

# Culture, Cognition, and Collaborative Networks in Organizations

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## Abstract

This article examines the interplay of culture, cognition, and social networks in organizations with norms that emphasize cross-boundary collaboration. In such settings, social desirability concerns can induce a disparity between how people view themselves in conscious (i.e., deliberative) versus less conscious (i.e., automatic) cognition. These differences have implications for the resulting pattern of intra-organizational collaborative ties. Based on a laboratory study and field data from a biotechnology firm, we find that (1) people consciously report more positive views of themselves as collaborative actors than they appear to hold in less conscious cognition; (2) less conscious collaborative-independent self-views are associated with the choice to enlist organizationally distant colleagues in collaboration; and (3) these self-views are also associated with a person's likelihood of being successfully enlisted by organizationally distant colleagues (i.e., of supporting these colleagues in collaboration). By contrast, consciously reported collaborative-independent self-views are not associated with these choices. This study contributes to our understanding of how culture is internalized in individual cognition and how self-related cognition is linked to social structure through collaboration. It also demonstrates the limits of self-reports in settings with strong normative pressures and represents a novel integration of methods from cognitive psychology and network analysis.

## Keywords

culture, cognition, collaboration, exponential random graph models, Implicit Association Test

Recent years have seen a surge of interest in the interrelationships among culture, cognition, and social structure—particularly the structure reflected in social networks. Whereas early research in this tradition tends to emphasize networks' causal role in shaping beliefs and cognitive orientations (e.g., Carley 1991; Walker 1985), a growing body of work suggests that culture—as manifested in individual tastes (Lizardo 2006), cognitive frames (McLean 1998), and world-views (Vaisey and Lizardo 2010)—can also

influence the size and composition of personal networks (for a review, see Pachucki and Breiger [2010]).<sup>1</sup>

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The search for mechanisms that link culture, cognition, and social structure has led a growing cadre of sociologists to engage more actively with cognitive psychology (e.g., Cerulo 2002, 2010; DiMaggio 1997, 2002; Martin 2000; Morgan and Schwalbe 1990; Schwarz 1998). In particular, a core insight from cognitive psychology—that human cognition occurs through a mix of more conscious (or deliberative) and less conscious (or automatic) thinking and feeling—serves as a basis for sociological research on topics as wide-ranging as violence (Cerulo 1988), role enactment (Danna Lynch 2007), morality in decision making (Vaisey 2009), and political ideologies (Martin and Desmond 2010).

In this tradition, this article examines the interplay among culture, cognition, and social networks in differentiated organizations with norms that emphasize cross-boundary collaboration. In such settings, social desirability concerns can lead people to conform to collaborative norms, even when doing so does not fit their underlying disposition (Goffman 1959; Reynolds and Herman-Kinney 2003). We examine the consequences of this dynamic for how people view themselves—in deliberative and automatic cognition—and for the pattern of collaborative network ties they establish within an organization. We pay particular attention to ties that span organizational boundaries (i.e., across departments and levels of the organizational hierarchy) because, across a variety of settings, bridging ties are associated with higher levels of individual status attainment and organizational outcomes (Burt 1992; Fleming and Waguespack 2007; Tsai and Ghoshal 1998).

Building conceptually on the sociological literature that engages with cognitive psychology, we introduce a novel methodological extension. Sociologists have pioneered a variety of methods for measuring meaning systems (for a review, see Mohr [1998]); however, when it comes to the measurement of less conscious cognition, researchers tend

to rely on self-reports (e.g., Vaisey 2009; Vaisey and Lizardo 2010). Although self-reports obtained through forced-choice surveys may involve less deliberation than interviews, considerable evidence from psychology suggests that even forced-choice surveys can be distorted in contexts governed by social desirability. That is, people are sometimes unaware of, or unwilling to report, their underlying beliefs—including their views of themselves (Banaji and Greenwald 1994; Fiske and Taylor 2007; Nisbett and Wilson 1977). A variety of tools are now available to assess the attitudes, beliefs, and self-concepts that reside in less conscious cognition (for a review, see Wittenbrink and Schwarz [2007]). This article represents an initial attempt to address longstanding sociological questions (e.g., Who collaborates with whom?) using methods traditionally used to study less conscious cognition and organizational networks. In so doing, we open the door for a new level of cross-disciplinary exchange.

Integrating a technique widely used to study less conscious, or automatic, mental states (i.e., a timed categorization exercise) and the tools of network analysis, we examine three related research questions: (1) In organizations with strong collaborative norms, to what extent do consciously reported (deliberative) views of the self as a collaborative actor diverge from less conscious (automatic) self-views? (2) To the extent that these views diverge, which form of cognition—deliberative or automatic—is more strongly associated with a person's choice to *enlist* organizationally distant colleagues in collaboration? (3) On the flip side, which form of self-related cognition is more strongly associated with a person's likelihood of being successfully enlisted by organizationally distant colleagues (i.e., of *supporting* these colleagues in collaboration)?

In addressing these questions, the study contributes to our understanding of how culture is internalized in human cognition,

explicates the role of self-related cognition in motivating collaborative action and shaping social structures, and highlights the limitations of self-reports in contexts governed by strong normative pressures. We also identify a promising new avenue—less conscious self-views—in the search for factors associated with network formation and point to new directions in research on social identity and self and other perception.

## THEORY

### *Collaborative Organizational Cultures and Social Desirability*

We define collaboration as help or support that individuals within organizations seek from and provide to one other toward the accomplishment of work-related objectives. We draw a conceptual distinction between two facets of collaboration: (1) *enlisting* colleagues in the accomplishment of one's own work objectives and (2) *supporting* colleagues in the achievement of their work objectives. Our definition stresses the act of choosing to enlist (in the former case) or support (in the latter case) another colleague in work activity. We therefore exclude programmatic interaction (e.g., routine encounters in regularly scheduled staff meetings) and coordination that occurs outside of an interactional context (e.g., synchronized work or production schedules).

Collaboration has long been recognized as the lifeblood of differentiated organizations, which need to integrate activities across functional, divisional, geographic, and hierarchical boundaries (Blau 1970; Lawrence and Lorsch 1967; Thompson 1967). Yet collaboration across horizontal boundaries (e.g., functions, divisions, and departments) often proves elusive because of barriers such as misaligned goals and performance criteria (Walton and Dutton 1969), divergent interpretive schemes (Dougherty 1992), inter-unit competition (Tsai 2002), and

incompatible language systems (Bechky 2003). At the same time, collaboration across vertical boundaries (e.g., hierarchical levels) can prove challenging because of perceived and actual differences in power, resources, and status (Astley and Sachdeva 1984; Fombrun 1983).<sup>2</sup>

To help overcome these barriers, organizations often adopt and actively promote an organizational culture that stresses cross-boundary collaboration. This culture of collaboration can be expressed in artifacts (e.g., formalized decision processes that stress consultation among work units), espoused beliefs (e.g., broadly disseminated values statements that trumpet collaboration), and underlying assumptions (e.g., taken-for-granted notions that working successfully with colleagues in other units is key to getting ahead in the organization) (Schein 1985). Once established, such a culture can create strong pressures for people to present themselves to others in a manner consistent with collaborative norms (e.g., expressing an interest in getting input or buy-in from a colleague, even when that input is unwanted).<sup>3</sup>

### *Cognition about the Self as a Social Actor*

The self-presentational dynamics triggered by a strong collaborative culture have implications for views of the self as a social actor. In particular, we suggest that people in organizational settings have self-views that reflect their orientation toward more collaborative or more independent action. We refer to this orientation as the collaborative-independent self-concept (Gecas 1982; Markus 1977; Markus and Kunda 1986; Rosenberg 1979; Stryker 1987).<sup>4</sup>

Consistent with various formulations of dual-process theory (for a review, see Evans [2008])—which suggest that cognition occurs through a mix of more conscious, or deliberative, and less conscious, or

automatic, thinking and feeling—we argue that collaborative self-concept resides in both cognitive modes. We refer to the more conscious form as explicit collaborative self-concept (ECS) and the less conscious form as implicit collaborative self-concept (ICS).

With respect to ECS, we argue that a hegemonic collaborative culture can constrain the toolkit of symbols, stories, rituals, and worldviews available for people to make sense of and justify their behavior (Swidler 1986, 2001). As a result, people in such organizations tend to frame their interactions in collaborative terms, including some interactions that are routine or even overtly uncooperative. That is, they will justify their actions—at least in their more conscious thoughts—in the language of collaboration, even when an objective observer of their behavior would not share this conviction. Support for this proposition comes from a study of self-reported conflict management styles of managers in large organizations: of the five styles studied, collaboration was most susceptible to social desirability bias (Thomas and Kilmann 1975).

By contrast, insights from cognitive science suggest that ICS reflects intuitive self-knowledge, which accumulates gradually through experience, is slow to change, and is less sensitive to short-term fluctuations in one's thinking (Lieberman, Jarcho, and Satpute 2004). Because it is based on cumulative experience and cannot be readily altered through ex-post justification of choices, we contend that implicit self-concept provides different, and potentially better, information about a person's collaborative propensity than does explicit self-concept.

Within organizations that have strong collaborative norms, we are therefore likely to find limited variability in measures of explicit collaborative self-concept (which will tend to correspond to the organizational norm of collaboration). By contrast, measures of implicit collaborative self-concept, which will tend to reflect the full range of

underlying dispositions in a population, will vary more substantially. For individuals whose underlying disposition favors more independent, rather than collaborative action, implicit collaborative self-concept measures will thus tend to diverge from their explicit counterparts.

### *Collaborative Self-Concept and the Choice to Enlist Others in Collaboration*

To draw a connection between collaborative self-concept and a person's choice to enlist colleagues in collaboration, we build on Vaisey's (2009) dual-process model of culture in action. Vaisey distinguishes between discursive and practical modes of cognition.<sup>5</sup> The former is used to justify or make sense of a person's choices. It is most evident in the narratives people tell when interviewed about the rationale for their behavior. Because people have access to more bits and pieces of culture (e.g., worldviews and values) than they can practically use, and because the elements of culture that people collect are often contradictory, Vaisey (building on Swidler [1986, 2001])—argues that the discursive mode does not generally motivate human action. By contrast, he contends that the practical mode is linked to motivation and predicts subsequent choices. Research in cognitive psychology similarly suggests that implicit self views can motivate the pursuit of behavioral goals consistent with those views (Bargh et al. 2001). We therefore expect that ICS will be associated with the choice to enlist certain colleagues in collaboration. By contrast, we do not expect to find a strong link between ECS, which has a more tenuous connection to motivation, and collaboration choices.

The challenge of seeking collaborators from other organizational units and at different hierarchical levels is counterbalanced by the personal and career benefits of forging boundary-spanning ties. For example, a new

boundary-spanning tie might enable a person to occupy a position of brokerage between two otherwise disconnected departments or between senior management and junior technical people; such brokering positions are associated with various forms of career success (Burt 1992). Furthermore, boundary-spanning ties can be valuable even when they are not associated with brokerage positions (Fleming and Waguespack 2007). In choosing whom to enlist in collaboration, people face a trade-off: ties to organizationally distant colleagues may be more valuable but they are also more difficult to build and maintain.

If ICS is associated with intuitive self-knowledge, which accumulates gradually through cumulative experience, then people who are more implicitly collaborative will also tend to be experienced collaborators. For these individuals, the trade-off will likely favor the selection of organizationally distant colleagues as collaborators.<sup>6</sup> We therefore expect the following:

*Hypothesis 1:* In organizations governed by strong collaborative norms, the implicit collaborative self-concept will be positively associated with the choice to *enlist* organizationally distant colleagues in collaboration (i.e., people in other departments and at different hierarchical levels).

### *Collaborative Self-Concept and the Choice to Support Others in Collaboration*

We now address the flip side of the collaboration coin: how do people choose whom to support in collaborative work? This choice can be disaggregated into two steps: a colleague must request a person's help or support, and the person must cooperate with the request. On the surface, one might not expect to find any association between a person's collaborative self-concept and the first step (i.e., colleagues' choices to request help or support from a person). That is,

people might be expected to hold private their collaborative self-concepts, rendering them undetectable to others. To the extent that the collaborative self-concept leaks to others, one might expect explicit self-concept, rather than implicit, to do the leaking. After all, how can implicit self-concept become known to others when people are not fully aware of it themselves?

Yet, we argue exactly this point. Our expectation is grounded in Goffman's (1959) observation that, even as people manage their self-presentation to accentuate certain idealized qualities, they inadvertently give off expressions to others that are more in line with their underlying self than with the character they are performing. Underlying dispositions can leak to others through nonverbal behavior, which can be difficult to control even when people actively manage their self-presentation (for a review, see DePaulo [1992]). Others often become aware of one's essential character even when one does not overtly communicate it or even tries to mask it. Empirical support for this notion comes from research on cooperation choices in social dilemma experiments. People who were themselves cooperative were able to identify, and chose to interact with, strangers who were cooperative—despite the fact that they had no direct knowledge of others' propensities to cooperate (Brosig 2002; Frank, Gilovich, and Regan 1993).

Just as the *nouveaux riches* and autodidacts reveal themselves to others through their *habitus* (Bourdieu 1986), so we suggest that one's underlying collaborative disposition can be detected by others even when one is not consciously aware of it. In organizational settings, implicit collaborative self-concept will therefore be associated with a person's likelihood of being asked for help or support by colleagues. Because it is linked to motivation, ICS will also be associated with a person's likelihood of complying with such requests. By contrast, because explicit collaborative self-concept is more susceptible to distortion from social desirability pressures and

has a more tenuous link to motivation, we do not expect ECS to be informative in colleagues' choices to request help or support from an individual or in a person's choice to cooperate with a request.

We further suggest that the collaborative signals people send will often disseminate across organizational boundaries (e.g., through the reputations that people develop or through organizational processes such as performance and talent management that transmit this information). For example, a person known for putting organizational interests ahead of individual or group interests can become known in other departments as someone who will be sympathetic to and supportive of requests for help. Similarly, a senior leader who develops a reputation for being overly directive with junior colleagues or for taking, rather than sharing, credit for joint accomplishments will not be frequently sought out for help or support by junior colleagues. We therefore expect the following:

*Hypothesis 2:* In organizations governed by strong collaborative norms, the implicit collaborative self-concept will be positively associated with a person's likelihood of being successfully enlisted by organizationally distant colleagues in collaboration (i.e., of *supporting* individuals in other departments and at different hierarchical levels).

## METHOD

### *Research Setting*

We tested these hypotheses in the context of a mid-sized biotechnology firm that employed approximately 1,000 people. Because of the strong functional affiliations defined by its formal organizational structure, and because its leadership team continually stressed the importance of cross-functional collaboration, the firm was well suited to studying the implications of social desirability pressures for boundary-spanning collaboration. The company had a profitable

marketed product and a portfolio of molecules at various stages of development. It was organized along functional lines and included three research and development (R&D) units, discovery, non-clinical sciences, and clinical; one commercial unit, which included marketing and sales; and a corporate support group (e.g., legal and human resources). Each of these units contained a number of departments. Our study focused on the R&D and commercial functions, because collaboration within and between these groups was widely considered critical to achieving the company's business objectives.

### *Sample and Data Collection*

Over 90 percent of employees worked in the R&D and commercial functions, but many job roles are not relevant to the study of cross-boundary collaboration. We therefore enlisted the heads of R&D and commercial—as well as their human resource representatives—to identify the target population for this study. We started by considering all 254 job titles in R&D and commercial. We then excluded three categories of job titles: (1) administrative support roles (e.g., administrative coordinator, administrative associate, fleet administrator, and executive coordinator); (2) field sales and other job roles that were primarily about external rather than internal interaction (e.g., senior sales specialist and government policy and relations director); and (3) individual contributor roles (e.g., documentation associate, quality assurance specialist, and scientist I/II). We worked iteratively with the department heads and human resources to ensure that these exclusions were made on a consistent basis across the R&D and commercial functions (e.g., applying consistent definitions of individual contributor roles). The remaining 127 job titles all involved at least some level of cross-boundary collaboration (i.e., active provision or receipt of help and support beyond programmatic, routine, or chance

interaction). Individuals occupying these roles were at reasonable risk of enlisting and supporting organizationally distant colleagues in collaboration. The sampling approach was therefore consistent with our theoretical focus on boundary-spanning networks. We invited all employees who held one of the 127 job titles to participate in the study. Because some job titles were held by more than one person, we included a total of 174 people.

We recruited participants in two stages. Potential respondents first received a joint e-mail from the heads of R&D and commercial, informing them of the study. We then followed up with a second e-mail that invited them to participate in the study. We also informed them that their participation was voluntary and that their participation and individual responses would remain confidential (i.e., known to us but not to anyone within the company).

We received responses from 118 of the 174 employees (68 percent total response rate). Of these individuals, 97 provided complete responses (56 percent complete response rate). The 97 individuals who provided complete responses had the following profile: average age was 43.4 years; average tenure in the firm was 4.67 years; average salary grade was 81 on a scale that ranged from 20 to 120; gender composition was 56 percent men; educational background was 48 percent PhDs or MDs; and racial/ethnic composition was 84 percent white. The 97 respondents were not significantly different (based on *t* test comparisons) from nonrespondents in terms of age, tenure, salary grade, gender, or educational background; there was, however, a modest yet statistically significant difference in the proportion of whites among respondents versus nonrespondents (84 versus 77 percent).

For the individual-level analyses, we included the 97 individuals who provided complete responses to test Hypothesis 1, and the 106 people who provided either complete responses or were missing only

responses to the network survey (i.e., their nominations of others as collaborators) to test Hypothesis 2. The nine respondents with missing nominations of others were at equal risk of being named as collaborators by their colleagues as the 97 who completed the network survey. It was thus appropriate to include them in the analyses related to Hypothesis 2. For the dyad-level analyses, we included only the 97 individuals with complete responses to ensure a comparable risk set of naming and being named by others.

Study participants received a link to an online survey and a timed categorization exercise (described below) designed to measure ICS. Half the participants received the timed exercise prior to the survey, while the other half took it after the survey. There are no significant differences in the responses of these two groups or their likelihood of providing complete responses. In addition, we collected demographic and job role data from the company's human resource information systems.

### *Measures – Collaborative Network*

We asked respondents to identify key members of their collaboration network using a standard name-generator question: "Who are the people at [Company] whose help, support, or cooperation you have successfully enlisted toward the accomplishment of your objectives?" (Ibarra 1995). There were no restrictions on the number of names that respondents could provide. Once the survey closed, we manually matched the names with the company's human resources system to address misspellings and the use of nicknames.

This question generated the response variables for individual- and dyad-level analyses. For the individual-level analyses, the response variables are counts of (1) the number of people enlisted in collaboration in other departments; (2) the number of people enlisted in collaboration at other hierarchical

levels (i.e., at different salary grades); (3) the number of people supported in collaboration in other departments (i.e., how many times a respondent was named by others); and (4) the number of people supported in collaboration at other hierarchical levels.<sup>7</sup> The first two measures pertain to Hypothesis 1; the latter two correspond to Hypothesis 2. For the dyad-level analyses, the response variable is an indicator set to 1 if a directed tie exists between a dyadic pair and to 0 otherwise.<sup>8</sup>

### *Measures – Implicit Collaborative Self-Concept*

To assess the implicit collaborative self-concept, we used the Implicit Association Test (IAT) procedure (Greenwald, McGhee, and Schwartz 1998). The IAT is the most widely used instrument for measuring aspects of implicit cognition (Wittenbrink and Schwarz 2007). Best known for its use in the study of prejudice and discrimination (for a review, see Quillian [2006]), the IAT has also been widely used in studies of the self-concept.<sup>9</sup> Although some studies show that IAT responses can be influenced by environmental factors and can vary to some extent across repeated trials (Karpinski and Hilton 2001; Lowery, Hardin, and Sinclair 2001; Mitchell, Nosek, and Banaji 2003), the IAT has been shown to have acceptable psychometric properties in self-concept research (Schnabel, Asendorpf, and Greenwald 2008).

The IAT requires respondents to rapidly sort words representing different categories into one of two groupings. The procedure assumes it is easier, and therefore takes less time, to sort items that are associated by some feature that is readily discerned in the respondent's mind, compared with items that are not associated in this manner. For example, to assess implicit preferences with respect to age, the IAT procedure might ask people to sort words associated with the

categories "Old," "Young," "Good," and "Bad." Subjects would encounter two configurations of these categories: one in which "Old" is paired with "Good" and "Young" is paired with "Bad" and one with the opposite configuration. Subjects would then sort—as rapidly as possible while limiting the number of mistakes—stimuli associated with each of the four categories (e.g., "Joyful" as a stimulus for "Good" and "Elderly" as a stimulus for "Old"). The researcher would then compare the time it took subjects to correctly sort stimuli in each of the two configurations. The differences in time would provide an indication of the less conscious associations that exist in subjects' minds. For example, if it took a subject significantly less time to correctly sort stimuli when "Good" was paired with "Young" and "Bad" with "Old" than when faced with the opposite configuration, the researcher could infer that the subject held, in less conscious cognition, a more positive association toward the "Young" category than toward the "Old" category. In addition to assessing relative preferences, the IAT has been used extensively to study the association of other attributes (beyond general qualities of good and bad) with social groups and with the self. These measures are referred to as implicit stereotypes and the implicit self-concept, respectively (see Greenwald and Banaji [1995] for a review of terms and definitions).

We configured the IAT to obtain a measure of the implicit self-concept with respect to the terms "Collaborative" and "Independent." Participants classified stimulus words related to the categories "Me" and "Not Me" with two attributes, "Collaborative" and "Independent." The stimuli used to represent the attribute "Collaborative" were "Coordination," "Joint," "Working Together," and "Collaboration." For the attribute "Independent," we used "Autonomous," "Solo," "Self-Sufficient," and "Independent." The stimuli representing the category "Me" were "I," "Me," "Mine," and



“Self.” For the category “Not Me,” we used “They,” “Them,” “Other,” and “Theirs.”

As is standard practice, this IAT involved two separate configurations of the four categories: (1) “Collaborative” paired with “Me” and “Independent” paired with “Not Me” and (2) “Collaborative” paired with “Not Me” and “Independent” paired with “Me.” One category pairing was placed on the left side of a participant’s screen and the other on the right side. Randomly selected stimuli (from the set of 16 noted earlier) then flashed in the middle of the screen. Respondents were asked to indicate with a left or right key stroke the construct pairing to which each stimulus belonged. There were 80 such trials. See Figure 1 for a schematic representation of this procedure as it appeared on respondents’ computer screens. The IAT, which we implemented through an online software program (Inquisit 2006), measured the time (in milliseconds) it took participants to categorize each stimulus and kept track of errors in classification. For readers unfamiliar with the IAT, demonstration tests are available at <http://www.implicit.harvard.edu>.

Consistent with prior research (Lane et al. 2007), we undertook several steps to improve the quality of IAT responses. Before each new configuration, respondents learned the associations between stimuli and categories through a training trial. In these trials, one category (e.g., “Me”) was on the left side of the screen, and its counterpart (e.g., “Not Me”) was on the right side. Randomly selected stimuli (drawn from the eight for these two constructs) flashed on the screen for respondents to categorize. In addition, we balanced trials across the left and right sides of the screen: in 40 of the 80 trials, “Collaborative” paired with “Me” was on the left side of the screen, and in the other 40 trials it was on the right side. There are no significant differences in responses across these balanced groups. To address potential measurement error from trials in which respondents were distracted or interrupted

in the middle of the study, we deleted all trials greater than 10,000 milliseconds. Similarly, to address the possibility that some respondents were simply rushing through the study and not paying attention to the stimuli presented, we eliminated subjects if over 10 percent of their trials had response latencies below 300 milliseconds. We also considered an additional basis for exclusion: the number of misclassified stimuli. Adding a 200 millisecond penalty for incorrect categorization does not yield any significant differences in results. We therefore did not include such a penalty in our analysis. After making these adjustments, we calculated a difference score for each subject:

$$d = (T_1 - T_2)/\sigma_p$$

where:

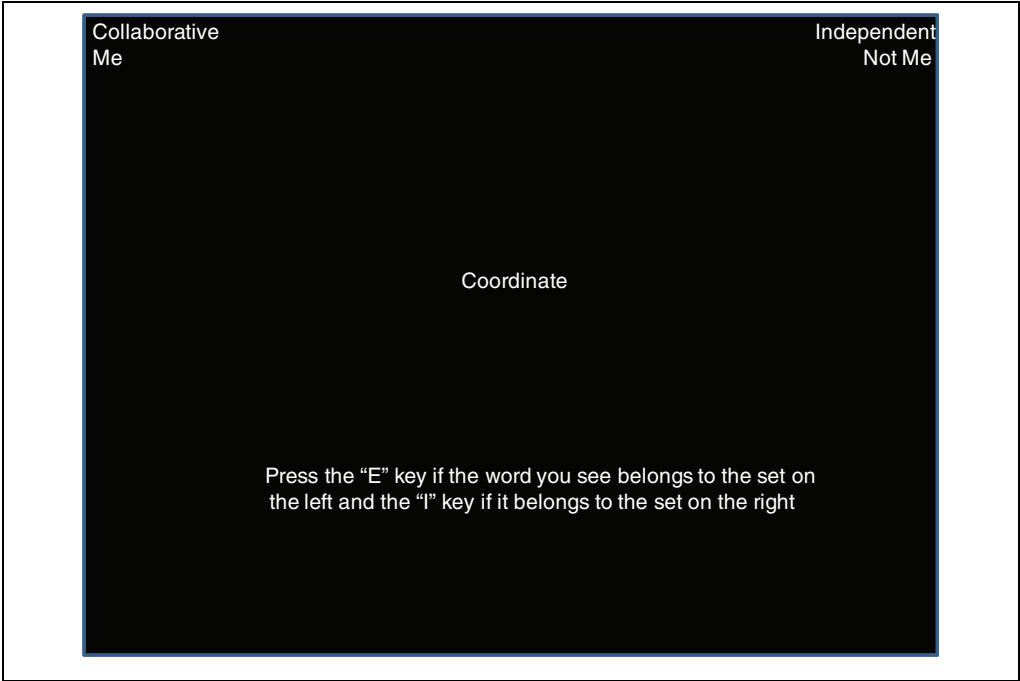
$T_1$  = mean response latency for  
Collaborative – Not Me vs.  
Independent – Me

$T_2$  = mean response latency for  
Collaborative – Me vs.  
Independent – Not Me

$\sigma_p$  = pooled standard deviation  
across all 80 trials

In line with previous usage, we contend that this difference score reflects a person’s collaborative–independent self-concept in implicit cognition. Higher values suggest a stronger implicit association of the self with collaborative, rather than independent, attributes. Lower scores imply the opposite association.

We pilot tested the collaborative–independent IAT procedure in a laboratory study involving 93 university students. The objectives of the pilot test were to ascertain whether participants understood the concepts sufficiently well to perform this particular classification task, to assess whether the data generated by the procedure were in line with comparable studies, and to determine whether the IAT provided the same or different information from self-reported



**Figure 1.** Illustration of Implicit Association Test Procedure

collaborative tendencies. After completing the IAT, subjects were given three hypothetical scenarios that involved making a choice of how many people to enlist in collaboration from one’s own group and from a different group. As expected, the IAT-based measure of ICS is only weakly correlated ( $r = .11$ , not significant) with our five-item measure of ECS. Finally, we tested whether ICS or ECS predicted the number or type of collaborators selected in the three hypothetical scenarios. Controlling for differences in stage of education, gender, and ethnicity, ICS predicts the total number of collaborators chosen, but not the proportion of out-group collaborators chosen. By comparison, ECS predicts neither the number nor the composition of collaborators selected. Overall, the laboratory study gave satisfactory evidence of the construct validity of the IAT measure we used in the field setting. (See Part A in the online supplement [<http://asr.sagepub.com/supplemental>] for

more information about the laboratory study.)

*Measures – Control Variables*

We derived our measure of ECS in the field study from the following survey question: “In general, what is your preferred way of working – independently or collaboratively?” Responses range from 7 (strongly prefer working collaboratively) to 1 (strongly prefer working independently).

The survey also included a question that we used to control for the level of task interdependence in a given job role: “How dependent are you on colleagues in [the other function] for success in your role?” Responses range from 1 (extremely dependent) to 5 (not at all dependent). We reverse coded these responses so that higher values represent a greater level of interdependence.

For models using individual-level data, we also included the following variables from the company's human resource systems as controls: log of a respondent's salary grade (ranging from 20 to 120), log of a respondent's tenure with the firm (in years), functional affiliation (indicator with R&D = 1, commercial = 0), gender (indicator with male = 1, female = 0), educational attainment (indicator with MD/PhD = 1, other = 0), and ethnicity (indicator with white = 1, other = 0). For models using dyad-level data, we included five indicators: same function (e.g., both in R&D), same gender, same education (e.g., both holding an MD/PhD), same ethnicity, and same location (i.e., same building and floor).

### *Measures – Identification with and Relative Preference for Own Function*

Finally, to assess the extent of misalignment between implicit and explicit collaborative self-concept, we constructed two other measures that could serve as points of comparison: relative identification with and relative preference for the two functions (R&D and commercial). We chose these comparisons because considerable prior research has established that people tend to identify with and favor their own organizational subunit (for a review, see Hogg and Abrams [2003]). In organizational settings, there is little reason to expect misalignment between implicit and explicit measures of group identification or liking. In fact, people are often encouraged to affiliate with, and tend to have shared identities (e.g., similar educational background or occupational affiliation) with, colleagues in their own subunit. These measures provided a useful benchmark against which to compare the misalignment in beliefs about a person's collaborative tendencies.

For relative identification, we used a modified version of the IAT procedure described

earlier. For the "R&D" category, we used the following stimuli: "Molecule," "Scientist," "Laboratory," "Dose Response," "Experiment," "Research," and "Development." For the "commercial" category, the stimuli were the following: "Forecast," "Customer," "Pricing," "Product Promotion," "Revenue," "Marketing," and "Sales." We selected these stimuli in consultation with the heads of R&D and commercial and pre-tested to ensure they captured the associations made by people in both groups. To assess identification, we used the "Me" and "Not Me" categories described earlier, along with the same stimuli. We calculated a measure of implicit relative identification by comparing the time it took subjects to categorize stimuli when "R&D" was paired with "Me" and "Commercial" with "Not Me" to the time it took when "R&D" was paired with "Not Me" and "Commercial" with "Me." We also developed a self-reported measure of relative identification based on the difference in responses to two questions that asked about the strength of respondents' identification with each function (on a four-point scale ranging from "completely" to "not at all").

For relative preference, our constructs were "Good"—stimuli included "Joy," "Love," "Peace," "Wonderful," "Pleasure," "Glorious," "Laughter," and "Happy"—and "Bad"—stimuli included "Agony," "Terrible," "Horrible," "Nasty," "Evil," "Awful," "Failure," and "Hurt." To calculate a measure of implicit relative preference, we compared the time it took subjects to categorize stimuli when "R&D" was paired with "Good" and "Commercial" with "Bad" to the time it took when the constructs were reversed. We also constructed a self-reported measure based on responses to three questions, two of which asked how "warmly" or "coldly" respondents felt toward each function (on a seven-point scale) and one that asked about respondents' preferences for working with each function (1 represented a "strong"

preference for one function, 7 represented a “strong” preference for the other function, and 4 represented no preference).

### *Analytic Approach*

We conducted two sets of analyses. The first uses individual-level data. The response variables are all count measures, that is, the number of organizationally distant colleagues enlisted or supported in collaboration. To address potential over-dispersion in these measures, we fitted negative binomial regression models.<sup>10</sup>

The second set of models uses dyad-level data (i.e., a 97x97 matrix representing whether a tie exists or does not exist between all ordered pairs of colleagues). The focus on dyad-level collaboration choices required that we contend with the non-independence of observations.<sup>11</sup> We therefore used exponential random graph models (also referred to as ERGM or  $p^*$  models), which explicitly take into account the dependence relationships that exist within a network; for example, mutuality, or the propensity for ties to be reciprocated; transitivity, or the tendency for friends of friends to become friends themselves; and stars, or the popularity of certain actors. These models assume that the observed network is but one realization of a network generation process that could, in principle, have produced other networks. This enables a researcher to ask: how unusual is a particular feature of the observed network relative to the features found in simulated networks drawn from a sample space of networks? Thus, from a single observation of a network, we can draw inferences simultaneously about multiple factors that could be associated with the likelihood of a tie existing between two given individuals: features of the network structure (e.g., the general tendency toward reciprocity), characteristics of the initiator of a tie (e.g., salary grade of the person who makes the collaboration choice), characteristics of the target of a tie (e.g., salary grade of the person about

whom a collaboration choice is made), and joint characteristics of the initiator and the target (e.g., whether the two people are at the same salary grade).

Fitting an exponential random graph model consists of three steps, which we implemented using the PNet software tool (Wang, Robins, and Pattison 2008). First, the model is estimated (typically including features of the network structure and hypothesized characteristics of actors) by comparing the observed network to a large number of simulated networks. Parameter estimates are expressed as conditional log-odds; that is, the change in the log-odds of a tie being present in response to an increase in a given network statistic. Next, convergence statistics for each parameter are inspected. These convergence statistics, expressed as *t*-ratios, help assess whether estimates from the first step satisfy the requirements of maximum likelihood estimation.<sup>12</sup> Finally, after obtaining a model with satisfactory convergence statistics for all parameters, the researcher assesses the model’s goodness-of-fit. In this third step, the average value of network statistics *not in the model* for the sample of simulated networks is compared to their observed values. This approach represents a rather stringent test of goodness-of-fit: the model is considered to fit well if it reproduces features of the network that were not used to construct it (for further information on the guidelines for fitting ERGMs, see Morris, Handcock, and Hunter 2008; O’Malley and Marsden 2008; Robins et al. 2007; Robins, Pattison, and Wang 2009; Snijders et al. 2006).<sup>13</sup> (See Part B in the online supplement for further background about ERGMs and details of the procedure we followed to estimate our models.)

To test our main hypotheses in this dyadic framework, we constructed two indicators of organizational distance: Different Department (set to 1 when two people worked in different departments and to 0 otherwise) and Different Grade (set to 1 when two people were at different salary grades and to

0 otherwise). We then examined interactions between these indicators with the ICS of the tie initiator (i.e., the person potentially enlisting a colleague) and the ICS of the target (i.e., the person potentially being enlisted, or supporting someone else, in collaboration). The initiator interaction terms (i.e., Different Department x Initiator's ICS and Different Salary Grade x Initiator's ICS) correspond to Hypothesis 1; the target interaction terms (i.e., Different Department x Target's ICS and Different Salary Grade x Target's ICS) correspond to Hypothesis 2.

## RESULTS BASED ON INDIVIDUAL-LEVEL ANALYSIS

Table 1 reports descriptive statistics and correlations for the key variables in the field study. The implicit collaborative self-concept has a statistically significant positive correlation with the number of colleagues enlisted in collaboration from other departments (i.e., outdegree, to other departments), the number of colleagues supported in collaboration (i.e., indegree), the number of colleagues supported in collaboration from other departments (i.e., indegree, from other departments), and the number of colleagues supported in collaboration at different salary grades (i.e., indegree, from other salary grades). By contrast, the explicit collaborative self-concept is not significantly correlated with any of the network measures.

Figure 2 shows that ICS and ECS are less strongly correlated than are the other two pairs of implicit and explicit measures we use as points of comparison: relative identification with and relative preference for one's own function relative to the other function. Whereas the correlation between ICS and ECS is .16 (not significant), the corresponding correlations for the identification and preference measures are statistically significant and considerably higher: .46 ( $p < .001$ ) and .37 ( $p < .001$ ), respectively.

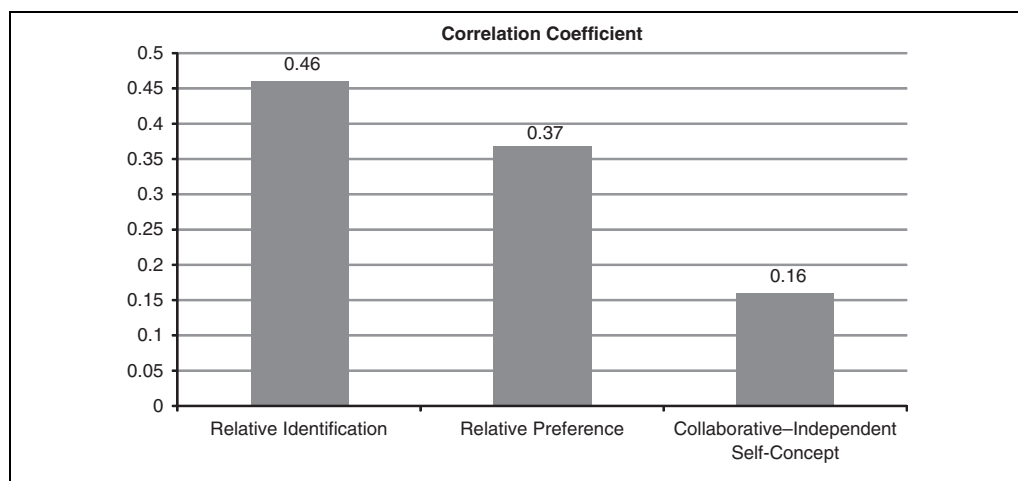
Furthermore, as Figure 3 shows, the distribution of responses for ECS is considerably skewed, while, as Figure 4 depicts, ICS is more evenly distributed. Part C in the online supplement depicts a scatterplot matrix of the relationship between ICS and ECS. These findings—when considered alongside the comparable results reported in the laboratory study—generally support the claim that social desirability pressures can distort self-reports of the collaborative self-concept.

Table 2 reports results of the negative binomial models used to test Hypothesis 1: that is, ICS is associated with the number of organizationally distant colleagues enlisted in collaboration (i.e., with outdegree, to colleagues in other departments and at different salary grades). In Model 1, the response variable is the number of colleagues enlisted in collaboration from other departments. Consistent with expectations, ICS is a significant covariate with a positive coefficient. By contrast, ECS is not significant. Ethnicity/White is also significant and has a positive coefficient, perhaps reflecting greater power, status, or resources possessed by these individuals, which aided in enlisting others in collaboration. One other variable typically associated with power, status, and resources—Log Salary Grade—is positive but not statistically significant. In Model 2, the response variable is the number of colleagues enlisted in collaboration at a different salary grade. Two covariates are statistically significant: Function – R&D and Task Interdependence. The negative coefficient for Function – R&D may reflect a more hierarchical work culture among laboratory-trained scientists. One interpretation for the negative coefficient for Task Interdependence is that it serves as a proxy for power or resources. That is, people with greater power or resources felt less dependent on other functions and could wield their power to enlist colleagues' help or support. Both ICS and ECS have positive coefficients but are not significant. Taken together, the results in Table 2 provide partial support for Hypothesis 1: ICS is

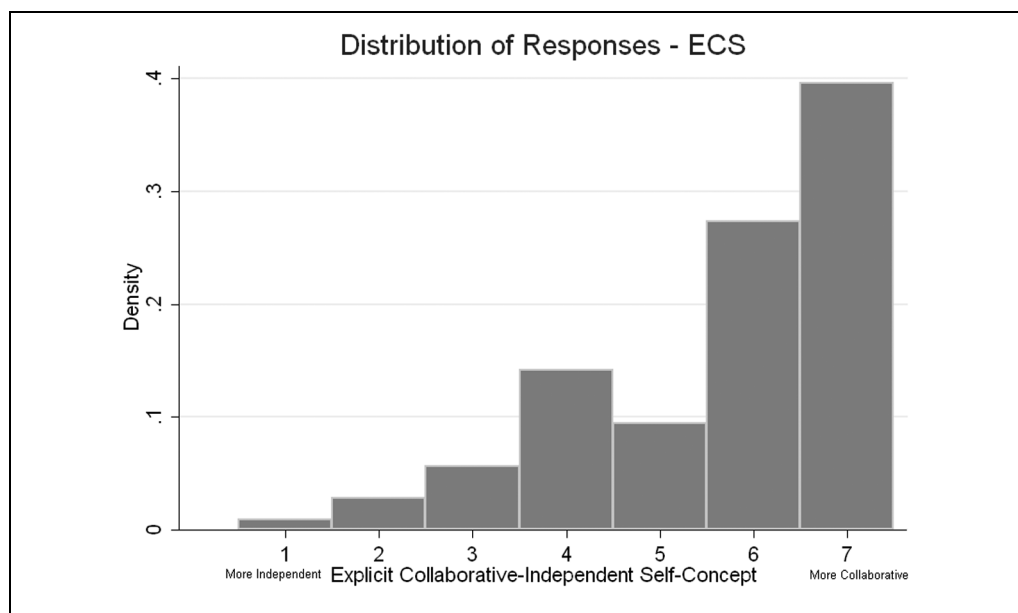
**Table 1.** Descriptive Statistics and Correlation Matrix

	Mean	SD	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
(1) Implicit Collaborative Self-Concept	-.21	.53	1.000								
(2) Explicit Collaborative Self-Concept	5.75	1.37	.159 (.119)	1.000							
(3) Gender – Male	.56	.50	.136 (.183)	.045 (.652)	1.000						
(4) Ethnicity – White	.83	.37	.044 (.669)	.073 (.466)	-.079 (.427)	1.000					
(5) Education – MD/PhD	.47	.50	.167 (.100)	.114 (.255)	.165 (.097)	-.105 (.292)	1.000				
(6) Tenure (Years)	4.63	2.80	.154 (.131)	.117 (.245)	.152 (.128)	.147 (.140)	.149 (.135)	1.000			
(7) Salary Grade	8.98	16.7	.140 (.170)	.188 (.060)	.224 (.024)	.121 (.227)	.368 (.000)	.170 (.088)	1.000		
(8) Function – R&D	.43	.50	.101 (.324)	.188 (.059)	.295 (.003)	.071 (.479)	.448 (.000)	.285 (.004)	.304 (.002)	1.000	
(9) Task Interdependence	2.59	1.14	.174 (.088)	.101 (.315)	-.050 (.617)	-.091 (.366)	.113 (.260)	-.100 (.318)	.278 (.005)	-.125 (.211)	1.000
(10) Colleagues Enlisted in Collaboration	1.05	11.26	.122 (.232)	.065 (.520)	.027 (.789)	.061 (.545)	-.104 (.298)	-.080 (.424)	.049 (.625)	-.041 (.683)	-.128 (.203)
(11) Colleagues Enlisted in Collaboration – Different Departments	3.50 (.011)	5.34 (.417)	.257 (.363)	.082 (.675)	.091 (.417)	.042 (.947)	-.081 (.302)	-.007 (.392)	.103 (.576)	-.086 (.056)	.056
(12) Colleagues Enlisted in Collaboration – Different Salary Grade	4.33 (.499)	7.14 (.907)	.069 (.488)	-.012 (.990)	-.069 (.175)	-.001 (.425)	-.135 (.454)	-.080 (.003)	-.075 (.207)	-.291 (.089)	-.127 (.173)
(13) Colleagues Supported in Collaboration	3.48 (.002)	3.01 (.554)	.299 (.104)	.056 (.000)	.056 (.000)	.146 (.003)	.217 (.000)	.106 (.010)	.518 (.066)	-.089 (.069)	.173 (.195)
(14) Colleagues Supported in Collaboration – Different Departments	1.81 (.013)	2.44 (.947)	.237 (.093)	-.006 (.000)	.058 (.000)	.159 (.000)	.200 (.000)	.133 (.045)	.499 (.038)	.069 (.038)	.195
(15) Colleagues Supported in Collaboration – Different Salary Grade	1.47 (.010)	1.93 (.361)	.244 (.176)	.087 (.000)	.047 (.001)	.137 (.021)	.120 (.000)	.081 (.000)	.365 (.382)	-.210 (.083)	.083

*Note:* *p* values in parentheses.



**Figure 2.** Correlation between Explicit and Implicit Measures

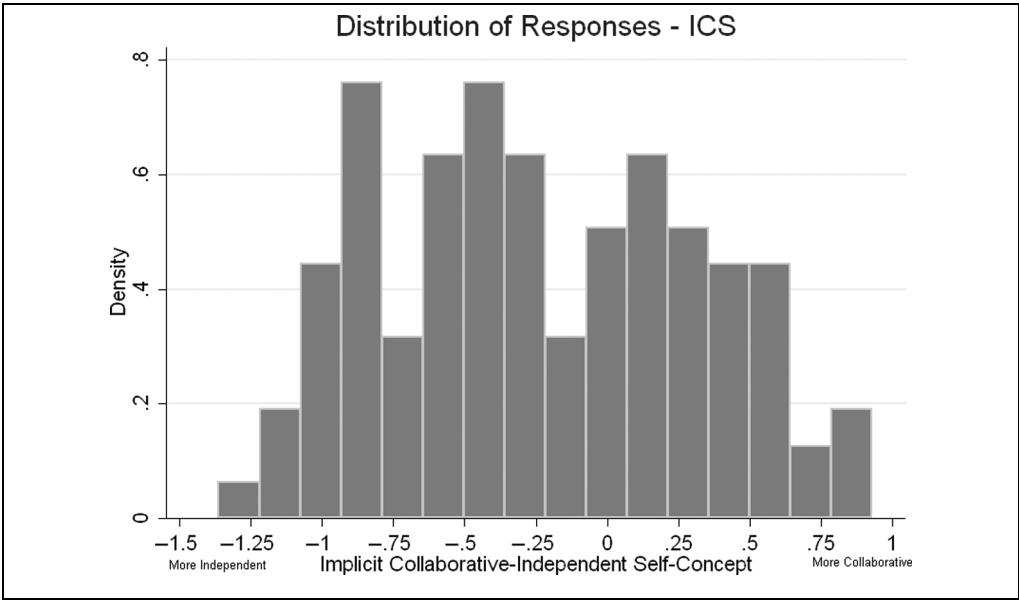


**Figure 3.** Distribution of Explicit Collaborative-Independent Self-Concept Measure

significantly associated with the number of horizontally distant—but not the number of vertically distant—colleagues enlisted in collaboration.

Table 3 reports results of the negative binomial models used to test Hypothesis 2: that is, ICS is associated with the number of organizationally distant colleagues supported in collaboration (i.e., with indegree,

from colleagues in other departments and at different salary grades). In Model 3, the response variable is the number of colleagues supported in collaboration from other departments. Again, consistent with expectations, ICS is significant and has a positive coefficient. By contrast, ECS is not significant. Log Salary Grade is also significant and has a positive coefficient, likely reflecting



**Figure 4.** Distribution of Implicit Collaborative–Independent Self-Concept Measure

the attractiveness of senior colleagues (who presumably enjoy high status or have access to power and resources) as prospective collaborators. In Model 4, the response variable is the number of colleagues supported in collaboration at different salary grades. Five covariates are statistically significant: ICS, Gender – Male, Education – MD/PhD, Log Salary Grade, and Function – R&D. Taken together, these results suggest support for Hypothesis 2.

**RESULTS BASED ON  
DYAD-LEVEL ANALYSIS**

Tables 4 and 5 report results of the Exponential Random Graph Models used to provide supplemental tests of Hypotheses 1 and 2. The two tables cover different dimensions of organizational distance: Model 5 focuses on horizontal boundary spanning, Model 6 addresses vertical boundary spanning. Both models have acceptable convergence statistics ( $|t| < .1$ ) for each parameter and satisfactory goodness-of-fit in subsequent

simulations (i.e.,  $|t| < .1$  for all parameters included in the model and  $|t| < 2$  for all but a couple of the parameters not included in the model). In both models, five network structural characteristics are statistically significant: Arc (the baseline tendency to form ties), Reciprocity (the tendency for ties to be reciprocated), and three higher-order dependence terms (Path Closure, Cyclic Closure, and Multiple Two-Paths). (See Part B in the online supplement for an interpretation and visual representation of these structural covariates.) The level of task interdependence of the sender is significant, with a negative coefficient. That is, consistent with results from Model 2, people who reported being less dependent on the other function also reported enlisting a larger number of colleagues. In addition, the salary grade and tenure of the target (i.e., the person about whom a collaboration choice was made) are significant and have a positive coefficient. That is, more senior people and those with longer tenure in the organization were more likely to be enlisted by others. The dyadic covariates suggest evidence of gender and



**Table 2.** Negative Binomial Regression Analyses; Colleagues Enlisted in Collaboration

	Model 1: Colleagues Enlisted in Collaboration – Different Departments	Model 2: Colleagues Enlisted in Collaboration – Different Salary Grade
Implicit Collaborative Self-Concept	.577* (.230)	.207 (.235)
Explicit Collaborative Self-Concept	.060 (.084)	.078 (.089)
Gender – Male	.048 (.258)	–.035 (.269)
Ethnicity – White	.676* (.325)	.248 (.249)
Education – MD/PhD	–.025 (.282)	.584 (.359)
Log Tenure	.110 (.183)	.150 (.175)
Log Salary Grade	1.010 (.680)	.702 (.564)
Function – R&D	–.435 (.295)	–1.884*** (.411)
Task Interdependence	–.110 (.128)	–.372** (.134)
Constant	–3.857 (2.859)	–1.164 (2.395)
Wald $\chi^2$ (9)	18.101	25.567
<i>p</i> -value	.034	.002
Number of Observations	97	97

Note: Robust standard errors in parentheses.

\* $p < .05$ ; \*\*  $p < .01$ ; \*\*\*  $p < .001$  (two-tailed tests).

education-based homophily (a tie was more likely when the initiator and the target shared the same gender or had the same level of educational attainment) and propinquity (a tie was more likely when the initiator and the target worked in the same office building and floor).

With respect to Hypothesis 1, one of the two relevant interaction terms—Different Salary Grade  $\times$  Initiator's ICS (in Model 6)—is significant with a positive coefficient. The other term—Different Department  $\times$  Initiator's ICS (in Model 5)—has a positive coefficient but is not significant. With respect to Hypothesis 2, both of the relevant interaction terms—Different Department  $\times$  Target's ICS (in Model 5) and Different Salary Grade  $\times$  Target's ICS (in Model 6)—are significant and have positive coefficients. Taken together, these analyses provide

corroborating support for Hypothesis 2 and partial support for Hypothesis 1. In contrast to the individual-level analyses, however, the dyad-level analyses show greater support for the role of ICS in the choice to enlist vertically, rather than horizontally, distant colleagues.

## DISCUSSION AND CONCLUSIONS

This study provides new insight into the interplay of culture, cognition, and social networks in organizations with norms that emphasize cross-boundary collaboration. In such settings, social desirability concerns can induce a disparity between how people view themselves in conscious (deliberative) and less conscious (automatic) cognition.

**Table 3.** Negative Binomial Regression Analyses; Colleagues Supported in Collaboration

	Model 3: Colleagues Supported in Collaboration – Different Departments	Model 4: Colleagues Supported in Collaboration – Different Salary Grade
Implicit Collaborative Self-Concept	.314* (.154)	.357* (.170)
Explicit Collaborative Self-Concept	–.046 (.073)	.081 (.076)
Gender – Male	.458 (.235)	.588** (.219)
Ethnicity – White	.094 (.333)	.367 (.265)
Education – MD/PhD	.148 (.221)	.569* (.246)
Log Tenure	.201 (.149)	.281 (.145)
Log Salary Grade	2.892** (.879)	1.105* (.472)
Function – R&D	.055 (.210)	–1.585*** (.265)
Task Interdependence	.124 (.104)	–.078 (.124)
Constant	–13.118*** (3.736)	–5.461** (1.874)
Wald chi2 (9)	50.357	70.021
p-value	9.23e–08	1.51e–11
Number of Observations	106	106

*Note:* Robust standard errors in parentheses.  
\**p* < .05; \*\* *p* < .01; \*\*\* *p* < .001 (two-tailed tests).

These differences have implications for the resulting pattern of collaborative ties. In both a laboratory and a field setting, we find evidence of divergence between people’s explicit (consciously reported) collaborative self-concept (ECS) and their implicit (less conscious) self-concept (ICS). In the field setting, the latter is associated with a person’s choice to enlist organizationally distant colleagues in collaboration, whereas the former is not. Intriguingly, the choice to support others in collaboration (i.e., to be successfully enlisted by organizationally distant colleagues) is associated with ICS but not with ECS. That is, counter to what one might expect, colleagues’ collaboration choices are associated with an aspect of self-cognition about which a person may not be fully aware.

These findings raise some questions. First, we provide a possible explanation for the fact that we find more consistent support for Hypothesis 2 (that ICS is linked to the choice to support organizationally distant colleagues) than for Hypothesis 1 (that ICS is linked to the choice to enlist organizationally distant colleagues). The measures used to test Hypothesis 1 are variations of outdegree (i.e., the number of network members named by the survey respondent). Survey-based measures of outdegree are known to suffer from expansiveness bias—the tendency for respondents to vary in the number of reported ties (Feld and Carter 2002)—and to have relatively low reliability (Zemljic and Hlebec 2005). By contrast, indegree measures—the number of times a person is named by others (which corresponds to Hypothesis 2)—have

**Table 4.** Dyad-Level Interaction – Horizontal Boundary Spanning; Conditional Log-Odds of Directed Tie between Dyadic Pair; Model 5 (Exponential Random Graph Model)

Explanatory Variables	Coefficient (SE)	Convergence Statistic ( <i>t</i> -ratio)	Explanatory Variables	Coefficient ( <i>SE</i> )	Convergence Statistic ( <i>t</i> -ratio)
<i>Structural Covariates:</i>					
Arc		.018 <sup>*</sup>	<i>Dyadic Covariates:</i> Same Function	.057 (.105)	-.009 <sup>*</sup>
Reciprocity	2.51*** (.267)	.042 <sup>*</sup>	Same Gender	.306* (.110)	.049 <sup>*</sup>
Path Closure (AT-T)	1.04*** (.092)	.023 <sup>*</sup>	Same Educ. – MD/PhD or Not	.279* (.123)	.027 <sup>*</sup>
Cyclic Closure (AT-C)	-.478*** (.104)	.040 <sup>*</sup>	Same Ethnicity – White or Other	.228(.118)	-.039 <sup>*</sup>
Multiple Two-Paths (A2P-T)	-.173*** (.028)	.016 <sup>*</sup>	Same Location	1.24*** (.104)	.017 <sup>*</sup>
<i>Initiator Covariates:</i>					
ICS	.046 (.103)	-.043 <sup>*</sup>	Different Department	-.146 (.115)	-.039 <sup>*</sup>
ECS	.032 (.040)	.010 <sup>*</sup>	Different Department x Initiator's ICS	.104 (.107)	.016 <sup>*</sup>
Log Salary Grade	.172 (.232)	.018 <sup>*</sup>	Different Department x Target's ICS	.213* (.084)	.039 <sup>*</sup>
Log Tenure	-.008 (.069)	-.001 <sup>*</sup>			
Task Interdependence	-.098* (.047)	.028 <sup>*</sup>			
<i>Target Covariates:</i>					
ICS	.164 (.089)	-.013 <sup>*</sup>			
ECS	-.017 (.044)	.011 <sup>*</sup>			
Log Salary Grade	.958** (.301)	.019 <sup>*</sup>			
Log Tenure	.204*** (.076)	.015 <sup>*</sup>			
Task Interdependence	.025 (.049)	.053 <sup>*</sup>			

*Note:* Standard errors in parentheses. See Part B in the online supplement for definitions of AT-T, AT-C, and A2P-T.  
[<sup>\*</sup>]*t* statistic below recommended threshold of .10 for model convergence.  
\*  $p < .05$ ; \*\*  $p < .01$ ; \*\*\*  $p < .001$  (two-tailed tests).

**Table 5.** Dyad-Level Interaction – Vertical Boundary Spanning; Conditional Log-Odds of Directed Tie between Dyadic Pair; Model 6 (Exponential Random Graph Model)

Explanatory Variables	Coefficient (SE)	Convergence Statistic ( <i>t</i> -ratio)	Explanatory Variables	Coefficient (SE)	Convergence Statistic ( <i>t</i> -ratio)
<i>Structural Covariates:</i>					
Arc	−9.47*** (1.60)	−.021 <sup>†</sup>	<i>Dyadic Covariates:</i> Same Function	.044 (.104)	−.021 <sup>†</sup>
Reciprocity	2.51*** (.294)	−.038 <sup>†</sup>	Same Gender	.272* (.113)	−.052 <sup>†</sup>
Path Closure (AT-T)	1.04*** (.092)	−.055 <sup>†</sup>	Same Educ. – MD/PhD or Not	.295* (.122)	.015 <sup>†</sup>
Cyclic Closure (AT-C)	−.479*** (.101)	−.053 <sup>†</sup>	Same Ethnicity – White or Other	.218 (.115)	−.058 <sup>†</sup>
Multiple Two-Paths (A2P-T)	−.171*** (.033)	−.029 <sup>†</sup>	Same Location	1.26*** (.114)	−.026 <sup>†</sup>
<i>Initiator Covariates:</i>					
ICS	.020 (.102)	.012 <sup>†</sup>	Different Salary Grade	.028 (.114)	−.040 <sup>†</sup>
ECS	.030 (.040)	−.022 <sup>†</sup>	Different Salary Grade x Initiator's ICS	.229* (.111)	−.023 <sup>†</sup>
Log Salary Grade	.202 (.221)	−.020 <sup>†</sup>	Different Salary Grade x Target's ICS	.310* (.119)	.008 <sup>†</sup>
Log Tenure	.018 (.075)	−.089 <sup>†</sup>			
Task Interdependence	−.108* (.050)	−.012 <sup>†</sup>			
<i>Target Covariates:</i>					
ICS	.010 (.122)	−.060 <sup>†</sup>			
ECS	−.019 (.039)	−.041 <sup>†</sup>			
Log Salary Grade	.983*** (.286)	−.023 <sup>†</sup>			
Log Tenure	.199* (.078)	.003 <sup>†</sup>			
Task Interdependence	.029 (.045)	−.005 <sup>†</sup>			

*Note:* Standard errors in parentheses. See Part B in the online supplement for definitions of AT-T, AT-C, and A2P-T. <sup>†</sup>|*t*| statistic below recommended threshold of .10 for model convergence.  
\**p* < .05; \*\* *p* < .01; \*\*\* *p* < .001 (two-tailed tests).

relatively high reliability. This difference in reliability may account for the divergence in findings. Given the laboratory study finding—that ICS is positively associated with the number of collaborators selected in hypothetical scenarios—it would be useful in future research to explore how ICS relates to more reliable indicators of outdegree (e.g., as measured through archived electronic communications).

Next, we address the reverse causal explanation: that one's position in a network structure determines one's less conscious self-views. Although the cross-sectional nature of our field study does not allow us to rule out this possibility, the positive association found in the laboratory study between ICS and the number of collaborators subsequently chosen in hypothetical scenarios suggests that the reverse causal story cannot fully account for our findings. (See Part A in the online supplement for details.) We suspect that network position and ICS are co-determined. Longitudinal studies, perhaps using actor-driven network models (Steglich, Snijders, and West 2006), are needed to understand their co-evolution. Such research could also identify other contextual factors that shift ICS over time (e.g., organizational and occupational mobility).

In addition, our study design does not allow us to observe other individual-level factors—such as personality traits (e.g., extraversion or likability) or skills—that could be implicated in collaboration choices. The laboratory study (see Part A in the online supplement) did include two individual difference measures that are associated with certain kinds of networks: individualism–collectivism (Wagner 1995; Wagner and Moch 1986) and the *tertius iungens* orientation (Obstfeld 2005). Neither measure is strongly correlated with ICS or with subjects' collaboration choices. Nevertheless, we cannot rule out the possibility that ICS is only serving as a proxy for an omitted personality characteristic such as extraversion. Future research should more

closely examine the link between ICS and other individual difference constructs and control for the latter in statistical models. Another limitation to address in future research is our somewhat coarse-grained measure of task interdependence. This measure could be refined by assessing interdependence between each pair of colleagues, rather than in aggregate between functions; such a measure would better account for role-based factors that influence collaboration choices.

Finally, we suggest the need to examine whether these results generalize to other workplace settings. For example, can people detect one another's collaborative dispositions in organizations where work is mostly done remotely or through virtual teams? Is ICS implicated in choices to collaborate with temporary or off-shore workers? What role does ICS play in collaboration with external actors (e.g., competitors, alliance partners, or regulators)?

## Contributions

This study makes a number of conceptual and methodological contributions to research on culture, cognition, and social structure. First, it clarifies how people internalize culture—in the form of organizational norms—in contexts governed by social desirability. Widespread and strongly sanctioned norms can limit the available toolkit of symbols, stories, rituals, and worldviews that people use to justify and make sense of their actions (Swidler 1986, 2001). As a result, in deliberative or discursive cognition, individuals are more likely to frame interactions in terms that align with prescribed norms, even when an objective observer of their behavior would not share this view. By contrast, less conscious self-views, or practical cognition, will be less susceptible to distortion. In such settings, dual-process models will prove especially useful in understanding how culture shapes the way people see themselves (Evans 2008; Vaisey 2009).

This study also clarifies the role of self-related cognition in motivating collaborative action and influencing social structure (as expressed in collaborative networks). Our findings suggest that the implicit collaborative self-concept is implicated in choices to form ties that span organizational boundaries—both horizontal (across departments) and vertical (across hierarchical levels). Network researchers have long sought to identify individual-level factors associated with the tendency to form network ties, in general, and boundary-spanning ties, in particular (see, e.g., Burt, Jannotta, and Mahoney 1998; Mehra, Kilduff, and Brass 2001; Obstfeld 2005; Totterdell, Holman, and Hukin 2008). Although a few network scholars have examined the relationship between cognition and networks (e.g., Casciaro 1998; Kilduff and Krackhardt 1994; Krackhardt 1987, 1990; Krackhardt and Kilduff 1999), this study represents—to the best of our knowledge—the first attempt to delve into the role of less conscious cognition. It suggests a promising new avenue—implicit self-views—in the search for factors associated with network formation and change.

In addition, the study has implications for research on self and other perception (Felson 1985; Felson and Reed 1986; Ichiyama 1993; Miyamoto and Dornbush 1956). For example, Yeung and Martin (2003) examine the conditions under which people can influence others' perceptions of them and how, consistent with Cooley's (1902) "looking glass self hypothesis," self-views can be shaped by individuals' perceptions of how others view them. Yeung and Martin (2003:873) conclude that "self-perception involves the internalization of the perspectives of others—at least those whom we see as ascendant over us." In similar fashion, a study of newly married couples shows that views initially held by the higher status spouse are more likely to influence the partner's subsequent self-views (Cast, Stets, and Burke 1999). Our results suggest the need to complicate these stories by accounting for differences

in self-views that reside in deliberative versus automatic cognition. The latter may be less susceptible to influence by others' perceptions. In our setting, others' choices to collaborate with an individual are linked to the person's less conscious self-view. Conversely, these prior studies suggest the need to complicate our own account. For example, do status distinctions play a role in how one thinks of oneself implicitly? What are the conditions under which one can detect another's underlying disposition? To what extent do status differentials influence one's ability to do so?

Insights from this study also suggest promising new directions for various strands of identity research (see Burke 2006; Burke and Stets 2009; Hogg and Ridgeway 2003; McCall and Simmons 1978; Stryker and Burke 2000). For example, how do identities that reside below conscious awareness form, change over time, and become salient in a given context? Do the hierarchies of identity that reside in conscious cognition differ from those that exist in less conscious cognition? How do people verify one another's identities when those identities are implicitly, rather than explicitly, held? How do multiple identities, which are held in automatic cognition and share dimensions of meaning, influence one another in the process of identity change? Along the same lines, prior work on the role of values in shaping personal identities (e.g., Gecas 2000; Hitlin 2003) could be extended to consider potential differences in identity change that occur in deliberative versus automatic cognition. Do values adopted because of social conformity pressures, for example, have a greater effect on identities held in one form of cognition than in the other?

With respect to research methods, the study highlights the limitations of survey research as a tool for assessing automatic cognition. In contexts governed by social desirability, self-reports can be significantly distorted and bear little relation to observed patterns of behavior. As an alternative to

self-reports, we develop and validate a technique that can be used in future research to assess the implicit collaborative self-concept. This technique can be readily extended to other implicit self-views (e.g., whether one sees oneself as local or cosmopolitan, insider or outsider, or explorer or exploiter) that may play a role in organizational action. It may also serve as a useful complement to established methods, such as the semantic differential (Burke and Tully 1977) and role-identity salience (Callero 1985, 1992), for the measurement of role identities.

In conclusion, this study underscores the value of continued engagement between sociology and cognitive psychology. It represents a further integration of concepts (e.g., dual-process theory, self-concept, cultural toolkits, and boundary-spanning networks) and methods (e.g., the Implicit Association Test and exponential random graph models) in the cross-disciplinary investigation of culture, cognition, and social structure.

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## Notes

1. A distinct line of research on homophily (e.g., Lazarsfeld and Merton 1954; McPherson, Smith-Lovin, and Cook 2001) also recognizes that similarity in values, attitudes, and beliefs (i.e., value homophily) can serve as the basis for interpersonal attraction and network formation.
2. Although the sources of difficulty vary between horizontal and vertical boundary spanning, both forms of collaboration are typically more difficult

than collaboration within departments or at the same hierarchical level. Our arguments therefore pertain generally to collaboration between organizationally distant colleagues (i.e., we include colleagues separated by horizontal or vertical distance).

3. We follow Coleman (1988:S104) in conceiving of these collaborative norms as prescriptive, that is, reinforced by "social support, status, honor, and other rewards."
4. We follow Rosenberg (1979:7) in conceiving of self-concept as "the totality of an individual's thoughts and feelings having reference to himself as an object." Self-concept is often distinguished from self-schema (Markus 1977), which refer to stable attributions about a particular aspect of the self (e.g., whether one is a more collaborative or more independent organizational actor). Although we are technically focused on the latter, we use the more generally recognized term, self-concept. The conceptual distinction between the two is not of material interest given our emphasis on only one aspect of self-concept. For brevity, and given our focus on collaboration choices, we also use the term *collaborative self-concept* interchangeably.
5. These modes correspond to ECS and ICS, respectively.
6. Although we expect to find an association between ICS and the enlistment of proximate and distant colleagues in collaboration, we expect the motivational link to be more evident in the case of distant colleagues. Motivational complexity is known to moderate the link between implicit cognition and the pursuit of goals, with multiple or competing goals that people typically have with close contacts serving to attenuate the link (Shah 2003). Because people are more likely to have multiple or competing goals with organizationally proximate colleagues (with whom they come into contact for a variety of reasons that are not related to collaboration), we expect to find a stronger association between ICS and collaboration with organizationally distant colleagues.
7. In network analysis terms, these measures are variations of outdegree (i.e., the number of collaborators a respondent named) and indegree (i.e., the number of colleagues who named the respondent as a collaborator).
8. Ties were directed in the sense that we accounted separately for cases when Person *i* named Person *j* as a collaborator and cases when Person *j* named Person *i* as a collaborator.
9. For critiques of the IAT technique, see Arkes and Tetlock (2004) and Tetlock and Mitchell (2009). For responses to these critiques, see Jost and colleagues (2009), Greenwald and colleagues (2009), and Banaji, Nosek, and Greenwald (2004).
10. We also fitted Poisson models, which produce comparable results to the ones reported here.

11. For example, if Person  $i$  named Person  $j$  as a collaborator, then—by the principle of reciprocity—Person  $j$  might also be more likely to name Person  $i$ . In this case, the two observations of reported collaboration between Person  $i$  and Person  $j$  would not be independent of one another.
12. These  $t$ -ratios are not the same as the ratio of a parameter estimate to its standard error that is typically reported in regression analyses. Rather, they are a diagnostic for whether the estimation process has converged sufficiently. The  $t$ -ratio assesses the hypothesis that the average value of a parameter from the simulations equals the corresponding observed network statistic. If the model has converged, there should be very little evidence against the hypothesis. That is, lower  $t$ -ratios suggest better convergence, with the threshold of 95 percent confidence corresponding to  $|t| < .10$ .
13. Goodness-of-fit simulations also produce  $t$ -ratios for each parameter. In this case, a model is considered to fit well if  $|t| < .10$  for all parameters that were included in the model and  $|t| < 2.0$  for most, if not all, parameters not included in the model.

## References

- Arkes, Hal R. and Philip E. Tetlock. 2004. "Attributions of Implicit Prejudice, or 'Would Jesse Jackson 'Fail' the Implicit Association Test?'" *Psychological Inquiry* 15:257–78.
- Astley, W. Graham and Paramjit S. Sachdeva. 1984. "Structural Sources of Intraorganizational Power: A Theoretical Synthesis." *Academy of Management Review* 9:104–113.
- Banaji, Mahzarin R. and Anthony G. Greenwald. 1994. "Implicit Stereotyping and Prejudice." Pp. 55–76 in *The Psychology of Prejudice, Vol. 7, The Ontario Symposium*, edited by M. P. Zanna and J. M. Olson. Hillsdale, NJ: Lawrence Erlbaum Associates.
- Banaji, Mahzarin R., Brian A. Nosek, and Anthony G. Greenwald. 2004. "No Place for Nostalgia in Science: A Response to Arkes and Tetlock." *Psychological Inquiry* 15:279–310.
- Bargh, John A., Peter M. Gollwitzer, Annette Lee-Chai, Kimberly Barndollar, and Roman Trotschel. 2001. "The Automated Will: Nonconscious Activation and Pursuit of Behavioral Goals." *Journal of Personality and Social Psychology* 81:1014–27.
- Bechky, Beth A. 2003. "Sharing Meaning across Occupational Communities: The Transformation of Understanding on a Production Floor." *Organization Science* 14:312–30.
- Blau, Peter M. 1970. "A Formal Theory of Differentiation in Organizations." *American Sociological Review* 35:201–218.
- Bourdieu, Pierre. 1986. *Distinction: A Social Critique of the Judgment of Taste*. Translated by R. Nice. London: Routledge and Kegan Paul.
- Brosig, Jeannette. 2002. "Identifying Cooperative Behavior: Some Experimental Results in a Prisoner's Dilemma Game." *Journal of Economic Behavior & Organization* 47:275–90.
- Burke, Peter J. 2006. "Identity Change." *Social Psychology Quarterly* 69:81–96.
- Burke, Peter J. and Jan E. Stets. 2009. *Identity Theory*. New York: Oxford University Press.
- Burke, Peter J. and Judy C. Tully. 1977. "The Measurement of Role Identity." *Social Forces* 55:881–97.
- Burt, Ronald. 1992. *Structural Holes: The Social Structure of Competition*. Cambridge: Harvard University Press.
- Burt, Ronald S., Joseph E. Jannotta Jr., and James T. Mahoney. 1998. "Personality Correlates of Structural Holes." *Social Networks* 20:63–87.
- Callero, Peter L. 1985. "Role-Identity Salience." *Social Psychology Quarterly* 48:203–215.
- Callero, Peter L. 1992. "The Meaning of Self-in-Role: A Modified Measure of Role-Identity." *Social Forces* 71:485–501.
- Carley, Kathleen M. 1991. "Growing Up: The Development and Acquisition of Social Knowledge." Pp. 75–102 in *The Self-Society Dynamic: Cognition, Emotion and Action*, edited by J. A. Howard and P. L. Callero. Cambridge: Cambridge University Press.
- Casciaro, Tiziana. 1998. "Seeing Things Clearly: Social Structure, Personality, and Accuracy in Social Network Perception." *Social Networks* 20:331–51.
- Cast, Alicia D., Jan E. Stets, and Peter J. Burke. 1999. "Does the Self Conform to the Views of Others?" *Social Psychology Quarterly* 62:68–82.
- Cerulo, Karen A. 1988. *Deciphering Violence: The Cognitive Structure of Right and Wrong*. New York: Routledge.
- Cerulo, Karen A. 2002. *Culture in Mind: Toward a Sociology of Culture and Cognition*. New York: Routledge.
- Cerulo, Karen A. 2010. "Mining the Intersections of Culture and Cognitive Science." *Poetics* 38:115–32.
- Coleman, James S. 1988. "Social Capital in the Creation of Human Capital." *American Journal of Sociology* 94:S95–120.
- Cooley, Charles H. 1902. *Human Nature and the Social Order*. New York: Scribners.
- Danna Lynch, Karen. 2007. "Modeling Role Enactment: Linking Role Theory and Social Cognition." *Journal for the Theory of Social Behaviour* 37:379–99.
- DePaulo, Bella M. 1992. "Nonverbal Behavior and Self-Presentation." *Psychological Bulletin* 111:203–243.
- DiMaggio, Paul. 1997. "Culture and Cognition." *Annual Review of Sociology* 23:263–88.
- DiMaggio, Paul. 2002. "Why Cognitive (and Cultural) Sociology Needs Cognitive Psychology." Pp. 274–81 in *Culture in Mind: Toward a Sociology of*



- Culture and Cognition*, edited by K. A. Cerulo. New York: Routledge.
- Dougherty, Deborah. 1992. "Interpretive Barriers to Successful Product Innovation in Large Firms." *Organization Science* 3:179–202.
- Evans, Jonathan St. B. T. 2008. "Dual-Processing Accounts of Reasoning, Judgment, and Social Cognition." *Annual Review of Psychology* 59:255–78.
- Feld, Scott L. and William C. Carter. 2002. "Detecting Measurement Bias in Respondent Reports of Personal Networks." *Social Networks* 24:365–83.
- Felson, Richard B. 1985. "Reflected Appraisal and the Development of the Self." *Social Psychology Quarterly* 48:71–78.
- Felson, Richard B. and Mark D. Reed. 1986. "Reference Groups and Self-Appraisals of Academic Ability and Performance." *Social Psychology Quarterly* 49: 103–109.
- Fiske, Susan T. and Shelley Taylor. 2007. *Social Cognition: From Brains to Culture*. New York: McGraw-Hill.
- Fleming, Lee and David M. Waguespack. 2007. "Brokerage, Boundary Spanning, and Leadership in Open Innovation Communities." *Organization Science* 18:165–80.
- Fombrun, Charles. 1983. "Attributions of Power across a Social Network." *Human Relations* 36:493–508.
- Frank, Robert H., Thomas Gilovich, and Dennis T. Regan. 1993. "The Evolution of One-Shot Cooperation: An Experiment." *Ethology and Sociobiology* 14:247–56.
- Gecas, Viktor. 1982. "The Self-Concept." *Annual Review of Sociology* 8:1–33.
- Gecas, Viktor. 2000. "Value-Identities, Self-Motives, and Social Movements." Pp. 93–109 in *Self, Identity, and Social Movements*, edited by S. Stryker, T. J. Owens, and R. W. White. Minneapolis: University of Minnesota Press.
- Goffman, Erving. 1959. *The Presentation of Self in Everyday Life*. Garden City, NY: Doubleday.
- Greenwald, Anthony G. and Mahzarin R. Banaji. 1995. "Implicit Social Cognition: Attitudes, Self-Esteem, and Stereotypes." *Psychological Review* 102:4–27.
- Greenwald, Anthony G., Debbie E. McGhee, and Jordan L. K. Schwartz. 1998. "Measuring Individual Differences in Implicit Cognition: The Implicit Association Test." *Journal of Personality and Social Psychology* 74:1464–80.
- Greenwald, Anthony G., T. Andrew Poehlman, Eric Uhlmann, and Mahzarin R. Banaji. 2009. "Understanding and Using the Implicit Association Test: III. Meta-Analysis of Predictive Validity." *Journal of Personality and Social Psychology* 97:17–41.
- Hitlin, Steven. 2003. "Values as the Core of Personal Identity: Drawing Links between Two Theories of Self." *Social Psychology Quarterly* 66:118–37.
- Hogg, Michael A. and Dominic Abrams. 2003. "Inter-group Behavior and Social Identity." Pp. 408–431 in *The Sage Handbook of Social Psychology*, edited by M. A. Hogg and D. Abrams. Thousand Oaks, CA: Sage.
- Hogg, Michael A. and Cecilia L. Ridgeway. 2003. "Social Identity: Sociological and Social Psychological Perspectives." *Social Psychology Quarterly* 66:97–100.
- Ibarra, Herminia. 1995. "Race, Opportunity, and Diversity of Social Circles in Managerial Networks." *Academy of Management Journal* 38:673–703.
- Ichiyama, Michael A. 1993. "The Reflected Appraisal Process in Small-Group Interaction." *Social Psychology Quarterly* 56:87–99.
- Inquisit 2.0.60616. 2006. [Computer software]. Seattle, WA: Millisecond Software.
- Jost, John T., Laurie A. Rudman, Irene V. Blair, Dana R. Carney, Nilanjana Dasgupta, Jack Glaser, and Curtis D. Hardin. 2009. "The Existence of Implicit Bias Is Beyond Reasonable Doubt: A Refutation of Ideological and Methodological Objections and Executive Summary of Ten Studies that No Manager Should Ignore." *Research in Organizational Behavior* 29:39–69.
- Karpinski, Andrew and James L. Hilton. 2001. "Attitudes and the Implicit Association Test." *Journal of Personality and Social Psychology* 81:774–88.
- Kilduff, Martin and David Krackhardt. 1994. "Bringing the Individual Back In: A Structural Analysis of the Internal Market for Reputation in Organizations." *Academy of Management Journal* 37:87–108.
- Krackhardt, David. 1987. "Cognitive Social Structures." *Social Networks* 9:109–134.
- Krackhardt, David. 1990. "Assessing the Political Landscape: Structure, Cognition, and Power in Organizations." *Administrative Science Quarterly* 35:342–69.
- Krackhardt, David and Martin Kilduff. 1999. "Whether Close or Far: Social Distance Effects on Perceived Balance in Friendship Networks." *Journal of Personality & Social Psychology* 76:770–82.
- Lane, Kristin A., Mahzarin R. Banaji, Brian A. Nosek, and Anthony G. Greenwald. 2007. "Understanding and Using the Implicit Association Test: IV – What We Know (So Far) About the Method." Pp. 59–102 in *Implicit Measures of Attitudes*, edited by B. Wittenbrink and N. Schwarz. New York: Guilford Press.
- Lawrence, Paul R. and Jay W. Lorsch. 1967. "Differentiation and Integration in Complex Organizations." *Administrative Science Quarterly* 12:1–47.
- Lazarsfeld, Paul F. and Robert K. Merton. 1954. "Friendship as a Social Process: A Substantive and Methodological Analysis." Pp. 18–66 in *Freedom and Control in Modern Society*, edited by M. Berger. New York: Van Nostrand.

- Lieberman, Matthew D., Johanna M. Jarcho, and Ajay B. Satpute. 2004. "Evidence-Based and Intuition-Based Self-Knowledge: An fMRI Study." *Journal of Personality and Social Psychology* 87:421–35.
- Lizardo, Omar. 2006. "How Cultural Tastes Shape Personal Networks." *American Sociological Review* 71:778–807.
- Lowery, Brian S., Curtis D. Hardin, and Stacey Sinclair. 2001. "Social Influence Effects on Automatic Racial Prejudice." *Journal of Personality and Social Psychology* 81:842–55.
- Markus, Hazel. 1977. "Self-Schemata and Processing Information about the Self." *Journal of Personality and Social Psychology* 35:63–78.
- Markus, Hazel and Ziva Kunda. 1986. "Stability and Malleability of the Self-Concept." *Journal of Personality and Social Psychology* 51:858–66.
- Martin, John Levi. 2000. "The Relation of Aggregate Statistics on Beliefs to Culture and Cognition." *Poetics* 28:5–20.
- Martin, John Levi and Matt Desmond. 2010. "Political Position and Social Knowledge." *Sociological Forum* 25:1–26.
- McCall, George J. and J. L. Simmons. 1978. *Identities and Interactions: An Examination of Human Associations in Everyday Life*. New York: Free Press.
- McLean, Paul D. 1998. "A Frame Analysis of Favor Seeking in the Renaissance: Agency, Networks, and Political Culture." *American Journal of Sociology* 104:51–91.
- McPherson, Miller, Lynn Smith-Lovin, and James M. Cook. 2001. "Birds of a Feather: Homophily in Social Networks." *Annual Review of Sociology* 27:415–44.
- Mehra, Ajay, Martin Kilduff, and Daniel J. Brass. 2001. "The Social Networks of High and Low Self-Monitors: Implications for Workplace Performance." *Administrative Science Quarterly* 46:121–46.
- Mitchell, Jason P., Brian A. Nosek, and Mahzarin R. Banaji. 2003. "Contextual Variations in Implicit Evaluation." *Journal of Experimental Psychology: General* 132:455–69.
- Miyamoto, S. Frank and Sanford M. Dornbush. 1956. "A Test of Interactionist Hypotheses of Self-Conception." *American Journal of Sociology* 61: 399–403.
- Mohr, John W. 1998. "Measuring Meaning Structures." *Annual Review of Sociology* 24:345–70.
- Morgan, David L. and Michael L. Schwalbe. 1990. "Mind and Self in Society: Linking Social Structure and Social Cognition." *Social Psychology Quarterly* 53:148–64.
- Morris, Martina, Mark S. Handcock, and David R. Hunter. 2008. "Specification of Exponential-Family Random Graph Models: Terms and Computational Aspects." *Journal of Statistical Software* 24:1–24.
- Nisbett, Richard E. and Timothy DeCamp Wilson. 1977. "Telling More Than We Can Know: Verbal Reports on Mental Processes." *Psychological Review* 84:231–59.
- Obstfeld, David. 2005. "Social Networks, the *Tertius Lungen* Orientation, and Involvement in Innovation." *Administrative Science Quarterly* 50:100–130.
- O'Malley, James A. and Peter V. Marsden. 2008. "The Analysis of Social Networks." *Health Services and Outcomes Research Methodology* 8:222–69.
- Pachucki, Mark A. and Ronald L. Breiger. 2010. "Cultural Holes: Beyond Relationality in Social Networks and Culture." *Annual Review of Sociology* 36:205–224.
- Quillian, Lincoln. 2006. "New Approaches to Understanding Racial Prejudice and Discrimination." *Annual Review of Sociology* 32:299–328.
- Reynolds, Larry T. and Nancy J. Herman-Kinney. 2003. *Handbook of Symbolic Interactionism*. Walnut Creek, CA: AltaMira Press.
- Robins, Garry, Pip Pattison, Yuval Kalish, and Dean Lusher. 2007. "An Introduction to Exponential Random Graph ( $p^*$ ) Models for Social Networks." *Social Networks* 29:173–91.
- Robins, Garry, Pip Pattison, and Peng Wang. 2009. "Closure, Connectivity and Degrees: New Specifications for Exponential Random Graph ( $p^*$ ) Models for Directed Social Networks." *Social Networks* 31:105–117.
- Rosenberg, Morris. 1979. *Conceiving the Self*. New York: Basic Books.
- Schein, Edgar H. 1985. *Organizational Culture and Leadership*. San Francisco: Jossey-Bass.
- Schnabel, Konrad, Jens B. Asendorpf, and Anthony G. Greenwald. 2008. "Using Implicit Association Tests for the Assessment of Implicit Personality Self-Concept." Pp. 508–528 in *The Sage Handbook of Personality Theory and Assessment*, Vol. 1, edited by G. J. Boyle, G. Matthews, and H. Saklofske. London: Sage.
- Schwarz, Norbert. 1998. "Warmer and More Social: Recent Developments in Cognitive Social Psychology." *Annual Review of Sociology* 24:239–64.
- Shah, James. 2003. "Automatic for the People: How Representations of Significant Others Implicitly Affect Goal Pursuit." *Journal of Personality and Social Psychology* 84:661–81.
- Snijders, Tom A. B., Philippa E. Pattison, Garry L. Robins, and Mark S. Handcock. 2006. "New Specifications for Exponential Random Graph Models." *Sociological Methodology* 36:99–153.
- Steglich, Christian, Tom A. B. Snijders, and Patrick West. 2006. "Applying SIENA: An Illustrative Analysis of the Coevolution of Adolescents' Friendship Networks, Taste in Music, and Alcohol Consumption." *Methodology: European Journal of*

- Research Methods for the Behavioral and Social Sciences* 2:48–56.
- Stryker, Sheldon. 1987. "The Revitalization of Symbolic Interactionism." *Social Psychology Quarterly* 50:83–94.
- Stryker, Sheldon and Peter J. Burke. 2000. "The Past, Present, and Future of an Identity Theory." *Social Psychology Quarterly* 63:284–97.
- Swidler, Ann. 1986. "Culture in Action: Symbols and Strategies." *American Sociological Review* 51:273–86.
- Swidler, Ann. 2001. *Talk of Love*. Chicago: University of Chicago Press.
- Tetlock, Philip E. and Gregory Mitchell. 2009. "Implicit Bias and Accountability Systems: What Must Organizations Do to Prevent Discrimination?" *Research in Organizational Behavior* 29:3–38.
- Thomas, Kenneth W. and Ralph H. Kilmann. 1975. "The Social Desirability Variable in Organizational Research: An Alternative Explanation for Reported Findings." *Academy of Management Journal* 18:741–52.
- Thompson, James D. 1967. *Organizations in Action: Social Science Bases of Administrative Theory*. New York: McGraw-Hill.
- Totterdell, Peter, David Holman, and Amy Hukin. 2008. "Social Networkers: Measuring and Examining Individual Differences in Propensity to Connect with Others." *Social Networks* 30:283–96.
- Tsai, Wenpin. 2002. "Social Structure of 'Coopetition' within a Multiunit Organization: Coordination, Competition, and Intraorganizational Knowledge Sharing." *Organization Science* 13:179–90.
- Tsai, Wenpin and Sumantra Ghoshal. 1998. "Social Capital and Value Creation: The Role of Intrafirm Networks." *Academy of Management Journal* 41:464–76.
- Vaisey, Stephen. 2009. "Motivation and Justification: A Dual-Process Model of Culture in Action." *American Journal of Sociology* 114:1675–1715.
- Vaisey, Stephen and Omar Lizardo. 2010. "Can Cultural Worldviews Influence Network Composition." *Social Forces* 88:1595–1618.
- Wagner, John A. 1995. "Studies of Individualism-Collectivism: Effects of Cooperation in Groups." *Academy of Management Journal* 38:152–72.
- Wagner, John A. and Michael K. Moch. 1986. "Individualism-Collectivism: Concept and Measure." *Group and Organization Management* 11:280–303.
- Walker, Gordon. 1985. "Network Position and Cognition in a Computer Software Firm." *Administrative Science Quarterly* 30:103–130.
- Walton, Richard E. and John M. Dutton. 1969. "The Management of Interdepartmental Conflict: A Model and Review." *Administrative Science Quarterly* 14:73–84.
- Wang, Peng, Garry Robins, and Philippa Pattison. 2008. "PNet: Program for the Simulation and Estimation of P\* Exponential Random Graph Models." Department of Psychology, University of Melbourne, Australia.
- Wittenbrink, Bernd and Norbert Schwarz. 2007. "Introduction." Pp. 1–16 in *Implicit Measures of Attitudes*, edited by B. Wittenbrink and N. Schwarz. New York: Guilford Press.
- Yeung, King-To and John Levi Martin. 2003. "The Looking Glass Self: An Empirical Test and Elaboration." *Social Forces* 81:843–81.
- Zemljic, Barbara and Valentina Hlebec. 2005. "Reliability of Measures of Centrality and Prominence." *Social Networks* 27:73–88.

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