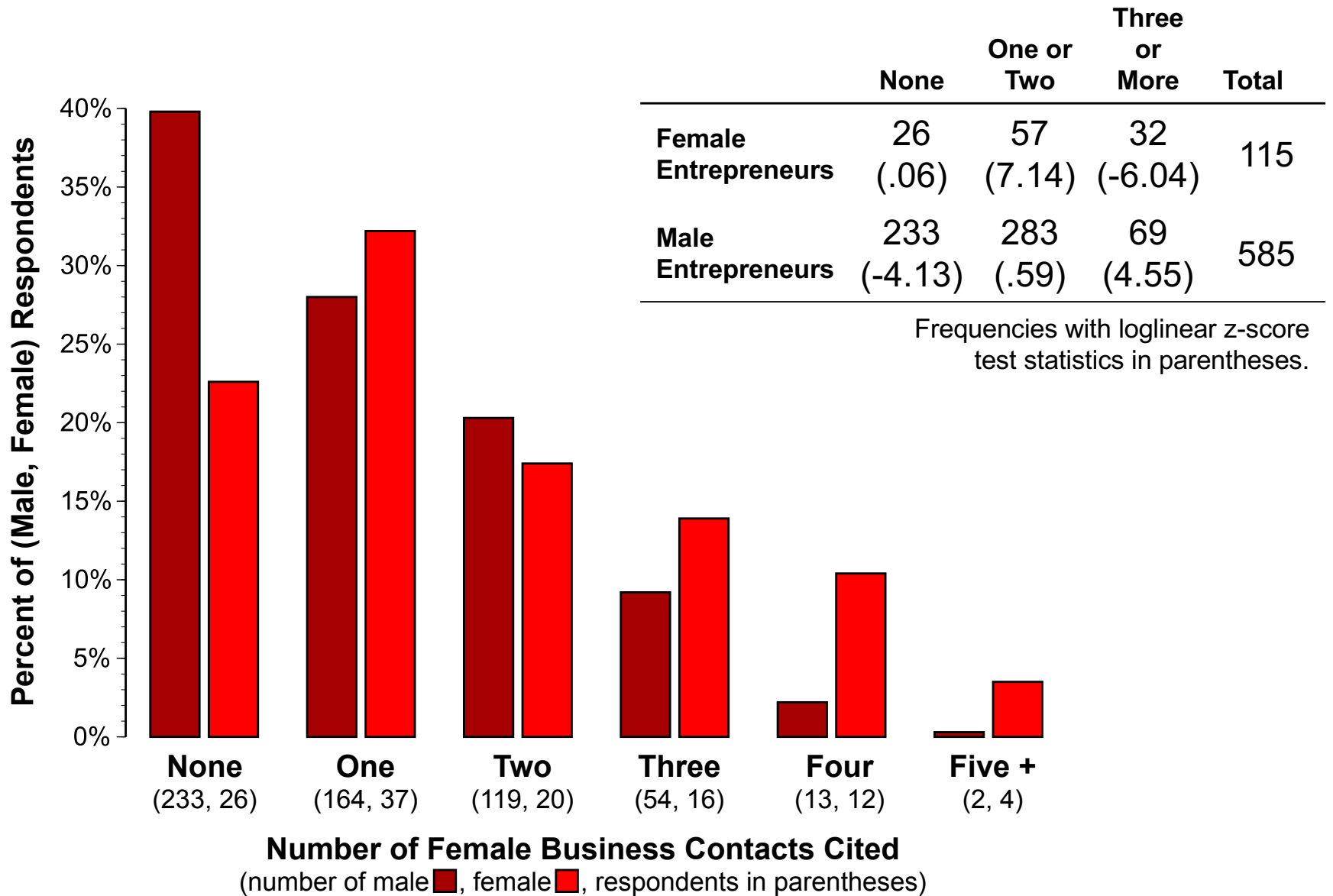


Figure 5.

Number of Female Business Contacts Cited



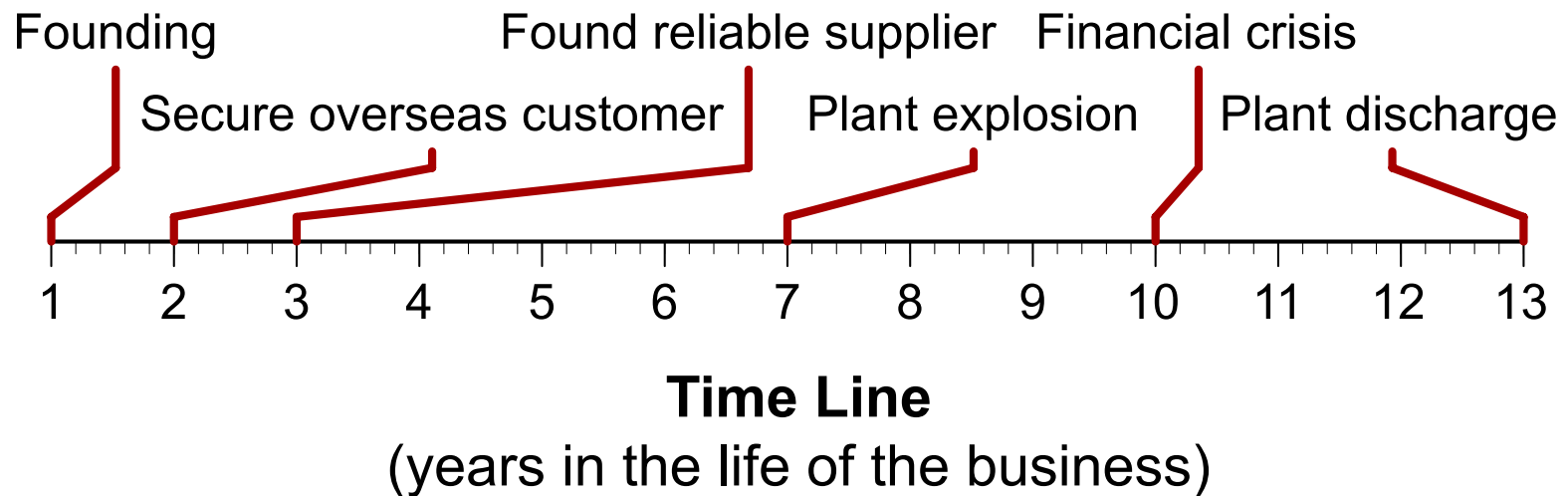


Figure 6.
Event Sequence for a Sample Entrepreneur

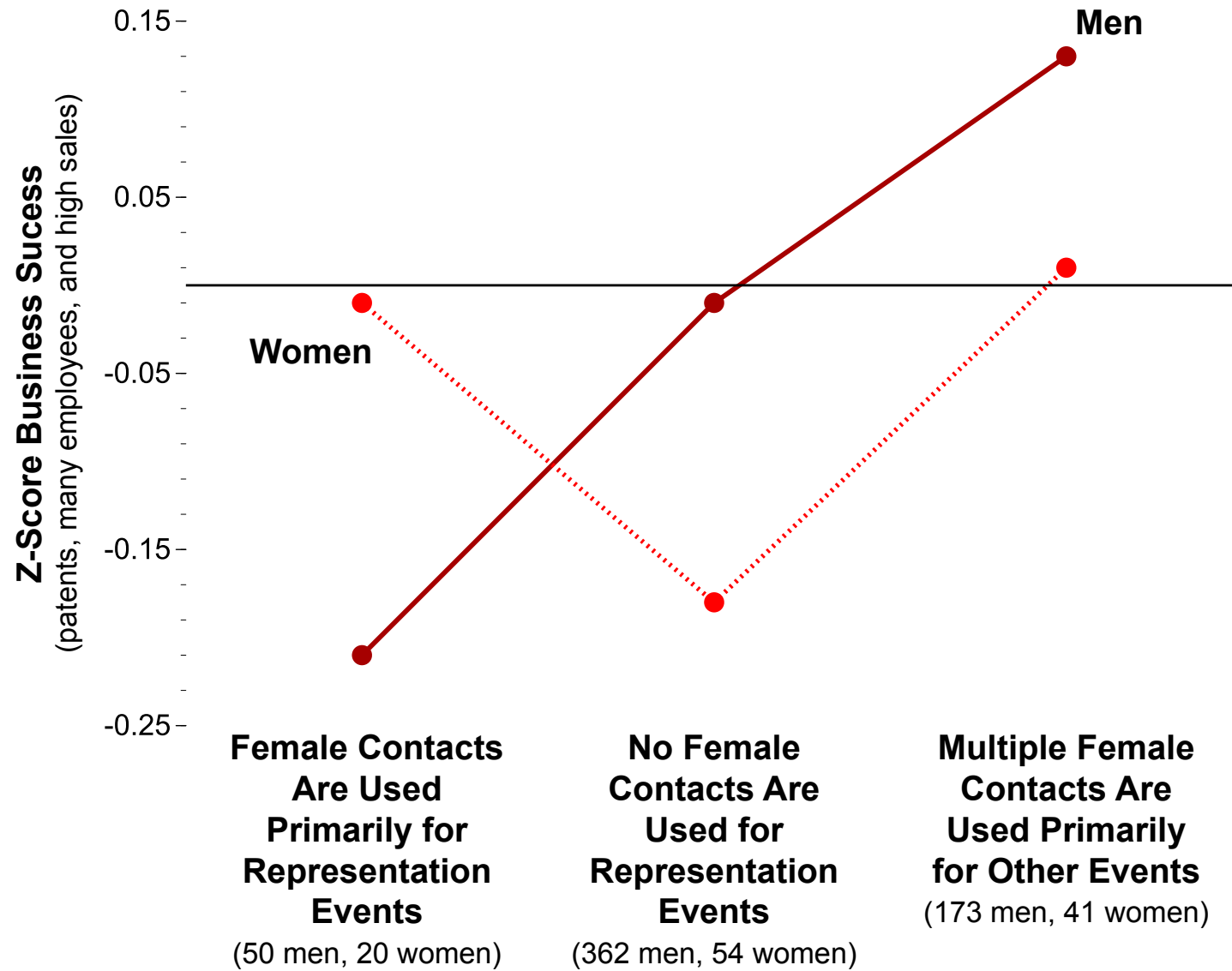


Figure 7.

Higher Success for Entrepreneurs Who Do Not Use Female Contacts for Representation Events

Table 1.**Relative to Men, the Female Entrepreneurs Do Not Have Better Social Origins and Are Neither Better Educated, nor More Experienced**

	Male	Female	P(no diff.)
Father Farmer or Common Laborer	56.2%	54.4%	.72
Father Elementary Education or Less	39.9%	37.7%	.65
Father Junior High School	30.9%	27.2%	
Father Vocational/High School	19.2%	22.8%	
Father Some College	10.0%	12.3%	
Entrepreneur Age (year born)	1965.9	1968.4	.003 **
Entrepreneur Years of Education	13.0	13.2	.59
Entrepreneur Less Than College	43.3%	40.9%	.89
Entrepreneur Junior College	30.6%	32.2%	
Entrepreneur College	26.2%	27.0%	
Prior Job Was Non-Management	11.1%	10.4%	
Prior Job Was Ordinary Manager	17.1%	16.5%	.96
Prior Job Was Middle or Senior Manager	71.8%	73.0%	.59
Prior Job Was in Same Industry	60.5%	57.5%	
Prior Job Was in Other Manufacturing	23.0%	27.4%	
Prior Job Was Outside Manufacturing	16.6%	15.0%	
Entrepreneur Married	96.9%	95.7%	.49
Year Current Firm Was Founded	2000.1	2000.6	.27
Entrepreneur Founder of Current Firm	81.0%	73.9%	.08
Current Firm is a Family Firm	36.9%	33.0%	.43
Percent Family in Network	8.8%	10.9%	.14

NOTE — Cells contain means or percentages. Probability of no difference is based on chi-square for categories, t-test for continuous variables. * P < .05 ** P < .01 *** P < .001

Table 2.
Kinds of People Cited as Business Contacts

Kind of Person Cited	Citations from		Test for Women More Likely than Men to Cite Row	Probability No Difference
	Man	Woman		
Classmate in School	.24	.42	2.64	0.01
Party Member	.08	.01	-2.20	0.03
Neighbor	.11	.18	1.49	0.13
Military	.03	.01	-1.33	0.18
Family	.52	.60	0.93	0.35
Childhood Friend	.07	.08	0.29	0.77
Co-Member in Business Association	.18	.19	0.13	0.90
None of the Above	5.25	5.05	-1.65	0.10
Female	1.07	1.70	5.19	< .001

NOTE — Cells in the first two columns are average numbers of row contacts cited by column respondents (e.g., one in four respondents cited a classmate as a contact). Respondents were asked to check as many row categories as applied to each person they had cited as a business contact. Contacts could be cited for multiple roles (e.g., a neighbor could be a classmate). Test statistics are from a logit model predicting the row kind of person in the 4,464 cited contacts from respondent gender (female 1, male 0), and adjusting standard errors up for autocorrelation between contacts cited by the same respondent (cluster option in Stata). Controlling for the total number of citations a respondent made does not change the conclusions.

Table 3.
Analyzing Kinds of Relationships Cited

Respondent Gender	Contact Gender	Relationships of Row Kind	Mean Years Known	Percent Daily Contacts
Male	Male	3,101	10.52	51.4
Male	Female	626	10.61	60.9
Female	Male	542	10.09	45.8
Female	Female	195	11.55	59.5
Total		4,464	10.53	52.4

Table 4.
Kinds of Relationships Cited

Characteristic of Relationship Cited	Citation from a Man to a Woman	Citation from a Woman to a Man	Citation from and to a Woman	No Gender Differences
Years Known	0.09 (0.25)	-.43 (-0.96)	1.03 (1.23)	1.49
Emotional Closeness	0.03 (0.39)	-.19 (-2.06) *	0.33 (1.86)	10.33 *
Level of Trust	-.03 (-0.36)	-.12 (-1.41)	0.22 (1.57)	5.97
Contact Frequency	0.40 (4.53) ***	-.14 (-1.19)	0.34 (1.95)	30.74 ***
Daily Contact	0.39 (4.19) ***	-.22 (-1.51)	0.33 (1.71)	29.49 ***
Less Than Daily	0.25 (1.79)	0.24 (1.70)	0.20 (0.80)	5.44

NOTE — These are the results of predicting row characteristic of relationship from the three column predictors (man citing man is reference category) across all 4,464 cited relationships. Coefficient test statistics, in parentheses, are adjusted down for autocorrelation between contacts cited by the same respondent (cluster option in Stata). Years known is predicted by an OLS regression model, with $F_{(3,699)}$ the summary test. Ordinal logit models predict emotional closeness (4 especially close, 3 close, 2 less close, 1 distant), level of trust (five-point scale, low to high), contact frequency (4 daily, 3 weekly, 2 monthly, 1 less), and frequency less than daily (3 weekly, 2 monthly, 1 less). Summary tests are chi-square statistics (3 d.f.). Logit model predicts daily contact (summary test is a chi-square statistic, 3 d.f.). Controlling for the total number of citations a respondent made does not change the conclusions. * $P < .05$ ** $P < .01$ *** $P < .001$

Table 5.
When Relationships Are Cited

Characteristic of Relationship Cited	Citation from a Man to a Woman	Citation from a Woman to a Man	Citation from and to a Woman	No Gender Differences
Founding Contact	-1.08 (-6.50) ***	0.05 (0.92)	-0.86 (-3.87) ***	54.27 ***
First Event Contact	-0.55 (-3.96) ***	0.01 (0.25)	-0.41 (-2.19) *	19.15 ***
Second Event Contact	-0.17 (-1.36)	0.04 (0.69)	-0.26 (-1.53)	3.85
Third Event Contact	-0.09 (-0.77)	-0.06 (-0.80)	0.07 (0.45)	0.99
Fourth Event Contact	0.18 (1.63)	-0.07 (-0.95)	0.21 (1.37)	4.78
Fifth Event Contact	0.14 (1.24)	-0.01 (-0.15)	0.04 (0.22)	2.00
Current Contact	0.11 (1.13)	0.03 (0.24)	0.01 (0.06)	1.29

NOTE — These are the results of predicting row characteristic of a relationship from the three column predictors (man citing man is reference category) across all 4,464 cited relationships. Coefficient test statistics, in parentheses, are adjusted down for autocorrelation between contacts cited by the same respondent (cluster option in Stata). Logit models predict whether contact was cited for help in founding the business, for help with first significant event, for help during each subsequent significant event, or as a current contact (summary tests are chi-square statistics, 3 d.f.). Controlling for the total number of citations a respondent made, and the years between founding and event, does not change the conclusions.

* P < .05 ** P < .01 *** P < .001

Table 6. Kinds of Significant Events in the History of the Business

Event (year after founding)	Number Cited	Women Citing (%)	Women Cited (%)	Examples
Founding (1.0)	700	16.4	8.3 ^{***}	the one person most valuable in founding the firm
Supplier (5.2)	255	16.5	12.5 [*]	replaced the main supplier major suppliers signed a cooperation contract suppliers had problems providing raw materials; resulted in serious losses
Customer (5.3)	833	16.0	13.1 ^{***}	company signed a big contract, which helped working capital company signed first export contract contract signed for custom product with large state-owned enterprise
Finance (5.3)	184	20.7	23.4 [*]	successfully raised money for the purchase of equipment shortage of funds, got help from friends solved financial difficulty by transferring equity
Government (6.8)	102	11.8	20.6	got preferential taxation policies enjoyed preferential land policies of the government obtained international agreements certification
Business Management (7.1)	1,006	15.4	18.7	mismanagement; serious business losses; almost closed down security control group concerned with product quality was established established classification of job responsibilities
Collaborations and Associations (7.5)	215	16.3	18.6	established cooperative relations with the domestic textile industry joined the association of private entrepreneurs received excellent quality award of Zhejiang Province
Production Technology (8.2)	519	16.6	22.0 ^{**}	introduction of new technology and equipment adopted new technologies; developed new products updated production technology; improved efficiency
Market Generally (9.4)	349	18.3	16.6	price of raw materials increased, so the cost of production increased financial crisis in Southeast Asia; we lost some customers industry competition more fierce; had development difficulties

NOTE — Parentheses contain the average year after founding in which the row kind of event was cited, followed by the number of row events cited, the percent of women who cited the row kind of event, and the percent of contacts cited for help with the event who were women.

* P < .05 ** P < .01 *** P < .001

Table 7.
**Men Are the Preferred Contact for Events
that Represent the Entrepreneur to Peers**

Gender of Respondent	Gender of Contact	Frequency	Percent Events that Are Representation	Test Statistic for No Difference from Reference Category
Male	Male	2,982	45.44	—
Male	Female	501	28.54	-6.63 ^{***}
Female	Male	518	45.17	-0.13
Female	Female	162	34.57	-2.83 ^{**}

NOTE — These are the 4,163 relationships between respondent and contact in each cited event (700 respondents citing 5.95 events; a founding and up to five subsequent events). Representation events are in the first three rows of Table 6. Test statistics are z-score logit test statistics predicting representation from the four rows using men citing men as the reference category of relationships. Test statistics are adjusted down for autocorrelation between events and contacts cited by the same respondent ("cluster" option in Stata). * P < .05 ** P < .01 *** P < .001

Table 8. Predicting Business Success

	Model A	Model B	Model C
Network Constraint (20 – 100)	-.35 ** (-2.75)	-.35 ** (-2.70)	-.32 * (-2.37)
Respondent Is Founder (0 – 1)	-.37 *** (-5.05)	-.37 *** (-5.10)	-.37 *** (-5.07)
Firm Age (years since founding, 1 - 30)	0.04*** (7.02)	0.04 *** (6.98)	0.04*** (6.84)
Business Has R&D Department (0 – 1)	0.70*** (11.97)	0.70 *** (11.92)	0.69*** (11.82)
Level of Success at Founding (z-score)	0.43*** (15.00)	0.44 *** (15.02)	0.44*** (15.00)
Respondent is Female (0 – 1)	-.01 (-.11)	-.01 (-.17)	-.01 (-.18)
Female x Network Constraint	-.37 (-1.26)	-.31 (-1.06)	-.34 (-1.13)
Female Contacts (-1, 0 , 1)		0.01 (0.31)	0.00 (0.06)
Female Contacts x Network Constraint		-.17 (-1.20)	-.11 (-.69)
Female Contacts Not Used for Representation Events (FCNURE -1, 0, 1)			0.01 (0.26)
FCNURE x Network Constraint			-.15 (-.71)
Intercept	0.74	0.75	0.64
R ²	0.45	0.45	0.45
Test for No Gender Prediction (F d.f.)	0.79 (2, 688)	0.78 (4, 686)	0.63 (6, 684)

NOTE — OLS regression predicting business success from row variables with industry fixed effects. Success is a z-score principal component combining employees, sales, and patents (from Burt and Burzynska, 2017: 228). Success at founding is a similar z-score for the business at the end of the first year after its founding. Network constraint is the horizontal axis in Figure 1, entered here as the log of constraint. Firm age is 2012 minus the year in which the business was founded. Founder and R&D Department are respondent self reports. Female contacts is a contrast between none (-1), one (0), and more than one (1) female contacts. Female Contacts Not Used for Representation Events (FCNURE) is the contrast in Figure 7. For the gender interaction terms, network constraint is measured as a deviation from its mean. * P < .05 ** P < .01 *** P < .001