Seeing Social Structure:
Assessing the Accuracy of Interpersonal Judgments about Social Networks[1]

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Abstract

Sociological research has long recognized that, even in brief or routine interactions, people constantly make judgments about others' social worlds and that these inferences have material consequences in contexts as diverse as hiring, venture capital funding, and courtship encounters. Yet it remains unclear whether people are accurate in making these interpersonal judgments and, if so, how far they can "see" into the social structure surrounding unfamiliar others. We draw on the "thin slicing" paradigm from social psychology to assess how accurate people are in making inferences about the social networks of unfamiliar others. Our data set includes over 2,100 interpersonal judgments made by 375 people about the social networks of 23 male and female targets. We find that people can make accurate judgments about unknown others' proximate social structure—that is, the size and composition of targets' reported contacts. They do not, however, make accurate judgments of more distal features of social structure—that is, the nature of connections among targets' reported contacts. We also find that people's judgment errors are broadly consistent with gender stereotypes. We conclude with a discussion of this work's implications for research on cognition and social structure, and on the antecedents of gender inequality.

INTRODUCTION AND THEORETICAL BACKGROUND

Tracing back to classical accounts of social interaction, sociologists have long recognized that, even in fleeting or routine interactions, people constantly make judgments about others' social worlds (Cooley [1902] 1983; Goffman 1959; Mead 1934). The inferences that people make of others' positions in social structure can have material consequences in contexts as diverse as hiring (e.g., Rivera 2012), venture capital funding (e.g., Shane and Cable 2002), and brief courtship encounters (McFarland, Jurafsky, and Rawlings 2014). Often, these interpersonal judgments are made of unfamiliar others—that is, people about whom one lacks direct and deep knowledge (Casciaro and Lobo 2008; Huang and Pearce 2015; Feinberg, Willer, and Keltner 2012).

Such judgments are possible because people routinely reveal—sometimes on purpose and other times without awareness or control—information about themselves through automatically expressed gestures, speech patterns, physical mannerisms, and other forms of expressive behavior. These "leakages" that people routinely convey—and others' interpretations of them—have long taken center stage in sociological accounts of social relations. For example, Elias ([1939] 2000) describes how people send and interpret signals about one another's social milieu through the adoption and enforcement of etiquette.

The leaking of social cues and others' interpretations of these leakages are central to Bourdieu's (1984) conception of the habitus. Bourdieu proposes that people internalize and embody the social world around them, such that their position in social structure becomes ossified in the form of their dispositions, mannerisms, and interpersonal style. Bourdieu argues that the habitus originates from within the mind and manifests in the body to provide a person with unconscious strategies, perceptions, classification systems, and practical rationalizations (Bourdieu and Wacquant 1992; Lizardo 2004, 2010).

Because of the recursive relationship between a person's habitus and the social world that gives rise to it, alignment between the cognitive structures in one's mind and environment enables better interpretation, classification, and meaning assignment within a given environment (Bourdieu and Wacquant 1992; Zerubavel 1991). In this respect, the habitus is assumed to bridge the objective world surrounding an individual with her subjective experience of the social world. Although this theoretical perspective has proven influential and garnered a great deal of attention in cultural sociology (Lamont 1992; Lizardo 2004; Bourdieu and Wacquant 1992; Lareau 2011), it rests on a foundation of untested assumptions about the accuracy of interpersonal judgments about others' social worlds, including judgments about their social networks.

Bourdieu (1984: 243), for example, asserts that the "spontaneous decoding of one habitus by another is the basis of the immediate affinities which orient social encounters, discouraging socially discordant relationships, encouraging well-matched relationships, without these operations ever having to be formulated other than in the socially innocent language of likes and dislikes." Yet we have heretofore lacked empirical evidence about this ability to decode the habitus of another and make accurate judgments about the nature of the others' social relations.

Separately, a robust literature in social psychology has examined the extent to which people can accurately perceive the personal characteristics of unfamiliar others based on momentary observations of their speech patterns and nonverbal mannerisms using videotapes or photographs (Ambady and Rosenthal 1992; DePaulo 1992; Feinberg, Willer, and Keltner 2012). In fact, researchers have identified specific parts of the brain that are solely dedicated to making sense of other people (Mitchell et al. 2005). Not only are such judgments about unfamiliar others quick, automatic, and effortless, they often accurately reflect others' traits, states, and intentions (Bargh 1994). For example, people can accurately determine others'

feelings of happiness, sadness, anger, or fear (Ekman 1993); personality traits such as agreeableness, conscientiousness, and extraversion (Borkenau and Leibler 1993, 1995; Carney, Colvin, and Hall 2007; Gifford 1994; Funder 1995; Ickes 1993; Kenny 199); sexual orientation (Rule et al. 2008; Rule, Ambady, and Hallett 2009); and intelligence (Murphy, Hall, and Colvin 2003), to name a few. This literature has, however, stopped short of examining whether one's ability to make accurate inferences about others based on brief observations of expressive behavior extends not only to their personal characteristics but also to the social worlds in which they are embedded.

Prior work on cognition and social networks provides tantalizing hints that people have some capacity to make accurate judgments about others' social networks and that these assessments can have important consequences for attainment. For example, Kilduff and Krackhardt (1994) report that measures of perceived network relations are more closely tied to a person's performance reputation in an organization than are measures of actual network relations. Similarly, Krackhardt (1990) reports that people who hold an accurate picture of the informal network structure in an organization are more likely to occupy positions of power than are those with inaccurate renderings. Yet this line of work has focused on the accuracy of cognition about *aggregate* network structure among a set of *known* contacts (for a review, see Kilduff and Krackhardt [2008]). To our knowledge, no prior studies have examined the correctness or fallibility of interpersonal judgments about the social networks of *individuals* who are *unknown* to the perceiver. Thus, it remains unclear whether and how far people can "see" into the social structure that surrounds unfamiliar others. Insofar as people make errors in such judgments, we also do not know whether these errors are systematically biased—for example, based on stereotypes that people may hold about the targets they are evaluating and the social categories (e.g., gender, race) to which they belong.[i]

To make initial headway on this broader agenda, we fuse sociological insights about interpersonal judgments with the "thin slice" toolkit from social psychology to address the specific question: How accurate are the inferences that people draw about the social networks of unfamiliar others whom they observe only fleetingly? The thin slicing research paradigm is designed to simulate brief moments of "sociability," absent any instrumental motives, when, across a variety of contexts, people make judgments about others. The main thrust of this paradigm involves asking perceivers to judge targets based on brief exposure to targets' behavior (i.e., a "thin slice" of their stream of behavior). The thin slices paradigm rests on the bedrock assumption that people express who they are, what they think, how they feel, and what their future intentions are through both verbal and nonverbal behavior. Typically, this paradigm utilizes short video clips, audio segments, or pictures to investigate the extent to which other people can make accurate judgments about unfamiliar others (e.g., Ambady, Hallahan, and Rosenthal 1995; Ambady and Rosenthal 1993; Ambady, Hallahan and Conner 1999; Funder 1987; Ickes 1993; Kenny 1994, 1991).[ii] Extending this paradigm to the realm of social networks, we compiled a data set that includes over 2,100 interpersonal judgments made by 375 perceivers of the social networks of 23 targets.

We examine the accuracy of perceivers' assessments of, or their ability to decode, the proximal social structure surrounding a target—measured by the size, gender composition, and kinship composition of reported contacts—and of the distal social structure in which a target is embedded—measured by network constraint (Burt 1992). We focus on characteristics of others' positions in social structure to test theoretical claims that these fast and automatic judgments help establish relationships between people and contribute to broad social order (Bourdieu and Wacquant 1992). In cases where perceivers make inaccurate judgments of targets' networks, we also explore the extent to which errors are systematically biased. Because gender is a ubiquitous frame through which people view social interactions

(Markus et al. 1982; Ridgeway 1997, 2011; Ridgeway and Correll 2004), we analyze the extent to which errors in judgment about others' social networks conform to prevailing gender stereotypes.

Stereotypes—widely shared cultural beliefs that are either housed in the unconscious or consciously accessible—provide rules for enacting social relations. Insofar as people hold stereotypes about the number and composition of relationships that men and women tend to build, such perceptions may reinforce or exacerbate network-based inequality. In particular, we examine four stereotypical expectations about women's networks, relative to men's. First, given their greater tendency toward sociability and social support, as well as their communal orientation (Eagly 2009; Moore 1990; Wellman and Wortley 1990), we anticipate that perceivers will be more likely to err in assuming that women, rather than men, have larger networks than they actually do. Second, given the baseline tendency toward gender homophily, to which women are especially prone in many contexts (Ibarra 1992; Marsden 1988; Rogers and Kincaid 1981; for a review, see McPherson, Smith-Lovin, and Cook [2001]), we expect that perceivers will be more likely to err in thinking that women, rather than men, have a greater proportion of ties to other women than they actually do. Third, because they have traditionally played the role of "kin-keepers" (Marsden 1987; Moore 1990) in extended family relations, we presume that perceivers will be more likely to err in believing that women, rather than men, have a greater proportion of kinship ties than they actually do. Finally, because positions of brokerage are often associated with power, which tends to be associated with men rather than with women (Brands and Kilduff 2013; Kanter 1977; Ridgeway 2011), we expect that perceivers will be more likely to err in assessing the networks of women, rather than men, as being more constrained than they actually are.

To preview our results, we find that perceivers are accurate in their judgments of size, gender composition, and kinship composition of targets' reported contacts. In other words,

people appear to be capable of "seeing" the proximate social structure that surrounds others. We find, however, that perceivers are not accurate in their judgments of network constraint, which requires an understanding of how a target's reported contacts are themselves connected to each other. Thus, it appears that people are not capable of "seeing" the distal social structure in which others are embedded. We also report evidence that, when people make errors, their misjudgments about others' networks conform to prevailing gender stereotypes. We discuss below the implications of these findings for research on the interrelationships between cognition and social structure and on the antecedents of gender inequality.

METHODS

Data Collection—Overview

There were two main components of our data collection effort. First, we produced thin slice video content for, and assessed the personal and social network characteristics of, 23 target individuals. Second, at a later time, we recruited a second set of perceivers to view the videos for a subset of targets, assess targets' social network characteristics, and provide information about their own personal and network characteristics. We selected perceivers who had no preexisting relationship to the targets to ensure that interpersonal judgments were based on social cues "given off" by targets in their video presentations rather than on personal or reputational knowledge that perceivers might have had about targets (Goffman 1959; Funder and Colvin 1988).

Data Collection—Targets

We recruited 23 participants (57% female; average age of 25, ranging from 19 to 38) into an experimental laboratory at a west coast university to serve as targets for the study. To reduce variation in accuracy stemming from possible differences in perceivers' ability to read

social cues across different racial groups, we recruited only white participants as targets. Targets were paid $15 for a one-hour study.

Targets began by completing an ego-centric network survey that we assume represented their actual social network. Although people may not accurately recall whom they interact with on a given day (see Bernard et al. [1984] for a review), Freeman, Romney, and Freeman (1987) show that people are quite capable of recounting enduring patterns of relations. Thus, responses to an ego-centric network survey can be taken as a valid proxy for a target's actual network.

We used a standard name-generator question (Burt 1984): "From time to time, most people discuss important matters with other people. Looking back over the last six months, who are the people with whom you discussed matters important to you?" Targets could list up to eight contacts.[iii] They then indicated the gender of each person they named and their relationship to the person (i.e., spouse, other family member, friend, professional contact, or other). Finally, we asked targets to identify which of their contacts had close or very close relationships with one another. We used this matrix of interrelationships to calculate each target's network constraint (described in greater detail below).

Next, targets generated thin slice video content about themselves using a video recording tool that was embedded in the survey. We presented targets with five questions that were designed to get them to speak and act in an authentic, natural and casual manner. In thinking about this design, we focused on capturing targets' expressive behavior that is dependent upon enduring qualities of a person, rather than temporary or external factors of the situation. Because social judgments are primarily enabled through informal interactions, we sought to create for each target a site of "sociability" that was explicitly dissociated from economic, business, or instrumental pursuits (Simmel and Hughes 1949; Weber 1994). Because videos are more likely to contain information that people use to encode the fluid

behavior they observe in others, and following standard practice in the thin slicing literature, we opted to use videos rather than still frames (Ambady, Bernieri, and Richeson 2000).

Also in line with the typical approach used in thin slicing research, we chose five broad, open-ended questions designed to prompt targets to express themselves freely. We asked targets to make video recordings of themselves responding to these questions: (1) "How would you describe yourself?" (2) "Can you describe how you like to cook or prepare eggs for yourself or others?" (3) "Do you have any advice about how to best prepare for a job interview?" (4) "Imagine that scientists found life on 3 other planets! Elon Musk, the CEO of SpaceX, is now selling reasonably priced tickets on daily shuttles to other planets. Passports are being issued for travel into space. What do you do?", and (5) "Some people say that the best leaders are the ones that don't want to lead at all. What do you think about that?"

Targets produced videos ranging in length from one minute and three seconds to two minutes and five seconds. Extant thin slicing literature typically uses slices ranging from two seconds to five minutes so we designed our slices with this range in mind. Again following standard practice in the thin slicing literature, we took the first twenty seconds of a target's response to each question and combined these segments to create a montage with an average length of approximately two minutes (Ambady et al. 2000; Carney et al. 2007). Table 1 provides the responses to thin slice generating questions from three randomly selected targets.

***** Table 1 about here *****

To rule out the possibility that perceivers' judgments about targets' networks were based on personal characteristics that are merely correlated with social network characteristics—for example, to account for the possibility that extraverts *actually* have more contacts and also *seem* to others like they have more contacts—we also asked targets to complete the Big Five Inventory: 44 items that measure the five core personality traits of

extraversion, agreeableness, openness, conscientiousness, and neuroticism (John, Donahue, and Kentle 1991; John, Naumann, and Soto 2008). Targets concluded by providing demographic information such as their age, nationality, sex, race, marital status, and sexual orientation.

Data Collection—Perceivers

We recruited 381 participants (63% female; mean age of 22) at a west coast university into an experimental laboratory to serve as perceivers for the study. Although all targets were white, we were unable to fully standardize the race of target-perceiver pairs since it was not possible to recruit only white perceivers. The racial mix of perceivers was: 58% Asian, 35% White, 10% Hispanic, and 2% Black. (Note that the sum is greater than 100 because perceivers were able to select multiple racial categories). In supplemental analyses (not reported), we estimated models that included perceiver race as a control and that yielded comparable results to the ones reported below.

Each perceiver spent about an hour making various judgments about targets based on their brief video clips. Six participants did not finish the session and were therefore excluded from the final analysis, resulting in a final sample size of 375 perceivers, who were each paid $15. Given time constraints and following Carney et al. (2007), we asked each perceiver to view and make judgments about the videos of a subset of targets (5.8 targets on average). We randomized the order in which targets' videos were presented for each perceiver.

Our key variables of interest were based on perceivers' perceptions of targets' social networks. To reduce the cognitive burden on perceivers, we used visual network scales wherever possible (Mehra et al. 2014). For example, rather than having perceivers estimate the percentage of a target's contacts that are female, we hired a cartoonist to draw stylized images of networks that vary in gender composition. Figure 1 provides an example of this visual network scale. Although the visual scale provided anchors in the form of the network

pictures depicted in Figure 1, perceivers used a slider scale to indicate the proportion of female contacts in a given target's network. Thus, perceivers' assessments were based on a continuous measure and compatible with the measure used in targets' self-reports.

***** Figure 1 about here *****

Figure 2 shows the visual network scale we provided perceivers to assess network constraint in targets' networks. Perceivers were asked to indicate which of the network diagrams best approximated the degree of interconnected in a given target's network. We calculated the network constraint measure corresponding to each point in the visual scale, assuming no difference in the intensity of ties depicted.

***** Figure 2 about here *****

Perceivers made two kinds of judgments about targets: (1) their proximate social structure, as reflected in the size and gender and kinship composition of their reported network; and (2) their distal social structure, as indicated by the extent to which their reported contacts were themselves connected to each other. After making these assessments, perceivers completed an ego-centric network survey and the Big Five Inventory for themselves and provided information about their own demographic background. These data enabled us to examine whether the accuracy of perceivers' perceptions were a function of their own personal or social characteristics.

Dependent Variables

Our main dependent variable focuses on the accuracy of perceivers' judgments about the network characteristics of targets whose videos they were assigned to view and evaluate. Using "profile correlations," a procedure widely used in thin slicing research, we calculated accuracy scores across the four social network characteristics—size, gender composition, kinship composition, and constraint—that each perceiver assessed across all targets that were assigned to that perceiver (Carney et al. 2007; Hall, Bernieri, and Carney 2005). Network size

was based on a straight count of reported contacts. Network composition was based on the proportion of male versus female contacts reported and the proportion of kinship ties versus non-kinship ties reported. For constraint, we used Burt's (1992) standard measure:

$$C_i = \sum_j c_{ij},\ i \neq j \quad (1)$$

where C_i is network constraint on target i, and c_{ij} is a measure of i's dependence on contact j.

$$c_{ij} = (p_{ij} + \sum_q p_{iq}p_{qj})^2,\ i \neq q \neq j \quad (2)$$

where p_{ij} is the proportion of target i's social network invested in contact j,

$p_{ij} = z_{ij} / \sum_q z_{iq}$, and

z_{ij} measures the strength of connection between contacts i and j.

In line with prior work (Ambady et al. 2000; Funder 1987), we operationalized accuracy as the correlation between perceivers' perceptions about a particular network characteristic and targets' actual self-reports about the same characteristic. We then calculated the Pearson's correlation coefficient between perceivers' judgments and targets' self-reports, taking into account that each perceiver judged multiple targets.

Following the thin slices paradigm, an accuracy score not significantly different from zero indicates no correlation, or no systematic variation, between perceivers' judgments and targets' self-reports about a particular network characteristic. It suggests that perceivers were not accurate in drawing inferences about that feature of the target's network. By contrast, a score significantly greater than zero indicates a positive relationship between perceivers' judgments and targets' self-reports. In other words, an accuracy score significantly greater than zero suggests positive alignment between perceivers' judgments of a target's network characteristic and the target's self-report of the same characteristic (which we assume to approximate the truth). Note that it is possible to obtain a negative profile correlation, which,

suggests that a judgment is inversely related to an actual target's characteristics. A negative correlation can occur when a naïve perceiver has an inaccurate implicit theory about a particular behavioral tendency, for example, such as thinking that liars "look away" from the person to whom they are lying (Hartwig and Bond 2011). In fact, liars do not look away: they are much more likely to make excessive eye contact. When perceivers hold the prevailing stereotype that liars avoid eye contact when lying, their accuracy scores about when targets are lying or telling the truth are typically negative.

Our second dependent variable considers the (directional) errors of perceivers' judgments. We derived our measure of perceivers' errors by subtracting targets' self-reported network measures from each perceiver's assessments. We used directional errors because they allowed us to examine the extent to which the errors conformed to prevailing gender stereotypes. For example, to assess whether perceivers' judgments of the proportion of kinship ties in a target's network are consistent with the stereotype of women as "kin-keepers" (Moore 1990), we subtracted the actual proportion of kinship ties targets reported having from the proportion that perceivers ascribed to each target. If perceivers were more likely to make "positive" errors (i.e., to assume a greater proportion of kinship ties than actually exist) for female targets than for male targets, it would indicate that their errors were consistent with the "kin-keeper" gender stereotype.

Control Variables

A growing body of evidence documents the ways in which personal characteristics such as gender, age, and personality traits are related to social network characteristics (e.g., Burt, Kilduff, and Tasselli 2013). To account for the possibility that perceivers were merely making accurate interpersonal judgments about targets' personal characteristics (e.g., gender, age, and extraversion), which just happened to be correlated with social network characteristics (e.g., network size), we included targets' gender, age, and Big Five personality

traits as control variables in supplemental analyses described below. We also conducted supplemental analyses in which we controlled for the personal and social network characteristics of the perceivers themselves. Our results were substantially unchanged when we included either set of control variables. We report the former set of results below. The latter are available upon request but not reported for the sake of brevity.

Analyses

To assess the accuracy of perceivers' judgments about targets' social network characteristics, we conducted one-sample t-tests to test whether the mean of perceivers' accuracy scores for different social network characteristics was greater than zero. As noted above, the null is that perceivers' accuracy is no different from zero, meaning that there is no relationship between interpersonal judgments and targets' actual social networks. Although our hypothesis about accuracy is directional (i.e., greater than zero), we conservatively report two-tailed tests. Figure 3 provides a visual representation of this analytical approach.

***** Figure 3 about here *****

To evaluate the accuracy of perceivers' judgments of targets' network characteristics net of targets' personal characteristics, we conducted supplemental ordinary least squares regressions of accuracy in which we controlled for targets' gender, age, and Big Five personality traits and, separately, for perceivers' Big Five personality and social network characteristics. Because perceivers made multiple judgments across targets, we clustered standard errors in these models by perceiver.

Similarly, our analyses of (directional) errors are based on ordinary least squares regressions in which we include the target's gender as a covariate. We estimate these models with and without controls for targets' Big Five personality traits and perceivers' Big Five personality and social network traits. In these models, we again clustered standard errors by perceiver to account for the fact that each perceiver assessed multiple targets.

RESULTS

Table 2 reports descriptive statistics for both targets' actual social network characteristics and perceivers' judgments of targets for four characteristics of social networks: network size, proportion of male ties, proportion of kinship ties, and network constraint. The first and second columns report targets' actual social network characteristics and perceivers' perceptions of social networks, respectively.

***** Table 2 about here *****

Table 3 reports results of t-tests evaluating whether the perceivers' mean accuracy scores about targets' social network characteristics were greater than zero. If a perceiver provided the same judgment value for a social network characteristic across targets, we were unable to calculate an accuracy score for that social network characteristic (due to a lack of variance). For this reason, the sample size of perceivers' judgments varied slightly across social network characteristics.

For accuracy about network size of a target, scores ranged from -0.96 to 0.97, with a mean of .09. For accuracy about the gender composition of targets' networks, measured as proportion of male contacts, values ranged from -0.84 to 1, with a mean of .33. Accuracy about the proportion of kinship ties ranged from -0.94 to 0.97 and the mean was .07. The t-statistics for network size, proportion of kinship ties, and proportion of male ties were all greater than zero and highly significant ($p < .001$), providing strong and consistent evidence that people can be accurate when making judgments about these social network characteristics of unfamiliar others, based only on thin slice observations of them.

To put these accuracy scores in context, we compared our findings with other published research on accuracy scores of personal, rather than social, characteristics. The accuracy scores reported here fall in the lower end of the range identified in prior research,

.04 to .55, when perceivers were asked to make predictions about targets' personality traits, such as the Big Five (Ambady et al. 2000; Carney et al. 2007). The ability to be make accurate judgments about personality characteristics relies, in part, on the availability of valid and observable cues (Funder 2001). Thus, it is not surprising that accuracy scores based on more directly observable personal characteristics, such as extraversion, tend to be higher than the ones we report on social network characteristics (Funder and Sneed 1993).

By contrast, the t-test of the accuracy of judgments about the degree of constraint in others' networks suggests that there are limits to which people can see into the social worlds of others. Accuracy scores for network constraint ranged from -0.99 to 0.93, with a mean of -0.01. The test statistic for network constraint accuracy was -0.42 and not significant. Our results indicate that, although people appear to be able to make accurate judgments about others' proximate social structure, they are inaccurate when making judgments about the distal social structure—defined by the nature of connections among a target's reported contacts.

***** Table 3 about here *****

Table 4 reports results of regressions of accuracy scores on targets' gender, age, and Big Five personality traits. These models allow us to assess the accuracy of interpersonal judgments about social networks net of gender, age, and personality traits such as extraversion that are known to be associated with the nature and size of networks that people tend to build. In these models, we mean-centered all five target personality variables such that the intercept represented perceivers' accuracy scores for a target at the mean of all five personality variables. In Table 4, we report the intercept and corresponding confidence intervals from these models. The results are consistent with those reported in Table 3 and suggest that, even accounting for the targets' gender, age, and personality traits, perceivers can make accurate judgments about the size and composition of the networks of unfamiliar

others. They are not, however, able to make accurate judgments about the nature of connections among targets' reported contacts. In the specification shown in Table 4, perceivers' accuracy scores about targets' network constraint is negative and significant. This means that perceivers are, in fact, inaccurate when assessing network constraint of unfamiliar others. While the negative sign of the intercept for accuracy about network constraint is consistent across various model specifications, the significance level is highly dependent on the choice of specification. In most model specifications, the intercept for network constraint is either not significant or marginally significant. As a robustness check to account for concerns about the normality of the distribution of accuracy scores, we transformed all four accuracy score dependent variables into Fisher's-z coefficients and ran the same models. The results of these additional analyses (not reported) are consistent with those reported in Table 4.

***** Table 4 about here *****

Table 5 reports results of regressions of errors in judgments on target gender (where 1 = female). Because these errors are directional, we focus on not only the significance of the *Female* variable but also the sign of the coefficient. For example, a positive and significant coefficient for *Female* in the model of errors in judgments about network size indicates that perceivers were more likely to err in assuming that women, rather than men, have larger networks than they actually do. By contrast, a negative and significant coefficient suggests that perceivers were more likely to make errors in the opposite direction.

If perceivers' errors are influenced by prevailing gender stereotypes about social networks, we would anticipate that the *Female* coefficient would be positive and significant for network size, proportion of kinship ties, and constraint. In contrast, we would predict that the *Female* coefficient would be negative and significant for the proportion of male contacts. That is, perceivers would err in assuming that women, rather than men, have larger, more

kinship dominated, more gender homophilous, and more constrained networks than they actually do.

Table 5 reports results of regressions that predict the magnitude and the direction of the error of perceivers' errors in judgment. Across all four network characteristics, *Female* is a significant covariate,. For three network characteristics—size, proportion kinship ties, and constraint—*Female* is positive and significant. It is negative and significant in the case of proportion male ties. Thus, there is support for the proposition that, when people err in the judgments they make about others' social networks, those errors are indeed influenced by widely shared gender stereotypes.

***** Table 5 about here *****

As a follow-up to these findings, we explored whether the gender of the perceiver influenced the extent to which they make errors about targets' networks. For errors about targets' network size, the proportion of kinship ties, and constraint, we found no statistically significant differences between male and female perceivers. These results are consistent with the view that both men and women are influenced by gender stereotypes when they make errors in their interpersonal judgments about others' social networks. The gender of the perceiver did appear to affect errors in judgment about gender homophily. Male perceivers were significantly more likely than female perceivers to assume that female targets' networks were more gender homophilous than they actually were ($p < .05$).

DISCUSSION AND CONCLUSION

The goal of this study has been to assess the extent to which people can "see" the social structure that surrounds unknown others. We did so by drawing upon the tools of the thin slice research paradigm in social psychology (e.g., Ambady and Rosenthal 1992). Our findings indicate that people appear to be capable of making accurate judgments about the

proximate social structure in which unfamiliar others are embedded. In particular, judgments about network size and composition, in terms of gender and kinship ties, can be accurately assessed—even after controlling for the personality traits of targets. At the same time, our results suggest people are not capable of accurately assessing the distal social structure, as measured by network constraint, surrounding unfamiliar others.

When people make errors in judgments of others' social networks, we also find evidence that these errors are "framed by gender" (Ridgeway 2011)—that is, the errors hew to prevailing gender stereotypes about networks. People are more likely to err in assuming that women—rather than men—have larger, more gender homophilous, more kinship-oriented, and more constrained networks than they actually do. The tendency to incorrectly assume that women's networks are more gender homophilous than they actually are appears to be greater among men than among women.

These findings raise an important unanswered question: How can people "see" social structure surrounding others when they do not directly observe others' network ties? We believe that the answer lies in particular forms of nonverbal communication that are correlated with network patterns. Support for this contention comes from two distinct theoretical traditions within social psychology. The first—the Brunswickian lens model—suggests that meaningful individual differences can be reliably judged by naïve perceivers because these characteristics have a particular behavioral (verbal and nonverbal) signature (Brunswick 1952). The second—the social-functional tradition—proposes that behaviors are themselves strategic manifestations of a person's intention to shape others' perceptions (Fridlund 1992; Keltner and Kring 1998).

These two traditions jointly account for the fact that people can, for example, gauge extraversion by observing others' patterns of smiling, their pace of delivery, and the manner in which they make gestures (Asendorpf 1987; Funder and Sneed 1993). Similarly, a lack of

self-conscious emotions or an expansive posture can signal manipulation and emotional detachment, which are linked to the psychological trait of Machiavellianism (ten Brinke et al. 2016). Moreover, such verbal and nonverbal cues have also been shown to aid in the accuracy of interpersonal judgments that people make of others (Rogers, ten Brinke, and Carney 2016). It remains to be explored which specific verbal and nonverbal cues most contribute to the accuracy of interpersonal judgments that people make about others' social networks and which cues lead to errors that are consistent with prevailing stereotypes.

Contributions

The findings from this study make four main contributions. First, two core assumptions underlying many prominent theories of social interaction—ranging from Bourdieu's (1984) construct of the habitus to Goffman's (1959) account of impression management—are that: (1) people routinely leak information about their place in social structure to others through bodily operations, ordinary behaviors, and mannerisms; and (2) others—even if they are strangers—can draw accurate inferences based on these social cues. In fact, all sociological theories of cultural sociology have made implicit and even explicit assumptions about people's underlying cognitive processes (Carley 1989; Lizardo and Strand 2010; Vaisey 2008). Yet, within sociology, the evidence in support of many of these assumptions has been at best indirect. To our knowledge, this study provides the first direct test of a core set of these assumptions, focusing on social structure as manifested in the networks that surround unfamiliar others. We dedicate our attention to commonplace judgments about others' positions in social structure because "behind them lies the whole social order" (Bourdieu 1984: 468). Our results indicate partial support for the assumptions in that information about a person's proximate structure can be accurately conveyed to and perceived by others; however, information about a person's distal structure cannot be

accurately perceived by others even if it is "given off" in their self-presentation (Goffman 1959).

In uncovering this partial evidence, we open the door for new avenues of inquiry about the conditions and contexts in which people can accurately read cues about others' positions in social structure. For example, how does the accuracy of judgments about network characteristics vary when judgments are made across racial and class lines? Because such cues act as "the symbolic coordinates that differentiate lifestyles across the social landscape," answers to this question could shed new light on the links between culture and stratification (Lizardo 2010: 305). In addition, the thin slice paradigm could be extended to consider other facets of social structure that are not manifested in social networks. For example, to what extent can people read cues about a person's social trajectory—for example, whether they have experienced upward versus downward social mobility?

Second, our results point to a previously unexamined source of variation in people's ability to navigate and exert agency within social structure (Emirbayer and Goodwin 1994; Fligstein and McAdam 2012; Gulati and Srivastava 2014). In particular, we find considerable variation in perceivers' ability to draw accurate inferences about the networks of unfamiliar others. In other words, people vary in their ability to "see" into others' social worlds. Further work is needed to examine whether people with this capacity are able to avoid the costly errors of stereotyping and make more strategic choices about which network ties to form, activate, or let decay. The thin slice toolkit potentially provides a promising means to more systematically measuring and comparing this capacity across individuals and groups.

A third contribution is to the thin slice research paradigm itself. Research on social perception in social psychology and social cognition shows that people can make remarkably accurate judgments about a variety of personal characteristics ranging from personality traits to teacher effectiveness to patient satisfaction with physicians (Ambady and Rosenthal 1993;

Carney et al. 2007; Hall, Roter, and Rand 1981). People can also draw accurate inferences about unknown others' socioeconomic status (Kraus and Keltner 2009). While the specific socioeconomic strata from which a person comes is closer to social structure than, say, an emotional state like happiness, the findings presented here are a substantial theoretical advancement.

The current work implies that we do more than simply assess a person's internal qualities (e.g., How happy is she? How rich and educated is she? How dominant is he? How extraverted is he?). Instead, these data suggest that we make assessments of people, their personal qualities, and the social structure that surrounds them. These judgments matter when a person is deciding whom to befriend, hire, sit next to, invest in, or take on as a graduate student. In other words, in our daily social behaviors, we reveal and leak cues not only about our thoughts and feelings but also social facts such as how many friends we have, how close we are to our family, and how diverse our network contacts are.

Finally, we believe that this work may inform our understanding of one of the cognitive antecedents of gender bias (Correll, Benard, and Paik 2007; Duguid, Loyd, and Tolbert 2012; Ellemers et al. 2004; Heilman and Haynes 2005; Ridgeway 1997; Srivastava and Sherman 2015; Steinpreis, Anders, and Ritzke 1999). Widely shared cultural beliefs based on the category of gender are powered by the possibility that people behave in ways that reinforce and perpetuate these beliefs (Ridgeway 2011; West and Zimmerman 1987). Our findings build on a nascent literature that examines how gendered perceptions of networks can perpetuate inequality (Brands and Kilduff 2013; Burt 1998). Our results indicate that, when people make errors in judging others' networks, those errors tend to conform to prevailing gender stereotypes. Insofar as this pattern is pervasive and influences subsequent decision making, it would represent a heretofore unexamined mechanism underlying gender inequality. For example, if women are assumed to have more constrained

networks than they actually do, might this tendency reduce their likelihood of getting hired certain job roles—such as sales or new product development—for which brokerage is typically assumed to provide an advantage? Or might the erroneous belief that women inhabit dense network structures that transit redundant information make them less attractive targets of venture capital funding when they pursue a new entrepreneurial venture?

Limitations

The study is not without limitations, which point to avenues for future research. First, we rely on self-reported network data, which are sometimes susceptible to reporting bias (Marsden 2011). It would be useful in future studies to include more objective measures of targets' networks such as those derived from online or email archives (Kleinbaum, Stuart, and Tushman 2013; Srivastava 2015). Second, we used laptop webcams to gather videos of targets. It seems likely that their self-presentation in videos differed from the self-presentation they would have had in more natural social interactions. Further work is needed to understand how the accuracy of judgments about networks varies across these two contexts. A third related limitation is that we only used videos of average length and that included audio content. It remains unclear how thin a slice of behavior a perceiver can observe and still make accurate judgments. Similarly, it would be useful to examine the role of audio content in judgment accuracy. More broadly, we conducted our study in the relatively sterile context of a university laboratory. It is therefore unclear how the capacity to read others' positions in social structure might vary depending on the social context in which the evaluation is being made or on the social standing of the people being evaluated. For example, recent developments in cognitive science suggest that observing popular others elicits value signals that facilitate one's understanding of their mental states (Zerubavel et al. 2015). Replication of this approach in field settings is necessary to clarify the role of these contextual factors in the accuracy of interpersonal judgments.

Conclusion

In sum, this study sheds new light on a pervasive feature of social life—interpersonal judgments about others' positions in social structure. It joins a burgeoning literature (Cerulo 2002; DiMaggio 1997; Morgan and Schwalbe 1990; Srivastava and Banaji 2011; Vaisey 2008, 2009; Zerubavel et al. 2015) that underscores the value of drawing on concepts and methods from cognitive and social psychology to address longstanding sociological questions.

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TABLES AND FIGURES

Table 1. Examples of Thin Slice Video Transcripts

Question 1:	***How would you describe yourself?***
Targets' Responses:	• "I guess I'm a pretty open-minded person, so like I'm willing to try new things. Uhm.. I'm not closed off. Uhm, but I can be pretty quiet sometimes, like in class I'm pretty shy. Uhm, but like, I guess, once you get to know me, I'm like able to talk more. Uhm I like to have fun but…" • "How would I describe myself? I would describe myself as smart, fun, funny. I enjoy the outdoors and being active. I'm athletic. I'm curious about the world. I like exploring different things, seeing new things. Uhm, I'd also describe myself as laidback." • "I am a person who has a lot of different kind of interests. Uhm, rather than kind of having like one thing that I'm all about. I, uhm, I'm very interested in a lot of different things. Uhm, I tend to be a pretty independent…"
Question 2:	***Can you describe how you like to cook or prepare eggs for yourself or others?***
Targets' Responses:	• "Uhm, I like my eggs scrambled. So, I guess, I just, like, crack the eggs and put them in with milk and butter and cheese and salt and pepper and I just scramble them? Cook them over the fire. And I guess, uhm, whenever I eat them, I like to like kind of make them look sort of artsy so I put a little…" • "I have two ways that I like to cook eggs usually. Uh, either scrambled or fried. Scrambled, uh, I crack two eggs into a bowl and, uh, scramble them in the bowl. Maybe add a little bit of cheese or some milk and then cook in a frying pan." • "So, I'm actually a really bad cook and I don't like eggs. Uhm, but I do have a story, I am a really bad cook as I said and when I was in high school I was trying to – I was at home alone a lot – and I was trying to kind of, uhm, teach myself how to cook a little. So I decided to try and make scrambled eggs. Uhm…"
Question 3:	***Do you have any advice about how to best prepare for a job interview?***
Targets' Responses:	• "I guess the best advice I would give would be like don't go in with the mindset that it is an interview for a job. Go in with the mindset that you are basically, you're just talking to someone. You know, someone important, someone that you might wanna meet anyway. So its almost just like you are having a conversation, and I think that's the best way you can like really show who you are and…" • "Preparing for a job interview, uh, important to research the company, understand, uh, what they are looking for, uh, in an applicant, know what the company does, what their values are, what their mission is. Uhm, try to find out who is going to be interviewing you and learn some things about…" • "I don't have a whole lot of job interview experience. Uhm, but, in my little experience that I have had, in my few job interviews, the best things for me have been to be confident. Uhm, even if you don't feel confident. Uhm, its to appear confident. And also to be really friendly. I …"

Question 4:	***Imagine that scientists found life on 3 other planets! Elon Musk, the CEO of SpaceX, is now selling reasonably priced tickets on daily shuttles to other planets. Passports are being issued for travel into space. What do you do?***
Targets' Responses:	• "So if scientists found life on other planets and they have daily shuttles to them, I'd probably treat them just like any other country. So, like, I would love to go – just because I like traveling and I like, you know, seeing new things. But I don't know if I would just jump in my bags right now and go." • "Wow, life on other planets. What would I do? Uhm, I think I would be interested but honestly I would consider all of the risks of space travel. I'd want to know how safe it was and I'd want to know, uh, how long we would be going for. Uh, it says daily shuttles…" • "Obviously, I'm going to go out to space. Uhm, I, its kind of been a dream of mine for a long time. Especially to meet other life forms on other planets. I would absolutely love that. Uhm, that would be like the big …
Question 5:	***Some people say that the best leaders are the ones that don't want to lead at all. What do you think about that?***
Targets' Responses:	• "I, I think that is probably true. Uhm, well, I don't know. I mean, I guess to be a leader you have to have some sort of initiative, uhm, and if you don't want to lead chances are you won't or you won't lead as well. So I can see why that might not be true. But I guess at the same time…" • "Uhm, I think that some times that can be the case. Uhm, I think leaders aren't leaders until they have people who want them to lead. You can't be a leader by yourself. You need people who want to be led. Uhm, and I guess…" • "I definitely agree with that thing about, uhm, leaders. I personally am not…I … I do enjoy leading but I also don't think of myself as a leader type person and I…"

Table 2. Descriptive Statistics of Perceivers' Social Network Judgments and Targets' Actual Social Network Characteristics

	Targets' Self-Reports about Social Network Characteristics	Perceivers' Judgments about Targets' Social Network Characteristics
Network Size (# contacts)	5.4	4.2
Proportion male ties (%)	42.7	50.2
Proportion kinship ties (%)	45.0	33.0
Network constraint	0.23	0.38
N	23	2,166

Table 3. Accuracy of Perceivers' Judgments of Targets' Social Network Characteristics

Accuracy for:	Mean	t-test greater than 0 (SE)
Network size	.09	3.52*** (.02)
Proportion male ties	.33	18.82*** (.02)
Proportion kinship ties	.07	3.18*** (.02)
Network constraint	-.01	-0.42 (.03)

Note: Standard errors in parentheses. We were unable to calculate accuracy scores for perceivers' whose judgments did not vary across targets. The sample size for accuracy scores therefore varied across social network characteristics: it was 366 for network size accuracy, 367 for network constraint accuracy, and 375 for accuracy for proportion kinship and male ties. * $p < .05$; ** $p < .01$; *** $p < .001$; two-tailed tests.

Table 4. Predicted Accuracy of Perceivers' Judgments of Targets' Social Network Characteristics, Controlling for Targets' Gender, Age, and Personality Characteristics

	Predicted Accuracy Conditional On Target Gender, Age, and Personality	95% Confidence Interval
Network Size	.20*** (.05)	.12 – .29
Proportion Male Ties	.41*** (.03)	.35 – .47
Proportion Kinship Ties	.27*** (.04)	.19 – .36
Network Constraint	-.10** (.04)	-.17 – -.02

Note: Robust standard errors in parentheses clustered by perceiver. * $p < .05$; ** $p < .01$; *** $p < .001$; two-tailed tests.

Table 5. Regression of Perceivers' Judgment Error on Target Gender

	Unconditional Estimate of Error When Judging Female Targets
Network Size (# of contacts)	.76*** (.10)
Proportion male ties	-1.82* (.86)
Proportion kinship ties (%)	3.99*** (.71)
Network constraint	.02*** (.00)

Note: Robust standard errors are clustered by perceiver.* $p < .05$; ** $p < .01$; *** $p < .001$; two-tailed tests.

Figure 1: Visual Network Scale Example: Gender Composition

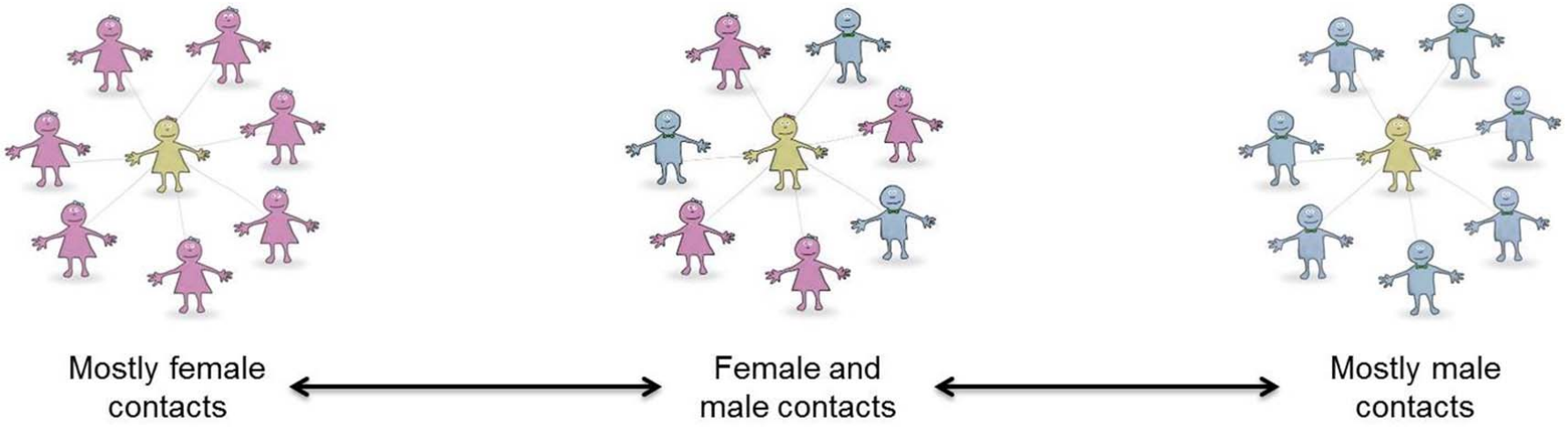


Figure 2: Visual Network Scale Example: Network Constraint

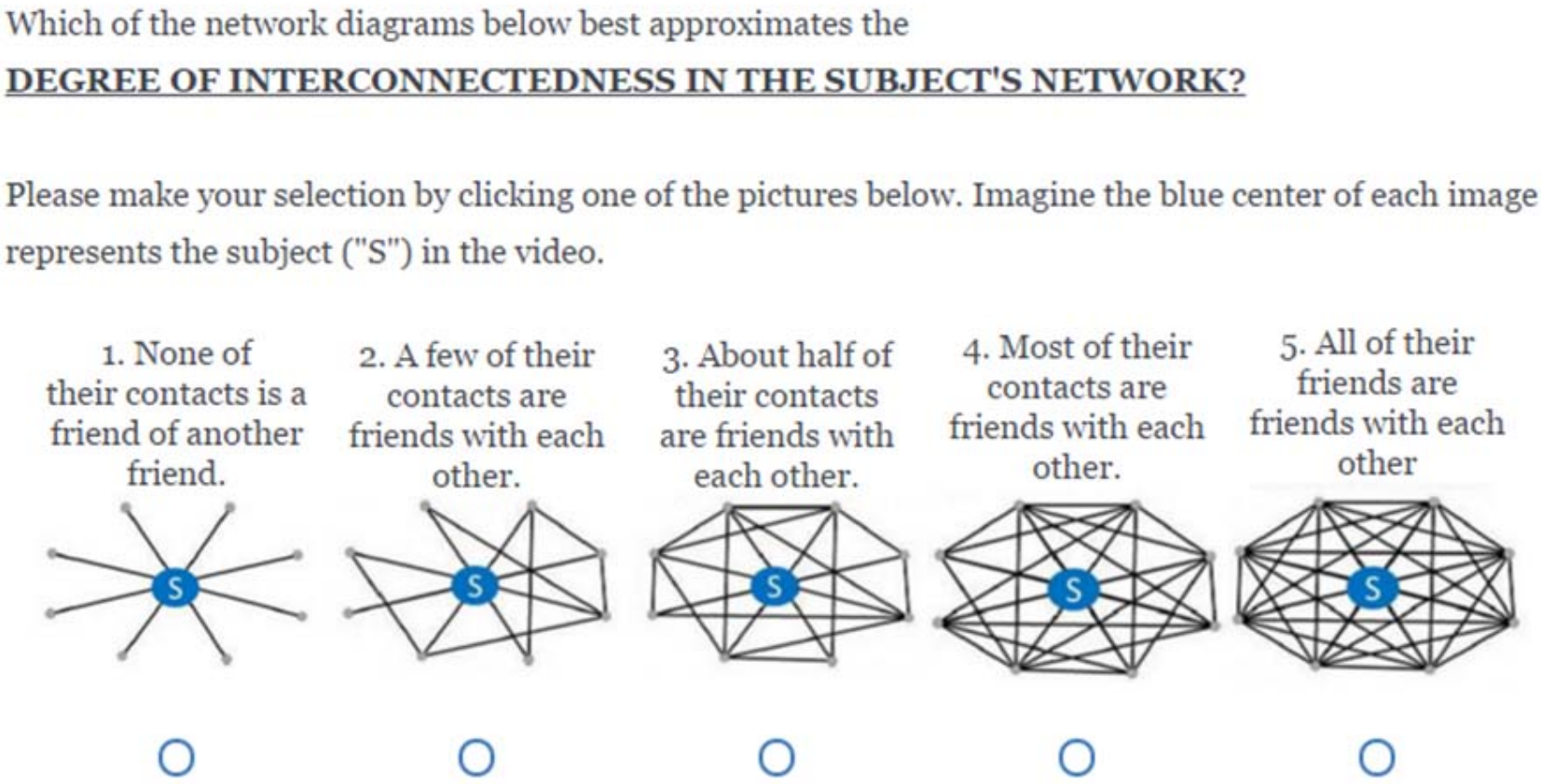
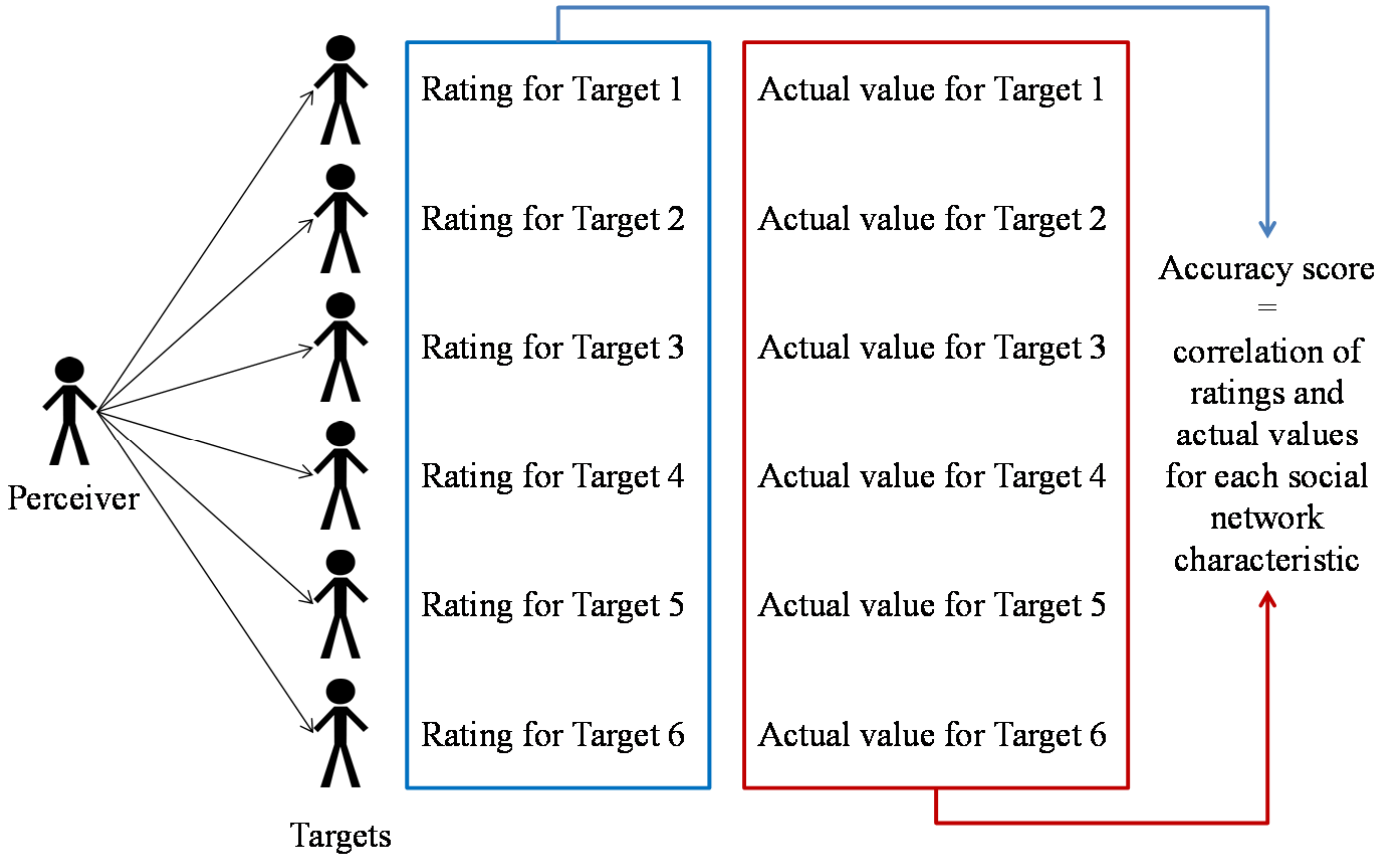


Figure 3: Visual Representation of Analytical Approach



ENDNOTES

[i] Social judgment processes occur in two ways, simultaneously: bottom up and top down processes. A bottom up process means that observable data from behavior, clothing and other ornaments, and physiognomic attributes, such as a babyish face, "afford" certain judgments. These cues are systematically associated with traits and states within a given culture and so assessments are made based on their presence or absence. Top down processes, in contrast, are best described as a projection—the projection of stereotypes, biases, and personal attributes that perceivers have and project onto the target (Gilbert 1999).

[ii] Research in evolutionary and social psychology argues that the ability to accurately detect features of another person's position in social structure, or social network, may be among the more important attributes to know about a person after merely a brief encounter. In addition to judgments about immediate safety and trustworthiness, fast and automatic judgments about dominance, social status, and social position help people gather information about who has resources that can help with survival (Oosterhof and Todorov 2008; Willis and Todorov 2006). Taken together, these two judgments can help determine who has resources needed for survival and may be willing to share them. From a more sociological standpoint, Bourdieu and Wacquant argue that quick, commonplace judgments are critical for unpacking social structures (1992).

[iii] Of the 23 targets in our study, only four reached the limit of eight when naming their contacts.