Network Broker Contingencies: Why Advantage Sometimes Isn’t

Appendices:

I. Strategic Leadership Exercise on Deploying Brokerage (pages 42-43)
II. Sources of Variation in 360 Evaluations (pages 44-45)
V. Other Contingencies (pages 53-58)
VI. Pulling Off the Blinders of Personal Experience (pages 59-60)

For text on this session, see Chapters 1 and 2 in Brokerage and Closure (including adjunct bits from Neighbor Networks).
Access to bridge connections doesn’t guarantee brokerage benefits. Returns are contingent on factors not yet discussed.

Graph A below is from *Brokerage & Closure* and the previous handout showing achievement increasing with more access to structural holes. Circles are z-score residual achievement for 1,986 observations averaged within five-point intervals of network constraint in each of six management populations (analysts, bankers, and managers in Asia, Europe, and North America, see discussion of Figure 2.3 in Chapter 2; heteroscedasticity is negligible, $X^2 = 2.97$, 1 d.f., $P \sim .08$). Bold line is the vertical axis predicted by network constraint.

Graph B to the right shows the raw data that were averaged to create Graph A. Vertical axis is wider to accommodate more variable achievement. Heteroscedasticity is high due to achievement differences between advantaged individuals ($X^2 = 269.5$, 1 d.f., $P < .001$), but the association between achievement and network advantage remains statistically significant when adjusted for heteroscedasticity (Huber-White, $t = -8.49$).

A. Achievement Scores for People in Open Networks Are Higher than Peers on Average ($r = -.58$, $t = -6.78$, $n = 85$)

B. But Vary Widely between the Advantaged Individuals (overall $r = -.24$, $t = -9.98$, $n = 1,989$)
Returns to network brokerage are a probability, not a certainty. Access to structural holes merely "increases the risk of productive accident," which allows for a great many trivial acts of brokerage.

Robert Stewart, by facilitating the flow of information among three locally cohesive but insular clusters, turned Digital Equipment Corporation into a small world (though a small world that remained relatively unconnected to other firms). In contrast to Robert Stewart's bridging connection, the box illustrates highly clustered inventors.

Patent co-authoring network from Lee Fleming & Matt Marx, "Managing creativity in small worlds" (California Management Review, 2006; see Fleming et al. 2007 ASQ). 418 3-digit primary tech categories for filing patents (> 120,000 subcategories).

Bringing Behavior into the Analysis
(other contingency issues: nested holes, active vs passive holes, personality, culture, greedy brokers, creating vs harvesting holes, managing vs eliminating holes, positive anchors)

Figure 1 in Burt and Wang, “Network brokers and bad behavior” (2019)
FRAMING & FRAME SHIFTS: Information arbitrage is about framing as much as content. Would the situation look different viewed from another perspective?

**Problem vs. Paradox.** What point of view, or frame of reference, will make the idea attractive to the target audience? The key is not to get "out of the box," so much as to see from within a different box. Failure here could be a good idea over there.*

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**COVER STORY**

**Pfizer**

Sildenafil, 1991

First tested on humans in 1991, Sildenafil didn’t prove effective for its initial indication: angina, or chest pain. After patients reported erections as a side effect, Pfizer began testing the compound for erectile dysfunction. In 1998, Viagra became the first drug to treat the condition, and the blockbuster has been a household name ever since.

Read the story  
Reader comments  
More Slide Shows

Carl Segerstrom, in Chicago’s 2012 ADP, worked at Pfizer when the Viagra trials were run. Carl sketched the story: Trials showed that the new drug was a failure as a heart medicine, so the trials were shut down and the test samples were recalled. Subjects were asked to return the test samples, and they usually do, but in this case, an unusually high proportion of subjects did not return the test samples. Someone asked, “let’s find out why they aren’t returning the test samples,” which revealed the profitable side-effect.

Framing for Target Audience

Meaning derives in some part from the context in which an object, idea, or person is viewed.

At the height of his wealth and success, the financier Baron de Rothschild was petitioned for a loan by an acquaintance. Reputedly, the great man replied, “I won’t give you the loan myself, but I will walk arm-in-arm with you across the floor of the Stock Exchange, and you soon shall have willing lenders to spare.” [from un-attributed material in Cialdini (1989:45)]

There is a delightfully descriptive word in Yiddish, mishpokhe, that refers to people who are “one of us.” The word refers to extended family, but it is popularly used to refer to people who are one of us. Rosten (1989:338) illustrates with Chase Manhattan Bank’s advertising campaign built around the slogan “You have a friend at Chase Manhattan.” In a window of the bank next to a Chase Manhattan branch there appeared a sign; “— BUT HERE YOU HAVE MISHPOKHE!”
Network brokerage is a process by which people clear sticky-information markets. The rewards enjoyed by network brokers are compensation for clearing a market that would otherwise not be clear.

In other words, variation between clusters/silos is essential to the value of brokerage. If there are no information differences between social clusters, then there is no value to moving information from one cluster to another.

Competition in theory eliminates variation, but social clustering in networks usually indicates variation in understanding and practice. For example, BP learning in the refining businesses.

Strong belief/culture/process/paradigm reinforce closed networks, and can obscure or blind people to variation between subgroups within the network. For example:

— Pfizer drug trial protocol
— Talent out of context (able musician in D.C. metro train station)
— INSEAD student teams
— Coca Cola as a distribution company versus custodian of the Coca Cola brand
— "Hard" sciences & the negative correlation between age and contribution look for use of right-wrong versus productive-unproductive or interesting-uninteresting

Personal experience is an insidious blinder. Personal experience enriches our understanding, but also limits it. People get trapped in their routines. They hear/believe/understand knowledge consistent with what they’ve already experienced. The power of fundamental principles, and framing problems in different ways, is that you can reason your way through challenges that involve experiences you have not yet had — making you valuable beyond whatever experience life has happened to give you personally. Getting out of our routines can be accomplished with deliberate action, but sometimes requires exogenous shock (Appendix VI).
Returns Low Because of Nested Holes

Modularity increases the risk of productive accident. This is the logic behind short courses (encourage breadth by lower cost to exploration).

Netscape’s Navigator was released under open-source license in March 1998 as Mozilla. It was re-designed for modularity to make it more attractive to contributors. Networks below show module dependencies before and after the re-design. "Propagation cost" is the average percentage of code that must be updated following a change in any one module.

**Mozilla version 1998-04-08**
propagation cost:* 17.35%

**Mozilla version 1998-12-11**
propagation cost: 2.78%

Successful Framing

What are the implications for medical sensors of Kobi Richter having served as a fighter pilot in the Israeli Air Force?

Kobi Richter

Board member and founder of Medinol, Dr. Richter is a renown Israeli businessman. Dr. Richter, who served in the Israeli military as a fighter pilot, directed the research and development department of the IAF and worked as a neuroscientist and AI researcher at M.I.T.

After his discharge from the army Dr. Richter founded Orbot with his brother. A company that manufactured testing systems for electric components.

Later, Dr. Richter founded biotechnology company Medinol. Medinol develops stents for cardiovascular treatments. Throughout the years Kobi has been involved in many other business ventures, one of them founding and managing the “Marathon” hedge fund.

Graphic is from video of Kobi Richter at 2016 TEDx in Emek Hefer, Israel.
Returns Low if Active Holes Are Treated as Passive: Active structural holes are reinforced in place so bridging them can be especially difficult regardless of value. Common reinforcing mechanisms are education, business function, legacy organization, culture, gender, age, race/nationality, along with others. If you have a good idea for brokerage, ask why the idea has not already been implemented. Something is preserving the status quo. First bridge is critical precedent for spanning active structural hole. “Local action” and displayed structural equivalence can be significant facilitators.

<table>
<thead>
<tr>
<th></th>
<th>PASSIVE</th>
<th>ACTIVE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Structural Hole Is</td>
<td>NOTHING. No one is interested in preserving or</td>
<td>SOMETHING: Hole (1) provides opportunities for insiders on one side</td>
</tr>
<tr>
<td>Maintained by:</td>
<td>eliminating the disconnect between the groups.</td>
<td>to exploit outsiders on the other side (e.g., Asian “compradors”),</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(2) permits insiders to hoard opportunities from outsiders, (3)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>makes it easier for insiders to launch organizations in which</td>
</tr>
<tr>
<td></td>
<td></td>
<td>insiders are advantaged, or (4) daily routines and valued relations</td>
</tr>
<tr>
<td></td>
<td></td>
<td>have adapted to the hole (e.g., Clendenin at Xerox, New England</td>
</tr>
<tr>
<td></td>
<td></td>
<td>cotton early 19th).</td>
</tr>
<tr>
<td>Difficulty Building the</td>
<td>LOW. No interests oppose the bridge, so the bridge</td>
<td>HIGH. Bridge is opposed so partners might be required to legitimate</td>
</tr>
<tr>
<td>Bridge</td>
<td>should easily absorb into the surrounding social</td>
<td>the bridge, regardless of the bridge’s value (e.g., American in France).</td>
</tr>
<tr>
<td></td>
<td>structure, and support should be in proportion to</td>
<td></td>
</tr>
<tr>
<td></td>
<td>bridge value.</td>
<td></td>
</tr>
<tr>
<td>Threat of Imitators</td>
<td>HIGH because bridge difficulty is low. Bundle</td>
<td>LOW because bridge difficulty is high. Broker monopoly can trigger</td>
</tr>
<tr>
<td></td>
<td>the bridge with other benefits to be the high-value broker.</td>
<td>abuse by brokers (e.g., Asian “compradors”).</td>
</tr>
</tbody>
</table>

Successful Framing

Going back to India in 1919, what are the implications of Gandhi framing his proposed aggressive response to the new British law as a “day of prayer and fasting,” versus Jinnah’s interpretation of the idea as a “general strike,” or Jinnah’s proposal for “direct action on a scale they can never handle”?

Graphic is from video clip shown in class, Gandhi, (1982, directed by Richard Attenborough, distributed by Columbia Pictures).
*Stills are from the British Steel video shown during the session. “He will win who knows when to fight and when not to fight.” (from Sun Tzu, in *The Art of War*, a melange of advisories assembled before the birth of Christ).
SOCIAL STANDING, **Rule 3:**
When a broker proposes something new, there is no guarantee that the proposal will work in our market, with our company processes, staffed by our people. There is risk to accepting the proposal. Chains of command broken in service of company interests can just as easily be broken in service of personal interests, or in service of well-intentioned but strategy-eroding interests. How will you be viewed in the target audience as the proposal source?

**For Example,**
**Are You the Right Age To Be Accepted as the Source of the Proposal?**

The graphs plot averages across 2,206 senior managers in six organizations in electronics, finance, software, and supply chain.

The top one shows the age at which people have the most access to structural holes (more open networks at the top).

The bottom graph shows the age at which people have the greatest returns to brokerage. Vertical axis is test statistic for the strength of association between a manager’s relative achievement and his or her network constraint (calculate for each age group the returns to brokerage graph).

Figure 4.2 in Burt, “Life course and network advantage” (2019 *Social Networks and the Life Course*).
Age is Not a General Caution; More a Function of Company Culture: "Peak" Periods in Manager Life-Cycle

Figure 3 in Burt (2018, "Life course and network advantage")

Manager Age
- Returns increase with age

Manager Age
- Returns decrease with age

Manager Age
- Returns increase & decrease

Shaded areas enclose "peak" years - ages in which returns to network advantage are similar to maximum.
Social Network at the Top of the Company

Lines indicate frequent and substantive work discussion; heavy lines especially close relationships.

RULE 3: Broker's Job Status
Reassures, or Lack of It Concerns, the Target Audience

Which means the network around a senior person is especially important for his or her achievement.

Graphs for executives, managers, and junior managers to the right show z-score compensation relative to peers (controlling for background differences) across levels of network constraint. Not only do more senior people have more open networks (on average), they earn higher returns to having open networks (also pay more if they don't have an open network).

Table to the left is from page 371 of Burt, "Structural holes and good ideas" (2004, American Journal of Sociology).

See pp. 156-162 and Figure 3.8 in Brokerage and Closure for general discussion showing the form of contingency functions.
RULE 3: Broker Network Status
Reassures or Concerns the Target Audience

Network status is on the vertical axis of the top graph. Status is defined in the same way that price is defined in the general equilibrium model: $S_i = \sum_j z_{ji} S_j$, where $S_i$ is status of person $i$, and $z_{ji}$ is connection from $j$ to $i$. Like price, status is only meaningful in reference to the status of some numeraire benchmark person. Here, status is normalized at the mean, so a score of 1.0 indicates a person of average status in the network.

$S_i = \sum_j z_{ji} S_j$

Sociogram is Figure 3.2 in *Neighbor Networks* and the graphs are from Figures 1 and 2 in Burt & Merluzzi discussion of the link between brokerage and network status as a reputation measure (2013, "Embedded brokerage," *Research in the Sociology of Organizations*)
Brokerage-Achievement Association, Contingent on Network Status in Second Life

Achievement is the canonical correlation dependent variable in Model 15, Table S5. “High” status is above median. Scores on the y-axis are average achievement scores for avatars within integer intervals of nonredundant contacts (left) or five-point intervals of network constraint (right). Statistics are based on averages plotted in the graph. See Table S8 for regression results with controls showing higher returns to brokerage for individual avatars with high status.

from Burt (2019, Structural Holes in Virtual Worlds).
RULE 3: Reputation Can Substitute for Status, making reputation valuable as the key to being accepted as a broker.

Graph plots investment banker reputation by levels of network status. Reputation is measured by average colleague evaluation. Boxes span 25% to 75% with bold horizontal at the mean. Whiskers extend down to minimum reputation, up to maximum.

Reputation Is Correlated with Status, but Is Distinct

High Status Is a Good Signal of Positive Reputation.

Low Status Is an Ambiguous Signal

GENERIC DEFINITION: "Differences in detail aside, most social scientists agree upon two aspects of reputation: first, knowing a business partner’s past behavior mitigates uncertainty about his future performance; second, reputation demonstrates the person’s credibility as an honest business partner and reduces the uncertainty associated with trusting him." (Hillmann and Aven, 2011, AJS, page 485)

RULE 3: Broker Advantage Is Contingent on Reputation

Graph plots relative banker compensation across levels of constraint in the banker's discussion network. Compensation is averaged within intervals of network constraint, but the test statistic is for all 469 observations, holding constant job rank, peer evaluation, years with the organization, minority, and working in US headquarters (Burt, *Neighbor Networks* 2010:91-93).

There are two predictions: one for bankers with above-average reputations (solid squares), the other for bankers with below-average reputations (hollow squares). Network status is added to each prediction as a control for a banker's social standing across all senior people in the bank.

As Rider (ASQ 2009:578-579) explains for placement agents: "A broker's reputation for consistently representing actors of high quality is a valuable, intangible asset that enables a broker to realize future rents on the brokerage position... If a positive reputation reduces the costs of assuaging potential exchange partners' concerns, then the returns to brokerage should be positively related to a broker's reputation." Similarly, Nee and Opper (*Capitalism from Below* 2012: 211) describe Chinese entrepreneurs building reputation in the course of brokering connections: "Through personal introductions and fine-grained information passed through social networks, the 'broker' typically signals trustworthiness and reputation of the prospective business partners. Moreover, it is in the broker's interest to make good recommendations, as most business partners will tend to reward their networking contacts in one way or another. Such introductions can span the social gaps, or 'structural holes' between groups."

For discussion, see Burt & Merluzzi (2014, "embedded brokerage"). The boutique investment bank, Moelis — "Best Global Independent Investment Bank" in 2010 and "Most Innovative Boutique of the Year" in 2011 — nicely illustrates the competitive advantage of reputation as entree to brokerage opportunities (download free Moelis case from www.sbs.oxford.edu/reputation/cases).
Relative to job rank and network status, reputation opens organizations and markets to the largest number of people with good ideas.

From Burt (2019, Structural Holes in Virtual Worlds).

**Most important, reputation enables a wider population of people to be brokers.**

- **Senior Job Rank**: 25 bankers eligible by their senior job rank.
- **Network Status**: 80 bankers eligible by their network status.
- **Reputation**: 200 bankers eligible by their reputation.

Horizontal axis ranks banker observations from highest status (hollow dots) or most-positive reputation (solid dots) to the opposite extreme. Vertical axis is the correlation between compensation and log network constraint for a sample of observations adjacent to each banker (24 of higher social standing plus 24 of lower). Displayed data are smoothed by averaging across 24 adjacent observations.
Illustrative Externality of Broker Behavior

Brokers are less constrained by local norms, and spend more time in diverse groups so they are more likely to violate a distant local norm.

These are 1,135 annual observations of 398 bankers over three years. Each year, a banker is at risk of being accused of bad behavior by colleagues in the annual review, and of having to report difficult colleagues for their bad behavior.

Received 5 accusations in the second year, and a total of 8 across years. Colleague comments about him:
- Moody, unprofessional, poor manager
- Single-mindedness about his job
- Short & ill-tempered, standoffish, rude
- Untrustworthy & difficult to work with
- While extremely competent & motivated, he can be overbearing and at times insulting

Made 13 accusations in the first year. Received 2 accusations that year, and a total of 5 across years. Colleague comments about her:
- Untrustworthy, lacking in team work/integrity
- Extremely intimidating; impatient, belittling & argumentative individual
- Moody, doesn’t share information
- She wants to control everything & her thinking is narrow-minded
- Not user friendly

Figure 2 in Burt and Wang, “Network brokers and bad behavior” (2019)
Demography of Cited Bad Behavior: More Citations Generate More Cites for Bad Behavior

<table>
<thead>
<tr>
<th></th>
<th>Citations Received</th>
<th></th>
<th>Citations Sent</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>A</td>
<td>B</td>
<td>C</td>
<td>D</td>
</tr>
<tr>
<td>Log Network Constraint</td>
<td>-.75</td>
<td>-.31</td>
<td>-.96</td>
<td>-.44</td>
</tr>
<tr>
<td></td>
<td>(-6.59)</td>
<td>(-1.61)</td>
<td>(-5.84)</td>
<td>(-1.83)</td>
</tr>
<tr>
<td>InDegree (all evaluations)</td>
<td>—</td>
<td>.043</td>
<td>—</td>
<td>.006</td>
</tr>
<tr>
<td></td>
<td></td>
<td>[.006]</td>
<td></td>
<td>[.008]</td>
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<tr>
<td></td>
<td></td>
<td>(7.07)</td>
<td></td>
<td>(0.81)</td>
</tr>
<tr>
<td>OutDegree (all evaluations)</td>
<td>—</td>
<td>—</td>
<td>-.006</td>
<td>.012</td>
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<td>[.004]</td>
<td>[.004]</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>(-1.47)</td>
<td>(2.97)</td>
</tr>
<tr>
<td>Intercept</td>
<td>.88</td>
<td>-1.33</td>
<td>1.16</td>
<td>-.85</td>
</tr>
<tr>
<td>N</td>
<td>1,135</td>
<td>1,135</td>
<td>1,135</td>
<td>1,135</td>
</tr>
<tr>
<td>Clusters</td>
<td>398</td>
<td>398</td>
<td>398</td>
<td>398</td>
</tr>
<tr>
<td>Chi-Square</td>
<td>43.38</td>
<td>112.40</td>
<td>34.09</td>
<td>55.11</td>
</tr>
<tr>
<td>d.f.</td>
<td>1</td>
<td>3</td>
<td>1</td>
<td>3</td>
</tr>
</tbody>
</table>

NOTE – Poisson regression models predicting number of bad-behavior citations received or sent in the annual peer evaluations (0, 1, 2, 3 or more, as in Table 2). Brackets contain standard errors. Parentheses contain z-score test statistics. Coefficients are estimated across the three annual panels (standard errors are adjusted up for correlation between relations cited by same person using the “cluster” option in Stata). InDegree is the total number of positive and negative citations a banker receives in a year from within and beyond the study population (0 minimum, 78 maximum, 20.11 average). OutDegree is the total number of positive and negative citations a banker makes in a year within and beyond the study population (0 minimum, 213 maximum, 21.78 average).

Table 3 in Burt and Wang, “Network brokers and bad behavior” (2019)
PERSONAL ENGAGEMENT: Network Advantage Is Contingent on Personal Engagement.

Statement: A way to obtain brokerage benefits quickly is to build connections with people who are already brokers. True or False? Why?

Which manager, John or Jim, would you assign to provide local leadership in the transformation.

\[ C \text{ versus } IC = \sum_j C_j/N \]
The ostensible advantage is spurious, here illustrated predicting banker compensation from direct constraint (banker's own network) vs indirect (from neighbor networks).

<table>
<thead>
<tr>
<th></th>
<th>Total Annual Compensation</th>
<th>Bonus Only</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>A</td>
<td>B</td>
</tr>
<tr>
<td>Intercept</td>
<td>-1.63</td>
<td>-1.92</td>
</tr>
<tr>
<td>Direct Network Constraint</td>
<td>-.38 (.09)**</td>
<td>—</td>
</tr>
<tr>
<td>Indirect Network Constraint</td>
<td>—</td>
<td>-.39 (.11)**</td>
</tr>
<tr>
<td>Senior Job Rank</td>
<td>.73 (.08)**</td>
<td>.79 (.09)**</td>
</tr>
<tr>
<td>Peer Evaluation</td>
<td>.51 (.09)**</td>
<td>.58 (.10)**</td>
</tr>
<tr>
<td>Years with Firm</td>
<td>.02 (.01)</td>
<td>.03 (.01)**</td>
</tr>
<tr>
<td>Minority</td>
<td>-.05 (.19)</td>
<td>-.14 (.19)</td>
</tr>
<tr>
<td>US Headquarters</td>
<td>.28 (.11)**</td>
<td>.23 (.11)**</td>
</tr>
</tbody>
</table>

NOTE — Regression coefficients are presented for annual data pooled across three years (469 observations). Compensation next year is predicted from row variables this year. Network constraint is the log of constraint. Annual compensation includes salary and bonus. Compensation is measured as a z-score within each year to indicate relative annual compensation. Squared multiple correlations for the equations are .31, .28, .31, and .31 (zero-order correlations in Appendix E, Table E4). Standard errors, given in parentheses, are adjusted for autocorrelation within individuals across years (* p < .05; ** p ≤ .001).

Table 4.2 in Neighbor Networks (from Table 3 in Burt, "Secondhand Brokerage" (2007, Academy of Management Journal).
In general, "secondhand" brokerage via neighbors has no effect on performance.

Within each of five populations (analysts, investment bankers, HR employees, product-launch employees, and supply-chain managers), a dot below indicates a population average on performance and network constraint within five-point intervals of network constraint. Correlations and routine test statistics are computed across 1,819 observations, with correction for repeated annual observations. See Appendix III for research design.

\[ P = b_2 \ln(\text{IC}) + b_3 X + R \]

\[ P = b_1 \ln(C) + b_2 \ln(\text{IC}) + b_3 X + R \]

Lack of Structural Holes in Networks around Employee’s Contacts
(average network constraint on contacts, averaged within five-point intervals)

![Graph showing correlation and partial correlation with network constraint and employee's performance]

<table>
<thead>
<tr>
<th>Study Population</th>
<th>Direct Contacts</th>
<th>Indirect Contacts</th>
</tr>
</thead>
<tbody>
<tr>
<td>Asia-Pacific product</td>
<td>2.70</td>
<td>1.00</td>
</tr>
<tr>
<td>Supply-chain managers</td>
<td>4.17</td>
<td>0.92</td>
</tr>
<tr>
<td>HR employees</td>
<td>4.35</td>
<td>0.21</td>
</tr>
<tr>
<td>Investment bankers</td>
<td>3.43</td>
<td>1.50</td>
</tr>
<tr>
<td>Investment analysts</td>
<td>3.18</td>
<td>0.24</td>
</tr>
</tbody>
</table>

*Cells contain t-tests predicting employee performance in the row population from structural holes in the employee’s network of direct contacts and holes between the employee’s indirect contacts, with controls for job rank, function, location, and experience (see Table 6.5 in 2010, Neighbor Networks). Observations vary from 258 to 469.
More, there is no evidence of spillover benefit from a network broker boss, or colleague.

Each dot is a population average on the Y axis and X axis for a five-point interval on the X axis (HR employees, product-launch employees, and supply-chain managers). Correlations and test statistics are estimated across individuals.

Graphs are Figures 4.6 and 4.7 in *Neighbor Networks*.
PERSONALITY:
Don’t Count on It

Network Entrepreneur
Personality Index

Select the phrase under each item that better describes you (circle A or B). Select only one phrase per item. If you disagree with both phrases, select the one with which you disagree less. With so few questions, it is important to select phrases that describe how you actually operate, rather than how you feel you should or would like to operate. There are no right or wrong answers. When you are finished, you should have a total of ten phrases circled. To get your score, see the answer key on page 48, then use the graph below to determine your personal disposition toward being a network broker.

1. When evaluating opportunities, I am likely to look . . .
   A. for a chance to be in a position of authority
   B. for the long-run implications

2. My strength lies in the fact that I have a knack for . . .
   A. being easygoing
   B. getting a point across clearly

3. In discussions among peers, I am probably seen as . . .
   A. an outspoken advocate
   B. motivating people to my views

4. I believe that people get into more trouble by . . .
   A. being unwilling to compromise
   B. not letting others know what they really think

5. In a leadership role, I think my strength would lie in the fact that I . . .
   A. won people over to my views
   B. kept everyone informed

6. In evaluating my aims in my career, I probably put more emphasis on . . .
   A. my ability to create an aura of excitement
   B. being in control of my own destiny

7. As a member of a project team, I . . .
   A. seek the advice of colleagues
   B. closely follow the original mandate of the group

8. Others are likely to notice that I . . .
   A. let well enough alone
   B. let people know what I think of them

9. In an emergency, I . . .
   A. take the safe approach
   B. am quite willing to help

10. I look to the future with . . .
    A. unshakable resolve
    B. a willingness to let others give me a hand

from Figure 1.6 in Brokerage and Closure
Personality differences are associated with the networks built by these staff officers, but only below managerial rank (clerical and technical staff), where there is no social capital association with performance.

For the purposes here, an employee has an entrepreneurial network if his or her network constraint score is no more than the average for all respondents.

Network Entrepreneur Personality Index (number of positive choices)

\[
P(\text{entrepreneurial network}) = \frac{1}{1 + e^{-f}}
\]

\[
f = -2.71 + 2.52S + (0.59 - 0.59S)\text{INDEX}
\]

\[
(2.7) \quad (2.5) \quad (-2.4)
\]

S is a dummy variable distinguishing employees in senior ranks.

From Burt, Jannotta, and Mahoney, "Personality correlates of structural holes" (1998, Social Networks)
More Important, Is there Evidence of Personality Affecting Network Advantage?

The evidence to the right shows personality affecting network advantage. It would be important — when estimating the returns to brokerage in this population — to hold personality constant (in terms of however personality manifests as a preference for closed rather than open networks).

The horizontal distinguishes people who prefer to work in a closed network (left) versus those who prefer to work in an open network. Each group is then divided into those whose current project is a closed versus an open network.

Z-score relative performance is measured by the columns over each category.

Notice that people who prefer closed networks perform better in a closed-network project and people who prefer an open network perform better in an open-network project.
Network Advantage Is Not Contingent on Kind of Person. It Exists Independent of Personality.

But the evidence on the previous page doesn't exist. Network effect is evident when people are assigned at random to networks (see Leavitt experiment in Appendix VII in first handout), and there is no evidence of an interaction between personality and network advantage, as illustrated in graph to the right.

Open versus closed networks are distinguished at median levels of current network (N) and usual network (network-relevant personality, P). Network index is number of nonredundant contacts.

Bars indicate average z-score character level achieved. Number of characters is given in parentheses.

Dark portion of each bar is the mean z-score level when player experience is held constant (notice the statistically negligible tendency for a larger experience effect when person is not operating within his or her usual network).

From Figure 7 in Burt, "Network-related personality and the agency question: multirole evidence from a virtual world" (2012, American Journal of Sociology). For more detail, see Appendix IV on network-related personality, and Appendix VI in first handout on national differences in business culture.
CULTURE: Don’t hide behind it. Cultural diversity typically does not eliminate the three rules of network advantage, but it does reveal interesting variations.

Popular belief distinguishes Asia for its emphasis on the collective over the individual, and success contingent on connections aligned with the formal chain of command. Brokerage could clash with collectivist social norms such that returns to brokerage are non-existent or even negative in China.

Evidence is mixed on the issue. In support of the idea that Chinese culture inhibits brokerage, Yang and Zhang (2015) had difficulty finding structural holes in entrepreneur networks and quote one of their entrepreneurs on fear of failure. Consistent with the quoted sentiment, Batjargal (2010) reports that networks around Chinese entrepreneurs are smaller and more dense than the networks around Russian entrepreneurs, Ma, Huang, and Shenkar (2011) report that networks rich in structural holes around Taiwanese managers weakened manager ability to identify opportunities, and Xiao and Tsui (2007) do not find achievement higher for Chinese employees with larger, more open networks.

On the other hand, there is evidence that business practice in China rewards brokerage. 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 capital by self-employed respondents in an area probability survey of eight large cities in China. Concluding that returns to brokerage are exceptionally high in China, Batjargal et al. (2013:1040) summarize their analysis in China and Russia as adverse and uncertain environments (relative to France and the United States): “entrepreneurs benefit from their network’s structural holes. However, those entrepreneurs who operate in settings where the entire institutional order is adverse and uncertain benefit more from their networks’ structural holes.”
Stratified Random Sample of 700 Chinese Entrepreneurs from Seven Cities in Three Provinces of China’s Yangtze Delta Area.

(20% 2013 China GDP, 32% 2013 China imports/exports)
65% entirely self-funded start-ups
29% partial (avg 58% self, 12% fam, 10% frnd)
6% no self-funding (avg 65% bank funds)

Sample Characteristics

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>N</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Small (10 - 100)</td>
<td>468</td>
<td>67%</td>
</tr>
<tr>
<td>Medium (101 - 300)</td>
<td>169</td>
<td>24%</td>
</tr>
<tr>
<td>Large (&gt; 300)</td>
<td>63</td>
<td>9%</td>
</tr>
<tr>
<td>Textiles</td>
<td>170</td>
<td>24%</td>
</tr>
<tr>
<td>Transportation Equipment</td>
<td>171</td>
<td>24%</td>
</tr>
<tr>
<td>Machinery</td>
<td>180</td>
<td>26%</td>
</tr>
<tr>
<td>Pharmaceuticals</td>
<td>77</td>
<td>11%</td>
</tr>
<tr>
<td>Electronics</td>
<td>102</td>
<td>15%</td>
</tr>
<tr>
<td>Respondent is Founder</td>
<td>559</td>
<td>80%</td>
</tr>
<tr>
<td>Year Born</td>
<td>1967 median, 8.4 sd, 1938-1988</td>
<td></td>
</tr>
<tr>
<td>Yr Founded</td>
<td>2001 median, 4.6 sd, 1982-2011</td>
<td></td>
</tr>
</tbody>
</table>

The map is taken from the Wikipedia entry for “Yangtze River Delta” with the delta proper indicated in green. Bold lines separate provinces. Bars indicate small, medium, and large firms in the sample 100 entrepreneurs from each city (respectively, light, dark grey, and black areas of city bar). This is Figure A1 in Burt and Burzynska, 2017 Management and Organization Review (MOR).

Figure A1 in Burt and Burzynska, "Chinese entrepreneurs, social networks, and guanxi," (2017 Management and Organization Review)
In Fact, East and West Show Similar Returns to Network Brokerage

Scores are averaged within each study population for each five-point interval of the network metric.

Correlations are based on the plotted data.

This is the graph on slide 27 in the “Foundations” handout, with a 2018 China survey added to the data.

Network Constraint (x 100)
- many ——— Structural Holes ——— few

- Managers in Asia, mostly China (n = 1342, 3 study pops., r = -.78)
- Managers in Europe (n = 1094, 3 study pops., r = -.73)
- Managers in the U.S. (n = 2085, 7 study pops., r = -.75)
And Similar Trust Associations with Network Closure

NOTE — Dots are average Y scores at each level of X. Graph A describes 46,231 observed colleague relations with analysts and bankers over a four-year period (adapted from Burt, 2010:174-175). Vertical axis is proportion of relations cited next year as good or outstanding. Horizontal axis is number of mutual contacts this year. Graph B describes 4,464 relationships cited by the 700 Chinese entrepreneurs. Vertical axis is mean respondent trust in the contact, measured on a five-point scale. Horizontal axis is the number of other people in a respondent’s network connected with the contact being evaluated for trust. Test statistics are estimated in both graphs with controls for differences in network size and adjusted for autocorrelation between relationships.

Figure 4 in Burt and Burzynska, "Chinese entrepreneurs, social networks, and guanxi," (2017 Management and Organization Review)
Over the Longer Run, Closure Slows Decay, Especially in New Relations.

Here, closure has its effect through the first two years of a relationship.

These are decay functions for colleague relations with investment bankers and analysts during the 1990s. Logit z-scores in parentheses below (based on 46,231 relations).

from Figure 4.8 in Brokerage and Closure. For general discussion of structural embedding primarily facilitating the formation of relations rather than their long-term survival, see Dahlander & McFarland (2013 ASQ), "Ties that last: tie formation and persistence in research collaborations over time."
GUANXI
- Familiarity, intimacy
- Trust
- Mutual obligation

Respondent Trust in Contact
5 for high, down to 1 for low

Guanxi Ties (C & D on page 35)

Other Ties (A & B on page 35)

Network Closure
Number of Third Parties Linking Respondent with Contact

Illustrative Comparative Network Analysis

from Burt and Batjargal, "Comparative network analysis" (2019, Management and Organization Review)
Same Network Mechanism, with Different Mixtures, Can Define Different Business Environments

NOTE: Grey area is current contacts (contacts cited this year by analyst or banker, contacts cited as current or met daily by Chinese entrepreneur). Red area is proportional to number of guanxi ties (known for more than two years for analyst or banker, most valued help in significant event for Chinese entrepreneur). Overlap indicates guanxi ties in current network.

QUESTIONS: Guanxi ties are more prevalent in China and critical to network advantage in China (there is no evidence of network advantage associated with success absent guanxi ties not cited as current contacts).

- Is the China difference a substantive difference between China and the West, or a methodological artifact?
- How prevalent are guanxi ties in the West (now we know what to look for), how often are they active as current contacts, and to what extent does success in the West depend on them?

from Burt and Batjargal, "Comparative network analysis" (2019, Management and Organization Review)
In Sum, Returns to Brokerage Are Contingent in Known and Likely Ways on Situation and Behavior

The Substance of Brokerage: Framing & Frame Shifts
Information arbitrage is about framing as much as content. Would the situation look different viewed from another perspective? Is failure on the original goal success on another?

RULE 3 of Network Advantage: Returns Are Contingent on Broker Social Standing
To the extent that a broker is proposing something new, there is no guarantee that the proposal will work in our market, with our company processes, staffed by our people. There is risk to accepting the proposal. Chains of command broken in service of company interests can just as easily be broken in service of personal interests, or in service of well-intentioned but strategy-eroding interests. Social standing in the form of job rank, network status, or reputation is the way would-be brokers overcome the suspicions with which brokers can be viewed. Reputation is particularly valuable. It enables the largest number of people for successful brokerage. Achievement then turns on identifying productive bridges (risk of productive accident), and effectively framing ideas to be attractive to target audiences.

Personal Engagement is Essential to Broker Advantage
Reinforcing Rule 3, there is no advantage or disadvantage to affiliation with network brokers. Advantage comes from personal access to structural holes. Advantage does not result from access to the information of diverse contacts so much as it results from personal skills developed when translating information between diverse contacts. Brokers develop skills of analogy and metaphor for seeing and communicating across social clusters, “tribes” of people. Social capital can be a forcing function for human capital.
Other Cautions and Considerations

Returns can be low because target structural holes are nested such that brokering across one requires brokering across many others. Look for modular elements where brokerage is practical, as in the Mozilla example.

Don’t count on personality. Personality can affect performance, but the brokerage-achievement association holds, regardless of personality.

Don’t hide behind culture. Though culture need not eliminate the brokerage-achievement association, it can reveal interesting variations, as in the China example.

Active structural holes are reinforced so bridging can be difficult regardless of value. Bridging active holes is especially sensitive to timing and legitimacy: show value in first bridge. If this is such a good idea, why hasn’t it already happened?

Don’t be greedy. Collateral brokerage grows the surrounding economy. Allowing others to be brokers expands group returns, and thus your share of the expanded returns, as in the biotech example.

Don’t try to connect everything. Bridges require structural holes: Don’t eliminate holes so much as manage them. Beware of eliminating future innovation and growth by securing dense networks across all current structural holes.

When projects are all led by network brokers, variable performance can occur because of a “positive anchor,” the person who imposes reputation costs within the network around the broker’s colleagues. Where is the positive anchor in your project?
Appendix Materials
Appendix I: Strategic Leadership Exercise on Deploying Brokerage

Describe a place in your business where you believe the business would benefit from more network brokerage.

(A) Diagram the situation to communicate to others the brokerage you have in mind.

(B) In brief, what benefits do you expect for the business?

(C) Given the benefits, why is the situation the way it is? (history, preserving forces)

(D) Discuss 2-3 difficulties to be overcome before you'll see the expected benefits. Be sure to consider external costs, how you would manage the brokers, and where you would locate them in the business.
Strategic Leadership Exercise, Process

10 minutes: Do items A, B, C individually in the main room.

5 minutes: Assemble as group.

20-25 minutes: In a brisk discussion, have each person in the group succinctly, quickly, describe their A-B-C.

5 minutes: Select an idea to be presented in the main room. The selection is up to you. Perhaps multiple people had similar ideas, or the idea situation is interesting because it so clearly requires network management, or the situation involves an interesting difficulty to be overcome before the idea would have value. Any idea is attractive that is likely to generate engaging and productive discussion back in the main room.

10 minutes: Select presenter(s) and outline the A-B-C presentation, covering primary difficulties to be overcome before you’ll see the problem resolved. Be sure to consider external costs, how you would manage the brokers, and where you would locate them in the business.

5 minutes: Return to the main room.

In the remaining time available, teams will be called out to present their work for general discussion.
Appendix II: Sources of Variance in 360 Evaluations

Most of the variance in evaluations is about the way two people work together, not their averages as individuals.

The below pie charts describe the variance explained in regression models predicting ego's evaluation of alter from ego's average rating of colleagues [rater variance] and alter's average rating from colleagues [reputation variance].

**Banker Relationships**
(N = 12,640)

- **25.1% Rater Variance**
  (qualities of the person making the evaluation)

- **61.5% Dyad Variance**
  (qualities specific to the subject-respondent dyad)

- **13.4% Reputation Variance**
  (qualities of the person evaluated)

**Staff Officer Relationships**
(N = 2,304)

- **18.4% Rater Variance**
  (qualities of the person making the evaluation)

- **52.2% Dyad Variance**
  (qualities specific to the subject-respondent dyad)

- **29.4% Reputation Variance**
  (qualities of the person evaluated)
and Good versus Bad is the Primary Dimension to Evaluations

I focus on good versus bad as a reputational quality that assuages audience concerns about a would-be broker. The focus is in contrast to studying reputation in terms of specific behaviors for which a person is known. Statistically significant correlations are likely to occur with details of reputation for specific behaviors, but it will be difficult to generalize the correlations into construct-validity hypotheses about reputation because of the diversity that studying details allows and wide confidence intervals around current measures of reputation. My focus on good-bad is based on the knowledge that good versus bad is the primary dimension to human evaluation in general. There are other dimensions, but good-bad is the primary one. In the interest of replicable results, I focus on the primary dimension for the time being.

Initial evidence for the primacy of good-bad was given in Osgood, Tannenbaum, and Suci (1957, *The Measurement of Meaning*) based on factor analyses of semantic-differential data from diverse populations. They find three recurring dimensions to evaluations of words and phrases: a good-bad contrast (termed the primary "evaluation," 69% of common variance), a strong-weak contrast (termed "potency," 15% of common variance), and an active-passive contrast (termed "activity," 13% of common variance). Note here that dimensional analyses of network data show managers distinguishing relations primarily on a good-bad dimension of closeness and secondarily on a personal-impersonal dimension (e.g., Burt, 2010:287). Osgood et al. (1957:38) emphasize that the good-bad contrast, "plays a dominant role in meaningful judgments, here accounting for almost 70 per cent of the common (extracted) variance, and this impression will be confirmed in subsequent studies to be reported."
Appendix III. Research Design for Spillover versus Contagion

Predict performance from direct and indirect network constraint, subject to controls for human capital and organizational factors.

This isn’t a contagion study in which all covariation between outcome response is measured subject to controls.

Only brokerage spillover is measured. It is possible for a strong contagion process to leave no evidence of brokerage spillover.

I propose to add indirect network constraint (measuring a manager’s indirect access to structural holes in the networks around his contacts) to the usual regression model in which manager performance is predicted from direct network constraint (measuring manager access to structural holes in his own network) and controls for manager differences on other performance factors, such as job rank, seniority, and so on:

\[ P = b_1 \ln(C) + b_2 \ln(IC) + BX + R, \]

where \( P \) is a measure of manager performance, \( R \) is a residual score of unpredicted performance, \( C \) is network constraint on the manager from direct contacts (first column of the table on next page), and \( IC \) is the indirect network constraint on the manager from connections among indirect contacts (second column in the table on the next page).

If this were a contagion analysis, I would predict — with controls for individual differences in experience and kind of work — manager \( i \)’s performance from the performance of her contacts \( \sum_j \delta_{ij} P_j \) where \( \delta_{ij} \) measures the extent to which person \( j \) is a close colleague for manager \( i \); see equation G1 in Appendix G). The model is general in that it includes all factors responsible for performance similarity between manager and contacts. Specific factors are not distinguished. Their aggregate effect is the correlation between manager performance and contact performance (also discussed as a spatial, or network, autocorrelation, e.g., Ord, 1975; Doreian, 1981; Dow, Burton and White, 1982). The correlation describes the extent to which performance is homogeneous within the immediate network around a manager; able managers discussing work with other able managers, unable managers finding solace in one another’s company.
Figure 2.3 in Neighbor Networks. More detail on computing network constraint is given in Appendix IV of the first handout.
Appendix IV: Network-Relevant Personality (P)

Given $N_k$, an index measuring ego’s network advantage in role $k$, average ego’s network scores across $K$ roles to describe ego’s average network advantage in the $K$ roles:

$$P = \frac{\sum_k N_k}{K}. \quad (1)$$

I will refer to $P$ as ego’s “network-relevant” personality. Role-specific network scores can be predicted from $P$:

$$N_k = b_n + b_{np}P + b_{nx}X_k + U_k, \quad (2)$$

where $X_k$ is one or more control variables for role $k$, $b_n$ is an intercept term adjusting for means on the control variable(s), and $U_k$ is the role-specific network index not predicted by ego’s average across roles. The “how much does personality matter for network advantage” agency question can be answered by estimating Eq. (2) for a study population: To the extent that personal preferences determine the network advantage measured by $N_k$, each of ego’s role-specific network scores will equal her average across roles, so ego’s average score, her network-relevant personality $P$, will describe close to 100% of the variance in her role-specific scores. To see how much network-relevant personality matters for predicting achievement from network advantage, add $P$ to the network prediction:

$$A_k = b_a + b_{ap}P + b_{ax}X_k + b_{an}N_k + R_k, \quad (3)$$

where $A_k$ is a measure of ego’s achievement in role $k$, $b_a$ is an intercept term, $P$ is ego’s average network score across roles (Eq. 1), $X_k$ is one or more control variables for the role, and $R_k$ is a residual term. Coefficient $b_{ap}$ measures the extent to which achievement in role $k$ depends on network-relevant personality, and $b_{an}$ measures the extent to which achievement depends on network advantage specific to the role.

From Burt, "Network-related personality and the agency question" (2012, AJS)

Answer key to page 28 — Add 1 for each of the following you circled: 1A, 2B, 3A, 4B, 5B, 6A, 7A, 8B, 9B, 10A
People build similarly open or closed networks in the roles they play.
(32% to 38% of network variance; 7,150 people playing 25,610 roles)

Figure 5 in Burt, "Network-related personality and the agency question" (2012, AJS)
But the network consistent across a person's roles makes almost no contribution to predicting achievement. Achievement depends on role-specific experience and the network you build in the role. (88% to 90% of predicted achievement variance)

Number of NonRedundant Contacts

- Network-relevant Personality $P$ (1%)
- Character-specific network (35%)
- Person's inworld experience (9%)
- Person's experience in this character (55%)

Network Constraint

- Network-relevant personality $P$ (2%)
- Character-specific network (27%)
- Person's inworld experience (10%)
- Person's experience in this character (61%)

Figure 6 in Burt, "Network-related personality and the agency question" (2012, AJS)
And the conclusion is robust across consequential differences between people.

<table>
<thead>
<tr>
<th>Role Strain, Too Little Focus</th>
<th>Percent Variance in Network Around Character (Figure 5)</th>
<th>Percent Predicted Variance in Character Achievement (Figure 6)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>NonRedundant Contacts (Model 7)</td>
<td>Network Constraint (Model 8)</td>
</tr>
<tr>
<td>All Characters (n = 25,610)</td>
<td>32</td>
<td>38</td>
</tr>
<tr>
<td>Role Strain, Too Little Focus</td>
<td>Person’s primary characters (n = 15,117)</td>
<td>48</td>
</tr>
<tr>
<td></td>
<td>Person’s secondary characters (n = 10,493)</td>
<td>12</td>
</tr>
<tr>
<td>Role Strain, Difficult Combinations</td>
<td>Person’s characters all same gender (n = 15,947)</td>
<td>34</td>
</tr>
<tr>
<td></td>
<td>Gender mix also played by others (n = 6,851)</td>
<td>31</td>
</tr>
<tr>
<td></td>
<td>Rare gender mix (n = 2,812)</td>
<td>25</td>
</tr>
<tr>
<td>Role Strain, Overlapping Constituents</td>
<td>High percent multi-character contacts (n = 10,783)</td>
<td>34</td>
</tr>
<tr>
<td></td>
<td>Low percent multi-character contacts (n = 14,827)</td>
<td>28</td>
</tr>
</tbody>
</table>

Note — Rows distinguish subsets of characters more or less likely to display network-relevant personality. Network-relevant personality is computed as an average across characters in the same row. The column regression model is estimated for characters in each row as described for Tables 4 and 5, from which percentage contributions to variance are computed as described for Figures 5 and 6.

Table 6 in Burt, "Network-related personality and the agency question" (2012, AJS)
Network-Relevant Personality, Conclusions

The multi-role research design used here has data requirements more demanding than the usual single-role design, so it is not suggested as a replacement for the usual single-role design. But where appropriate data are available, the multi-role design allows more general conclusions, like the two drawn from this analysis:

- There is clear evidence of people having a network-relevant personality. They tend to re-create the same network across the roles they play, which accounts for about a third of the variance in network advantage (Figure 5).

- But that variance has little to do with achievement. The dominant factors predicting achievement in a role are role-specific: a person’s experience in the role and the network advantage the person built up in the role (Figure 6).

- The two conclusions are robust across substantively significant differences in the mix of roles combined in a multi-role network (too many roles, difficult combination of roles, roles played to overlapping audiences, or roles overlapping in time). (Table 6).

In sum, agency differences captured by network-relevant personality are more relevant to style than success. People do tend to build similar networks in the different roles they play, but their network consistency across roles has little to do with achievement. Network models of achievement can focus on role-specific experience and network advantage.

The fact remains that people vary widely in their benefit from access to structural holes. The analysis in this paper has not explained that fact, only ruled out individual differences in personality as the explanation.

From Burt, "Network-related personality and the agency question" (2012, AJS)
Bars measure the extent to which a kind of organization is central in the local network of biotech alliances. Where a biotech cluster emerges (three cities to the left; based on patent activity and 50% of firms) you see collateral brokerage: central broker organizations foster the new brokers. Initial brokers facilitate project diversity and exchange across projects, which results in spin-off broker organizations. Where a cluster does not emerge (four cities to the right) you see the initially central organizations maintain their dominant position in the network. Nothing new develops.

**Appendix V (cont.)**

**Bridges Require Structural Holes: Don't eliminate so much as manage. Holes provide variation needed for innovation. Holes emerge from a division of labor, but there is value to explicitly cultivating them.**

"Le vide" between product labs at Rhone-Poulenc:
Have you noticed that really top scientists get their best ideas from people outside their own discipline? "Shock comes when different things meet. Le vide has a huge function in organizations. If you don't leave le vide, you have no unexpected things, no creation. There are two types of management. You can try to design for everything, or you can leave le vide." (Jean-René Fourtou CEO Rhone-Poulenc, explaining why two Rhone-Poulenc chemists won the nobel prize for Chemistry; quoted in 1996 *Fortune*, November 25)

Secrecy between product labs at Apple: "We have cells, like a terrorist organization. Everything is on a need-to-know basis." (Jon Rubinstein, formerly Apple's senior hardware executive; quoted in 2012 *Fortune*, January 18; org chart from 2011 *Fortune*, May 23)

Also, it can be unproductive to close holes: see Kellogg, "Brokerage professions & implementing reform in an age of experts," 2014 *ASR.*

Critical role of "disconnected" cities in emergence of jazz music:
Central cities like Chicago and New York produced the largest number of early jazz recordings, but the pieces most often re-recorded across markets as jazz classics came from "disconnected" cities like Memphis, Louisville, St. Louis, and Buenos Aires (tango & jazz). "Boutique beer" is analogue. Sociogram below is from Damon Phillips (*Shaping Jazz*, p. 15, Princeton U. Press 2013, which was initially on p. 439 of his article, "Jazz and the disconnected" in the 2011 *AJS*). Arrows indicate volume of bandleaders from source city recording in the target city, 1930-32.
Active Hole: Where did US time zones come from?

Until 1883 each United States railroad chose its own time standards. The Pennsylvania Railroad used the "Allegheny Time" system. By 1870 the Allegheny Time service extended over 2,500 miles with 300 telegraph offices receiving time signals. However, almost all railroads out of New York ran on New York time, and railroads west from Chicago mostly used Chicago time, but between Chicago and Pittsburgh/Buffalo the norm was Columbus time, even on railroads which did not run through Columbus. The Northern Pacific Railroad had seven time zones between St. Paul and the 1883 west end of the railroad at Wallula Junction.

In 1870 Charles F. Dowd proposed four time zones based on the meridian through Washington, DC for North American railroads. In 1872 he revised his proposal to base it on the Greenwich meridian. Sandford Fleming, a Canadian, proposed worldwide Standard Time at a meeting of the Royal Canadian Institute on February 8, 1879. Cleveland Abbe advocated standard time to better coordinate international weather observations and resultant weather forecasts, which had been coordinated using local solar time. In 1879 he recommended four time zones across the contiguous United States, based upon Greenwich Mean Time.

The General Time Convention (renamed the American Railway Association in 1891), an organization of US railroads charged with coordinating schedules and operating standards, became increasingly concerned that if the US government adopted a standard time scheme it would be disadvantageous to its member railroads. William F. Allen, the Convention secretary, argued that North American railroads should adopt a five-zone standard, similar to the one in use today, to avoid government action. On October 11, 1883, the heads of the major railroads met in Chicago at the Grand Pacific Hotel and agreed to adopt Allen's proposed system. ... Standard time was not enacted into US law until the 1918 Standard Time Act.*

*Text comes from October 24, 2015 Wikipedia entry for "Standard time" (five zones include one east of Eastern zone). Map is Dowd's 1884 fifth version advocating to railroaders the adoption of standard time zones. Engraving of William Allen is from Frank Leslie's Popular Monthly (April 1884). For details on bureaucratic infighting over standard time, see Bartky, Selling the True Time (2000, Stanford University Press).
Appendix V (cont.)

Bridges Require Structural Holes: The optimum balance between integrating operations and preserving differentiation is contingent on the industry in which a firm operates.

In the classic piece of research summarized to the right, firm profitability in the plastics industry increases with both integration across the three functions (sales, production, and research), and differentiation (structural holes) between the three functions. This is an illustration of Jack Welch’s “integrated diversity.”

Firms in the Plastics Market

managers behave and are organized differently in different functions

functions compared on four dimensions:
- goals (e.g., quantity vs. quality)
- time frame (short-term vs. long-term)
- interpersonal (getting job done vs. building relations)
- hierarchy (many levels, reviews, supervisors/employee)

difference between two functions

on each attribute divided into five categories:
- 1 two functions least different on attribute
- 2 two functions somewhat different on attribute
- 3 two functions moderately different on attribute
- 4 two functions most different on attribute
- 5 two functions most different on attribute

then summed across the four attributes to describe differentiation between functions:

\[
\begin{array}{ccc}
S & P & R \\
\text{Sales} & - & - \\
\text{Production} & 5 & - \\
\text{Research} & 13 & 9 \\
\end{array}
\]

and the firm’s differentiation score is average differentiation between key functions
(e.g., the 9 on p. 103 for low-A firm is \(\frac{5+9+13}{3}\))

managers are tightly coordinated across functions

respondents think about cross-function ties:
- senior managers who span functions
- cross-function teams
- individual managers working outside official channels

then are asked to characterize relations between each pair of functions:
- 1 couldn’t be worse; bad relations; serious problems
- 2-3 somewhat breakdown in relations
- 4 average — sound enough to get by
- 5-6 better than average, almost full unity
- 7 sound, full unity of effort is obtained

then their average response is used to describe integration between functions:

\[
\begin{array}{ccc}
S & P & R \\
\text{Sales} & - & - \\
\text{Production} & 5.87 & 4.55 \\
\text{Research} & 4.88 & - \\
\end{array}
\]

and the firm’s integration score is average integration between key functions
(e.g., the 5.1 on p. 103 for low-A firm is \(\frac{5.87+4.55+4.88}{3}\))

Data are from pp. 40 (performance), 36, 50 (differentiation), and 47, 50 (integration) of Lawrence and Lorsch (1967, 1986), Organization and Environment; (see pp. 258-260 of the book for methodological details).
Appendix V (cont.)

Bridges Require Structural Holes: The optimum balance between integrating operations and preserving differentiation is contingent on the industry in which a firm operates.

But where firms compete primarily on price, differentiation (structural holes) has no value. It is best to tightly integrate operations across functions. To the right, container firms compete primarily on price (e.g., tin can producers). Low- and high-performing container firms have low differentiation. High-performers are distinguished by their integration across functions.

Plastics: "The development of plastics materials is more of an art than a science. ... However, we have developed the art to a high enough degree so we can hit a target area, even if we can't hit the target in every case."

"Because our customers typically use the products we sell in a chemical reaction, we have a relatively high level of control over the suitability of our product to the customer. ... Consequently, we have a hundred markets, each different in requirements because of the customers' processing needs."

Foods: "This is a profitable business, which is an intensely competitive market, but not a very price-sensitive one. Top competition takes the form of a very intense merchandising effort around new product innovations."

Containers: "As far as this business is concerned, there is no innovation. If you really want to grow in this business, you ... have just got to have good delivery service to the customer, optimizing the flow of you material into his plant."

"Prices are important in this industry only in the sense that you must meet them. Also, product specifications are standardized, ... so we are producing a very undifferentiated product. Obviously, you have to sell something else. ... The customers, because of the speed at which they run their lines, are very concerned about imperfect containers. They keep detailed records of their losses and whose containers caused them."

Quotes are from pp. 25-26, 89-90, in Lawrence and Lorsch (1967, 1986), Organization and Environment. Graph is from page 103 of the book (plastics high-performer scores are averages of the two high-performing firms and low-performer scores are averages of the two low-performing firms).
Appendix V (cont.)

Securing the Bridge: Higher Remission Levels Emerge in Hospitals where QI Discussion Is More Clustered

Where QI discussion clusters — that is to say, where people with many QI discussion partners are connected to colleagues who have many QI discussion partners — we know that social norms and reputations emerge to drive coordination.

The stronger peer support provided by clustered QI discussion is visible as a higher hospital IBD remission rate. (Correlations exclude the hospital indicated by the white dot.)

Average number QI partners cited by colleagues around person i = \( \frac{\sum_j w_{ij} QI_j}{\sum_j w_{ij}} \)

where \( w_{ij} \) is 1 if \( i = j \), else \( w_{ij} = c_{ij} / \left[ \max c_{ij} \text{ for } i \right] \)

Initial Z-Score Remission Factor

Clustered QI discussion has no association with initial remission rates (December 2011). Factor combination of remission, steroid remission, and sustained remission (see Appendix for solution).

End-of-Year Z-Score Remission Factor

Clustered QI discussion has a strong association with end-of-year remission rates (January 2013). Factor combination of remission, steroid remission, and sustained remission (see Appendix for solution).

Figure 6 in Burt, Houghton, Lyttle, Meltzer, and Margolis (2013) “Network brokers and positive anchors in IBD medical care.”
Appendix VI. Pulling Off the Blinders of Personal Experience

The Wisdom of the Naskapi Indians (Weick, The Social Psychology of Organizing, 1979:262-263): The Naskapi Indians of Labrador survive primarily by hunting. Each morning the adult males gather to ask: “Where should we hunt today?” An unusual procedure is used to answer the question: The men take the shoulder bone of a caribou, hold it over a fire until the bone cracks, then hunt in whichever direction the crack points. The procedure works. The Naskapi almost always find game, which is rare among hunting bands.

Why do you think they are successful?


1. It isn’t good enough.
2. It’s only an experiment.
3. Surprises should be question marks.
4. All dissents and warnings have some validity.
5. Collaborators who disagree are both right.
6. What does a stranger think strange?
7. All causal arrows have two heads.
8. The converse of every proposition is equally valid.

Sometimes structural holes occur exogenously, as in a merger, or immigration, or a significant personal event.

Scan the roster of history’s intellectual and artistic giants, and you quickly notice something remarkable: Many were immigrants or refugees, from Victor Hugo, W.H. Auden and Vladimir Nabokov to Nikolas Tesla, Marie Curie, Sigmund Freud, and Albert Einstein. That is especially true of the U.S., a nation defined by the creative zeal of the newcomer. Today, foreign-born residents account for only 13% of the U.S. population but hold nearly a third of all patents and a quarter of all Nobel Prizes awarded to Americans.

It isn’t the immigrant’s ambition that explains her creativity but her marginality. Uprooted from the familiar, immigrants see the world at an angle, and this fresh perspective enables them to surpass the merely talented. And it isn’t necessarily new ideas from the outside that directly drive innovation. It’s their presence as a goad. Some people start to see the arbitrary nature of many of their own cultural habits and open their minds to new possibilities. Once you recognize that there is another way of doing X or thinking about Y, all sorts of new channels open to you. “The awareness of cultural variety helps set the mind free.” Exceptionally creative people such as Curie and Freud possess many traits, of course, but their “openness to experience” is the most important.

That seems to hold for entire societies as well. Consider a country like Japan, which has historically been among the world’s most closed societies. Examining the long stretch of time from 580 to 1939, Dean Simonton compared Japan’s “extra cultural influx” (from immigration, travel abroad, etc.) in different eras with its output in such fields as medicine, philosophy, painting and literature. Dr. Simonton found a consistent correlation: the greater Japan’s openness, the greater its achievements.

History bears this out. In ancient Athens, foreigners known as metics (today we’d call them resident aliens) contributed mightily to the city-state’s brilliance. Renaissance Florence recruited the best and brightest from the crumbling Byzantine Empire. Even when the “extra cultural influx” arrives uninvited, as it did in India during the British Raj, creativity sometimes results. The intermingling of cultures sparked the “Bengal Renaissance” of the late 19th century.

Not all cultural collisions end happily, of course, and not all immigrants become geniuses. The adversity that spurs some to greatness sends others into despair. But as we wrestle with our own immigration and refugee policies, we would be wise to view the welcome mat not as charity but, rather, as enlightened self-interest. Once creativity is in the air, we all breathe a more stimulating air. (The text is from an article by Eric Weiner in the Wall Street Journal (1/15/16), elaborated in the displayed book.)