Do You Read Me?
How Perceptions of Empathy Shape Self-Monitors’ Brokerage in Social Networks

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Social structure matters in organizational life, but our understanding of the origins of social network structure is limited. In this paper, we argue that to fully understand the role of personality in shaping social structures, we must better integrate the macro-structural perspective with the micro-level perspective by emphasizing an intermediate level of analysis: the potential contacts of the focal individual. Our alter-centric perspective builds on earlier evidence that the construct of self-monitoring is associated with brokerage, but suggests that the effect of self-monitoring on brokerage is amplified in those perceived as highly empathic. The mechanism that underlies this effect is the greater propensity of others to reciprocate the attempts at forging ties initiated by high-empathy, compared to low-empathy, high self-monitors. We find support for these predictions in a study of the dynamic emergence of a social network among a complete cohort of MBA students.

*Key words:* social networks; brokerage; dynamic networks; self-monitoring; empathy
Social structure plays a profound role in many facets of organizational life. In recent years, a substantial body of research has accumulated indicating that the structure of an individual’s social network has implications for creative potential, performance evaluation, compensation, and career prospects generally (reviewed in Burt 2005). There can be little remaining doubt that networks matter, but our understanding of the origins of social network structure remains limited (Kleinbaum 2012). In seeking to explain precisely how and why networks matter, most research has fallen into one of two groups. The first set of scholars takes a structural, macro perspective, attempting to specify what network configurations are associated with individual attainment. Research in this spirit has identified brokerage – defined as a structural position in which one is linked to others who, in turn, are disconnected from each other – as a key to individual career attainment (e.g., Granovetter 1973; Brass 1984; Burt 1997, 2004). The mechanism to which this effect is attributed is a vision advantage: sparse networks tend to provide more, better, and earlier access to a diverse range of information (Burt 1992). Because the source of this advantage is presumed to be structural, the role of individual social actors is down-played (Wellman and Berkowitz 1988).

In response to this macro-structural argument, a second body of scholarship has attempted to further peel back the theoretical onion by asking the question: what are the antecedents to network structure? Although various scholars have considered organizational antecedents of different types, such as training (Burt and Ronchi 2007) or career path (Kleinbaum 2012), perhaps the most widely-studied answer has come from micro-level research on the self-monitoring personality construct (e.g., Mehra, Kilduff and Brass 2001). Self-monitoring is a personality characteristic that accounts for “individual differences in the self-control of expressive behaviors [in response to varying social situations],” (Snyder 1974: 527)
and scholars have demonstrated, across a range of different settings, that individuals high in self-monitoring are more likely than are low self-monitors to develop brokerage positions in social networks (Mehra, Kilduff and Brass 2001; Kilduff and Krackhardt 2008; Oh and Kilduff 2008; Sasovova et al. 2010).

These literatures – the macro-structural perspective on social networks and the micro-level, intra-personal perspective on how self-monitoring shapes them – have made important contributions to an understanding of how individuals use their personal resources to shape social structures. However, the agentic view that undergirds the literature on self-monitoring and networks is still partly one-sided. Much attention has focused on the tendency of high self-monitors to forge ties that bridge disconnected social groups, but successfully forming such ties requires that high self-monitors’ efforts be reciprocated by others. Rather than being passive receivers of social influence attempts, others may display varying degrees of interest in forming ties with high self-monitors. In this paper, we seek to develop a more alter-centric perspective to the analysis of the effects of self-monitoring on social networks by focusing on the extent to which one’s perceived empathy affects others’ reciprocation of one’s attempts at forging ties. Our focus on alters’ perceptions of empathy is motivated by research on positive affect and interpersonal attraction, which suggest that when alters perceive high self-monitors as empathic, that perception induces positive affect and strengthens interpersonal attraction, which in turn results in an increase in the probability of tie reciprocation.

We begin our analysis by considering the relationship between self-monitoring and perceived empathy. We then develop a rationale for a moderating effect of perceived empathy on the influence of self-monitoring on social networks. This analysis unfolds in two steps. In the first step we examine individuals’ propensity to occupy positions of brokerage within a social
structure as a function of both self-monitoring and perceived empathy. Consistent with our prediction, results indicate that self-monitoring is a particularly strong antecedent of brokerage for people who are also perceived to be high in empathy. In the second step, we examine the two-sided nature of relationships by proposing that self-monitoring and perceived empathy will interact positively on the likelihood that a given person’s potential contacts will reciprocate her social gestures. Consistent with this conjecture, results of a dyad-level analysis indicate that the focal actor’s perceived empathy and self-monitoring interact positively in their effect on others’ reciprocation of the actor’s social advances.

We aim to advance theory and practice through our alter-centric perspective, which integrates macro-structural theories of network advantage with micro-level theories of network formation. Scholars of social networks are increasingly interested in understanding how networks evolve over time (Ahuja, Soda and Zaheer 2012). We suggest that a more complete understanding of brokerage dynamics requires consideration of the intermediate level of analysis: how others perceive the focal actor and, consequently, how likely they are to reciprocate social ties. By showing the role of perceived empathy in the acquisition of network brokerage (which, in turn, has been linked to individual performance), we also identify a novel mechanism by which emotional competence may lead to increased performance in organizations (O’Boyle et al. 2011; Walter, Cole and Humphrey 2011).

**Self-Monitoring and Empathy**

Micro-level research on antecedents of network structure has focused on self-monitoring, a psychological construct concerning the extent to which people deliberately modify their behavior to match the varying expectations of different social settings (Snyder 1974; Gangestad
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and Snyder 2000; Toegel, Anand and Kilduff 2007). Theory on self-monitoring builds on Goffman’s (1959) notion of self-presentation by arguing that people vary in the extent to which they are motivated to present themselves favorably to different audiences. High self-monitors show a greater motivation to have successful social interactions, and they are accordingly more concerned with the social cues and norms that others use to indicate appropriate behavior in different settings. Like shrewd politicians, high self-monitors try to tune in to the beliefs and emotions that may be more socially adaptive to express within a particular situation, based on the beliefs and emotions prevalent among others who are present. In doing so, they are likely to engage in relatively high levels of both surface and deep acting (Scott, Barnes and Wagner 2012). On the other hand, low self-monitors tend to heed Polonius’ advice in Shakespeare’s *Hamlet*: “To thine own self be true.” They tend to express self-consistent behavior across diverse contexts, regardless of what might be expected in a particular situation.

Empathy has played little role in the research on psychological antecedents of network structure, despite its importance in forming and maintaining interpersonal ties. Definitions of empathy vary in the social science literature, but our intended definition follows that of Rogers, who defined empathy as the ability to “perceive the internal frame of reference of another with accuracy and with the emotional components and meanings which pertain thereto” (Rogers 1959: 210), or more simply, “the ability to see completely through [another person’s] eyes” (Rogers 1980: 85). This type of empathy has been found to be generally beneficial in social relationships, helping to build closeness and satisfaction, and preventing misunderstanding and conflict (e.g.,
In essence, people like to associate with other people whom they perceive as highly empathic.

Accurate empathy requires “noticing, attending to, and correctly interpreting the messages conveyed through [people’s] words, tone of voice, facial expressions, and body posture,” (Gleason, Jensen-Campbell and Ickes 2009: 997). Because high self-monitors are more concerned about the impressions they make with others, they are thought to pay more attention to other people’s social cues, which should facilitate greater empathy, on the average, compared to low self-monitors. Some research supports this idea. For example, Ickes et al. (1990) found that high self-monitors showed more accuracy in their perceptions of the thoughts and feelings of prior interaction partners than did low self-monitors. In addition, Mill (1984) found that high self-monitors inferred emotional meanings from recorded voices more accurately than low self-monitors.

Although limited evidence suggests that high self-monitors may, on average, perceive other people’s thoughts and emotions more accurately, it is unclear whether high self-monitors are better at conveying their empathic understanding effectively to other people. Perceptions of empathy by one’s interaction partners may be even more important than empathy itself, since it is other people’s perceptions that determine their willingness to form network ties with the focal individual. Logically, it would seem that high self-monitors, with their greater focus on presenting viewpoints that are expected to be received favorably within any given social interaction, would do a better job conveying empathy to other people. However, in one study, high self-monitors’ social interactions were judged by independent raters as containing less

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1 Another construct that is similar to empathy is perspective taking. Both refer to a propensity to see the world from another person’s viewpoint. Perspective taking emphasizes the cognitive dimension whereas empathy is often seen as encompassing both a cognitive and an emotional dimension.
genuine empathy compared to the conversations of low self-monitors (Mill 1984). Thus, although theory and some empirical evidence suggest a positive association between self-monitoring and empathy, it is possible that some high self-monitors’ empathy is “lost in translation” when communicating with other people, resulting in lower perceptions of high self-monitors’ empathy. Nevertheless, we hypothesize:

**Hypothesis 1:** High self-monitors will be perceived to have greater empathy than low self-monitors.

**Individual Differences and Network Structure: The Role of Self-Monitoring**

To the extent that building connections with individuals from diverse social groups requires a willingness and desire to adapt one’s behavior according to the perspectives and feelings that are represented in different social settings, high self-monitors might be expected to build social networks that are higher in brokerage than those of low self-monitors. Indeed, an extensive and influential literature on the psychological antecedents of network structure reaches precisely this conclusion. In early work, Caldwell and O’Reilly (1982) showed that high self-monitors perform better at boundary-spanning work. Maintaining connections with individuals not otherwise connected to one’s social network is difficult (e.g., Burt 2002; Kossinets and Watts 2006), so low self-monitors may prefer to remain within a tight-knit social circle whose behavioral norms match their own inclinations. For both of these reasons, research has demonstrated that high self-monitoring is linked with brokerage in social networks. Cross-sectional studies have found a positive relationship between self-monitoring and brokerage in the friendship networks of employees at a small high-technology firm (Mehra, Kilduff and Brass 2001) and in the acquaintance networks of a community of entrepreneurs (Oh and Kilduff 2008). In addition, self-monitoring has been found to predict increases over time in network brokerage.
Acknowledging the dynamic nature of social networks, Sasovova et al. (2010) tracked friendships within a radiology department longitudinally, and found that high self-monitors added more new social connections over time, and that these connections were more likely to involve people previously disconnected from their networks, thereby increasing their brokerage. Thus, when examining self-monitoring and brokerage in isolation, we build on the results of prior studies and anticipate that high self-monitors will have networks richer in brokerage, on average. Our point of departure from this body of literature is to ask: what makes some high self-monitors better brokers than others?

**Brokerage, Reciprocity, and Others’ Perceptions of a High Self-Monitor’s Empathy**

Even if there is a positive association between self-monitoring and perceived empathy, not all high self-monitors may be equally adept at generating perceptions of empathy among alters, and as a result, some will be more likely to become brokers in the social network than others. Although high self-monitors may engage in more brokerage, on average, than low self-monitors, we have no theoretical reason to believe that the effect is distributed evenly. Indeed, Flynn and Ames (2006: 272) observed that “self-monitoring may not be equally useful for everyone.”

We propose that a key variable affecting the efficacy of people’s overtures toward comporting their behavior according to situation and establishing connections with others may be perceived empathy, or the degree to which others view the focal individual as understanding their perspectives and emotions. Focusing our analysis on how others perceive the focal person, we suggest that high self-monitors who are seen by others as having greater empathy will connect more easily than those who are not seen by others as having greater empathy. If high
self-monitors are able to convey an accurate reading of others’ thoughts and emotions, then they may be able to make people feel genuinely understood through their efforts to match their own behavior to the demands of the situation, facilitating the social connection process. Empathy not only helps to build new social connections, but can also help to buffer connections against potential disruptions on an ongoing basis (e.g., Bissonnette, Rusbult and Kilpatrick 1997; Simpson, Ickes and Oriña 2001). We therefore predict a moderating effect of empathy, such that high empathy amplifies the effect of self-monitoring on brokerage, both in the cross-section and over time:

**Hypothesis 2a:** Perceived empathy moderates the positive effect of self-monitoring on brokerage: for people perceived as higher in empathy, the self-monitoring effect on brokerage is stronger than for people perceived as lower in empathy.

**Hypothesis 2b:** Perceived empathy moderates the positive effect of self-monitoring on the formation of new ties: for people perceived as higher in empathy, the self-monitoring effect on new tie formation is stronger than for people perceived as lower in empathy.

**Hypothesis 2c:** Perceived empathy moderates the positive effect of self-monitoring on the formation of new structural holes: for people perceived as higher in empathy, the self-monitoring effect on the formation of new structural holes is stronger than for people perceived as lower in empathy.

At a more micro level, within dyads, the relevant question is how one individual induces another to reciprocate her gesture of friendship. Our argument suggests that perceived empathy will be particularly important in inducing such reciprocation. A high level of self-monitoring is critical to prompting individuals into action that may result in attempts directed at forging a tie, but a high level of empathy, as perceived by alter, is also important for those gestures at interaction to be reciprocated.

Perceived empathy may increase reciprocation of high self-monitors’ attempts at social connection for two main reasons. First, feeling accurately understood by someone else is
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intrinsically rewarding, and a high level of empathy could offer numerous benefits to one’s alters (Oishi, Koo and Akimoto 2008). Feeling as if one’s perspectives and feelings are understood by someone else is thought to make people feel “that they are worthy of respect, of being heard, and that their feelings and behaviors make sense” (Greenberg et al. 2001: 382-383), providing a sound basis for an interpersonal relationship. Second, empathy may facilitate reciprocation of gestures toward friendship by allowing a high self-monitor to more effectively highlight areas of similarity between themselves and another, since perceived similarity is a key determinant of interpersonal attraction (e.g., Singh and Ho 2000). Successful efforts toward strategically presenting oneself as similar to another person require not only the motivation and behavioral tendency to adapt one’s behavior to differing social situations, but also the ability to convey to others the perception that one mirrors their attitudes, beliefs, and feelings. To summarize:

**Hypothesis 3:** Perceived empathy moderates the positive effect of self-monitoring on reciprocity: for people perceived as higher in empathy, the effect of self-monitoring on the likelihood that other people will reciprocate ties is greater than for people perceived as lower in empathy.

**DATA AND METHODS**

In the current study, we tested these hypotheses about the role of perceived empathy in moderating the positive association between self-monitoring and network brokerage by examining the emergence of the socializing network among first-year Master of Business Administration (MBA) students. Although studies of MBA students lack the external validity to generalize readily to business organizations, this limitation is counterbalanced by the fact that we are able to observe the network during its formative phase. Like Sasovova et al. (2010), we measured friendship networks because these networks represent connections that are entered into voluntarily through effortful social interactions (rather than being “given” to students via formal
structural arrangements, such as study group assignments); because friendship networks influence professional success (e.g., Burt 1992; Ingram and Roberts 2000) and success in business school (Baldwin, Bedell and Johnson 1997); and because friendship networks are particularly salient in our study population.

A new cohort of MBA students is a particularly apt setting in which to study the role of personality in shaping social networks for two reasons. First, few people know one another in advance. Unlike any going concern, an MBA cohort is constructed from scratch, with no prior history, few pre-existing relationships, and little formal structure to shape or constrain the formation of social ties. Additionally, although instrumental reasons for forming ties undoubtedly emerge later (e.g., A has experience in an industry in which B would like to work), the earliest period is characterized by people who have just arrived in a new place seeking out stability and order in their social lives. The network emerges largely from this blank slate. Those formal structures that do exist, such as section assignments and residence location, can be accounted for econometrically, leaving significant variance to be explained by intra-personal factors, such as personality. As a result, this setting is well-suited to examining the socio-emotional dynamics of empathy and self-monitoring as they affect incipient social networks.

Sample and Data Collection

Our sample included all 268 first-year MBA students (33% women; 57% White non-Hispanic; 60% U.S. citizens; mean age of 28.0 years, $SD = 2.1$) at a private, East Coast university, who participated in this study as part of required coursework in organizational behavior. Our analysis required collection of four different data sets. First, we collected online surveys of the emerging social network in the new cohort of MBA students at two points in time:
first in late September, in the fourth week of classes and five weeks after students arrived on campus for orientation (hereafter “Time 1”), and again in early November, six weeks later (hereafter “Time 2”). After following a link to the study website, students answered a question (adapted from Burt 1992: 123) that was designed to assess their position within the evolving first-year MBA social network: “Consider the people with whom you like to spend your free time. Since you arrived at [university name], who are the classmates you have been with most often for informal social activities, such as going out to lunch, dinner, drinks, films, visiting one another’s homes, and so on?” Due to the large number of first-year students who had so recently met one another, we were concerned about the possibility of biased or incomplete recall (Brewer 2000). Consequently, we used a roster-based name generator, with the roster displayed in one column per section of the MBA program and names listed alphabetically within each section. Respondents indicated the presence of a social tie with a given person by checking the box next to that person’s name. No limit was placed on the number of names that a respondent could check. The median respondent cited 18 social ties at Time 1 and 22 at Time 2. Both distributions had very long right tails (Time 1: min = 2, max = 134, $SD = 20.1$; Time 2: min = 2, max = 188, $SD = 29.3$). The overall increase in network size was expected during a period in which networks are actively being formed. The response rate was 100% in both surveys.

Second, we gathered data from a self-report scale to measure students’ levels of self-monitoring. This instrument was administered during the fourth week of classes. Two students failed to complete this survey and were dropped from all analyses, yielding a final response rate of 99.3%. The number of incomplete observations is too small for any statistical analysis and since there is nothing that clearly distinguishes these students in the observable data, we simply assume they were missing at random.
Third, in the seventh week of the term, students completed surveys in which they used a standard scale to privately rate the empathy levels of peers in their study groups. Like many business schools, the institution we studied assigned each student in our sample to a study group through a stratified, quasi-random process that is designed to create diversity within each study group and relative parity of experience across study groups. Study groups were required to meet at least five days a week, often convening for several hours each day, throughout the period of our study. The first months of the fall term are perhaps the most academically intense period at the school we studied; within this cauldron, we believe that by the seventh week of the term, students had had sufficient time to form meaningful impressions of the socio-emotional abilities of their study group members. Study groups thus provide an excellent setting in which to gather peer evaluations of empathy. Each student’s empathy was rated by at least three other students, with a modal number of five raters per student. Response rate for our peer-evaluated empathy scale was 100%. Since perceived empathy is reported by numerous study group members, there is the possibility that error terms in our regressions might be correlated due to the structure of peer evaluations of empathy within study groups, violating the assumption of independent errors in regression. To account for this dependence, we adjust the standard errors in all models by clustering around study group assignment.

Finally, demographic information was provided by the school’s registrar about students’ gender, race, citizenship, age, class section, study group assignment, and residence status (on versus off campus). All identifying information was removed, leaving these various data sets linked together only by anonymous student ID numbers.

**Measures**
Our outcome of interest was the emergence of brokerage in the social network, so we examined both the presence of brokerage in the cross-sectional network as well as the emergence of brokerage ties longitudinally. We describe each of these analyses in turn.

**Cross-Sectional Analysis.** First, we examined the presence of brokerage in a static analysis using Burt’s (1992) structural constraint measure. Actor i’s structural constraint is defined as:

\[
Constraint_i = \sum_{j=1}^{n} \left( P_{ij} + \sum_{q=1}^{n} P_{iq} P_{qj} \right)^2
\]

where \( P_{ij} \) represents the proportion of actor i’s ties that comprise actor j. The inner summation incorporates the indirect constraint imposed on each actor i by actor j through connections among actors q who interact with both i and j. We used the igraph package (Csardi and Nepusz 2006) in the R statistical computing environment (R Development Core Team 2010) to calculate constraint. The dependent variable in our cross-sectional models is \( Brokerage_i = (Constraint_i)^{-\frac{1}{2}} \). This monotonic transformation introduces no bias to estimation and eliminates skewness (\( p > 0.35 \), indicating no significant deviation from normal in the transformed variable; D’Agostino, Belanger and D’Agostino 1990), thereby improving model fit. Additionally, the negative sign in the exponent results in a direct measure, rather than an inverse measure, of brokerage, which facilitates an intuitive interpretation of results. In our static models of brokerage, we followed Burt (1992, 2007) and estimated models using ordinary least squares (OLS) regression.

**Dynamic Analysis.** Second, to further elucidate the interplay between perceived empathy and self-monitoring in the dynamic emergence of network structure, we follow Sasovova et al. (2010) in estimating a series of models that examine changes in the network from Time 1 to Time 2. We define four different dependent variables in these analyses: Ties Added, Ties Lost, Holes Added, and Holes Lost.
Ties Added is the count of inward ties that the focal actor possesses at Time 2, but not at Time 1. Because Ties Added is based on inward ties, or mentions of the focal person by others in their survey responses, it relies only on the reports of others, which are likely to be more reliable than self-reports by the focal actor (Sasovova et al. 2010). An inward tie is considered added if another person reports socializing with the focal person in the Time 2 survey, but not the Time 1 survey. For comparability of our results with those of prior studies, we also calculate the analogous measure of Ties Lost, the count of inward ties possessed by the focal actor at Time 1, but not at Time 2.

Holes Added is the count of structural holes that the focal actor possesses at Time 2, but not at Time 1. By structural holes, we mean the number of triads in which the focal actor participates together with two alters, j and k, who are each connected to i, but not to each other. Structural holes can be added through two distinct mechanisms. One mechanism for the addition of a hole is when a complete triad is rendered incomplete by the severance of the tie between j and k. Breaking that tie opens a structural hole between j and k, allowing the focal actor, i, to intermediate between them. We term this mechanism the division mechanism for structural hole addition (termed “opened holes” by Sasovova et al. 2010). The second mechanism by which an actor can add a structural hole is through expansion of the dyad: forming new ties with individuals who are disconnected from someone already in one’s network (termed “new holes” by Sasovova et al. 2010). We also measure Holes Lost, the number of structural holes that exist at Time 1, but disappear by Time 2. Similar to the two mechanisms by which structural holes form, there are two mechanisms by which structural holes are lost. The first is through triadic closure (Heider 1958) – the formation of a direct tie between two actors, j and k, who had previously been connected only indirectly through i. The second way a structural hole is lost is
through collapse: when one or both of the ties linking i to j and k is broken. The dynamics of the formation and dissolution of structural holes are illustrated graphically in Figure 1.

Our measures of social ties and structural holes added and dropped are count variables, so models are estimated using Poisson quasi-maximum likelihood. Because Poisson is in the linear exponential family, the conditional mean of the data is assumed to be correctly specified, but no assumptions about the distribution of the data are required to generate consistent coefficient estimates (Gouriéroux, Monfort and Trognon 1984; Wooldridge 1997; Silva and Tenreyro 2006). Specifically, unlike the maximum likelihood version, quasi-maximum likelihood estimation of the Poisson does not assume that the data are distributed with the mean equal to the variance of the event count.

**Self-Monitoring.** To measure self-monitoring, we used a standard 18-item self-report scale that requires participants to label statements about themselves as either true or false (Snyder and Gangestad 1986). This revised scale is psychometrically superior to the original 25-item self-monitoring scale (Snyder 1974). Sample items include “In different situations and with different people, I often act like very different persons;” “I would not change my opinions (or the way I do things) in order to please someone or win their favor” (reverse-scored); and “I would probably make a good actor.” Reliability for the self-monitoring scale was acceptable in our sample (Cronbach’s α = .73). Finally, we normalized each individual’s self-monitoring score by subtracting the global minimum self-monitoring score and dividing by the range in self-monitoring scores; the resulting normalized variable had a minimum of 0 and a maximum of 1 by construction (mean = 0.49; standard deviation = 0.22).

To gain a deeper understanding of the composition of the self-monitoring scale, we performed a principal components analysis with an oblique rotation (Promax), which allows the
components to correlate with each other. The scree plot revealed a sharp drop-off after two components. Examining the loadings of the first six components, only these first two components were interpretable in terms of prior theory and empirical research, so we retained only these components. Using the same 0.30 factor loading criterion, the results of our analysis correspond closely to those of Briggs and Cheek (1988), who termed the two components of self-monitoring “public performing” and “other-directedness.”

Perceived Empathy. Consistent with our alter-centric theoretical approach, we measured perception of empathy using peer ratings of participants’ behaviors. Specifically, we used the empathy scale of the Emotional and Social Competencies Inventory (ESCI; Wolff 2005), a multi-rater 360-degree instrument used to assess individuals’ self-awareness, self-management, social awareness, and relationship management. The ESCI was developed based on a theoretical model of emotional and social competencies (Boyatzis 1982, 2009) and has been used in prior published research (e.g., Kellett, Humphrey and Sleeth 2002; Offermann et al. 2004; Koman and Wolff 2008; Margaret and Diana 2008). The items composing the empathy scale asked peers to indicate the frequency with which the focal actor exhibited five different behaviors reflecting empathic ability, on a scale from 1 (Never) to 5 (Consistently). The five behaviors were “Understands another person’s motivation,” “Understands others by listening attentively,” “Does not understand subtle feelings of others” (reverse-scored), “Understands others by putting self into others’ shoes,” and “Understands others’ perspectives when they are different from own perspective.” Averaging across peer ratings for each item for each participant (Thompson and Vacha-Haase 2000), reliability for the perceived empathy scale was excellent in our sample (Cronbach’s α = .90). As with the self-monitoring variable, we normalized each individual’s perceived empathy score by subtracting the global minimum empathy score and dividing by the
range in perceived empathy scores; the resulting normalized variable had a minimum of 0 and a maximum of 1 by construction ($M = 0.59; SD = 0.16$).

*Control variables.* To account for demographic differences that may affect social network structure, we included in our models the participants’ gender and a binary indicator of whether they belonged to the majority racial group, White non-Hispanic. In alternative specifications, available from the authors upon request, race was specified as a dummy variable for each minority racial group, relative to the majority group baseline, rather than as a single binary indicator of majority/minority status; in either case, none of the coefficients was significant in any model, so we present the more parsimonious approach here. We also included a binary indicator for whether the focal actor was a U.S. citizen, because international student status was suspected to play a significant role in socializing patterns among MBA students. As with racial groups, we tested the robustness of our results using alternative specifications that included a complete vector of dummy variables for citizenship status by nation, with the U.S. being the omitted variable. Because the number of students from any single non-U.S. country was relatively small, this specification offered no additional explanatory power, so we report the more parsimonious approach here, but we note that results for the alternative specification were substantively identical. We included a dummy variable for on-campus residence, another plausible determinant of social interactions (Festinger, Schachter and Back 1950; Marmaros and Sacerdote 2006), as well as a binary indicator of whether the person was older than 30 to account for the possibility that older students tend to engage in different socializing patterns than younger students. Finally, we controlled for each student’s section assignment, in case interaction patterns differed by section.
**Dyad-Level Analysis.** We test Hypothesis 3 using dyad-level models of tie formation at Time 2, conditional on the state of the tie at Time 1. Dyad-level models include individual-level variables describing the focal actor, including the self-monitoring and perceived empathy scores and their interaction, as well as the control variables described above. Additionally, dyad-level covariates are included to indicate whether the two dyad members are in the same section and study group; whether they both live on campus; and whether they belong to the same gender group. The dependent variable in our dyad-level analyses is the presence (or absence) of a tie between two specific individuals, so models are estimated using logistic regression.

Of course, estimation of dyad-level models is complicated by the fact that each individual in the data set participates in multiple different dyads, which are consequently not independent of one another. That is, $Y_{ij}$ may be correlated with $Y_{ik}$ to the extent that unobservable attributes of person $i$ affect both dyadic observations. Additionally, $Y_{ij}$ may be correlated with $Y_{ji}$ due to unobservable attributes of the dyad. Consequently, standard estimation approaches will underestimate standard errors and could falsely report results as significant (Kenny, Kashy and Cook 2006). We address this problem empirically by estimating models with standard errors that are simultaneously clustered on both members of the dyad individually and on the dyad itself. Furthermore, since our peer-reported measure of perceived empathy requires that standard errors also be clustered around the focal person’s study group, our models employ a four-way clustering of standard errors around the focal individual, her study group, the other member of the dyad, and the dyad itself. This approach – developed conceptually by Cameron, Gelbach and Miller (2011) and implemented for Stata in the clus_nway.ado file (Kleinbaum, Stuart and Tushman 2012) – is functionally similar to other approaches to dealing with dyadic dependence, such as the bootstrap-like re-sampling approach of the quadratic assignment procedure for
multiple regression (MR-QAP) or the use of exponential random graph models (ERGMs) (Cameron, Gelbach and Miller 2011).

RESULTS

Descriptive statistics and a correlation matrix appear in Table 1. Table 2 presents the results of regression models of perceived empathy and of brokerage in the Time 2 network on demographic and dispositional covariates; to conserve space, we only present results from Time 2, but Time 1 results were substantively identical.

[TABLE 1 HERE]

[TABLE 2 HERE]

We begin by testing Hypothesis 1, that self-monitoring is positively associated with perceived empathy. We first note that in the simple correlation in Table 1, there is no significant correlation between self-monitoring and perceived empathy. In the multivariate analysis in Model 1 of Table 2, we control for a range of demographic variables and still find no significant association ($p > 0.50$). To see whether the effect is concentrated in one component of the self-monitoring score, we re-estimated the model using each component of self-monitoring separately, including in each component either the items assigned to it by our principal components analysis or the (nearly identical) set of items assigned to it by Briggs and Cheek (1988). Across these analyses, we find no association of perceived empathy with the “public performing” component of self-monitoring (unreported, available upon request). However, in Models 2 and 3, we find a weak, but significant negative relationship between perceived empathy and the “other-directedness” component of self-monitoring. This surprising effect is significant with $p < 0.05$ when using the items from Briggs and Cheek (1988) and with $p \approx 0.051$
when using the items suggested by our own analysis. We thus find no support for Hypothesis 1, that high self-monitors are perceived to be higher in empathy than low self-monitors.

Next we present our cross-sectional analysis of brokerage. In the baseline results in Model 4, we found no differences in brokerage by gender, race, or citizenship status. We also found no differences across sections in any of our models (coefficients not shown). On-campus residence and being age 30 or younger were both associated with higher levels of brokerage ($p < 0.05$). In Model 5, we added to our baseline model a covariate for self-monitoring and, consistent with the prior literature (e.g., Mehra et al. 2001, Oh and Kilduff 2008, Sasovova et al. 2010), we found a positive, significant ($p < 0.002$) effect of self-monitoring on brokerage. In Model 6, we added a covariate to the baseline model to capture the main effect of perceived empathy and found the effect to be positive, but not statistically significant ($p > 0.20$). In Model 7, we entered both self-monitoring and perceived empathy covariates into a regression model together. Results directly paralleled the independent effects of self-monitoring in Model 5 and of perceived empathy in Model 6: perceived empathy had no significant main effect on brokerage, but the effect of self-monitoring remained positive and significant. Thus, the evidence in prior literature – the main effect of self-monitoring on brokerage – is robust to the main effect of perceived empathy.

Finally, we find support for Hypothesis 2a in Model 8. The results indicate a positive, significant interaction between self-monitoring and perceived empathy ($p < 0.02$) in their effect on brokerage in the cross-section, but no significant main effect of either, consistent with a moderating effect\(^2\). We took numerous steps to further understand this interaction. First, we split

\(^2\) Although we do not theorize an interaction at the level of the factors of self-monitoring, we note that the interaction effect is captured by the “public performing” component of self-monitoring and not the “other-directedness” component (unreported results, available upon request).
our sample at the median value of perceived empathy, then re-ran Model 5 (i.e., simple regressions of self-monitoring and control variables, but not perceived empathy or its interaction with self-monitoring) on the separate sub-samples. In the high-empathy sub-sample, results were similar to those reported in Model 5 of Table 2, except that the coefficient on self-monitoring is more than 50% larger ($\beta=1.50; p < 0.001$). In the low-empathy sub-sample, the self-monitoring effect is statistically insignificant ($p > 0.25$). Second, to further unpack the interaction effect, we estimated marginal effects of the self-monitoring effect in Model 8 on brokerage. When perceived empathy was held constant at any value below the sample median, self-monitoring had no significant effect on brokerage. The self-monitoring effect on brokerage became statistically significant at the 0.05 level when perceived empathy was held constant at 0.5, approximately one-half standard deviation below its mean value. When perceived empathy was held constant at the 75th percentile value in our sample, the self-monitoring effect was large ($\beta = 1.46$) and highly statistically significant ($p < 0.001$). In contrast, at extremely low values of perceived empathy, the self-monitoring effect on brokerage was negative, although statistically insignificant. These tests not only provide robust support for the hypothesis that the self-monitoring effect on brokerage in the cross-section is moderated by others’ perception of the focal person’s empathy; they also suggest the possibility that perceived empathy may be a necessary condition for brokerage in high self-monitors. We return to this point in the discussion section.

To gain a deeper understanding of the possible mechanisms underlying this moderating effect, we examine the micro-foundations of brokerage – the formation of ties and of structural holes. We model the formation and dissolution of ties between Time 1 and Time 2 as a function of self-monitoring, perceptions of empathy, their interaction, and control variables, considering changes in both the directed ties network and the reciprocal ties network. In Table 3, we present
the results of individual-level regression models of network change. In Models 1–3, the dependent variable is the count of the number of new ties added during the interval between Time 1 and Time 2; Models 4–6 consider the number of structural holes added during the same interval. In Models 7–9 and 10–12, the dependent variable is the number of ties and structural holes, respectively, that the focal individual lost during the interval between Time 1 and Time 2. Importantly, Models 1–6 are based on directed networks using inward ties whereas Models 7–12 are based on undirected networks using reciprocated ties: that is, our models of ties and holes added rely on the reports of other people, not on the reports of the focal individual. In contrast, ties and holes may be lost in Models 7–12 as a result of unilateral action by the focal actor.

Models 1, 4, 7 and 10 indicate that high self-monitors experience a higher rate of network churn than low self-monitors, consistent with the findings of Sasovova et al. (2010). They form both new ties and new structural holes and sever existing ties and holes more rapidly than do low self-monitors. In Models 2, 5, 8, and 11, we add in the main effect of perceived empathy and obtain two interesting results. First, the main effects of self-monitoring on the formation and dissolution of both ties and structural holes are unaffected by the addition of empathy to the models. Second, the direct effect of perceived empathy on tie formation (Model 2) is weak and marginally significant ($\beta = 0.259; p < 0.10$). The main effect of perceived empathy on dissolution of both ties and structural holes is statistically insignificant. Taken together, Models 2, 5, 8 and 11 suggest that perceived empathy may have some main effect on the augmentation of one’s network, but no significant main effect on network dissolution. Finally, in Models 3, 6,

---

3 The results in Table 3, Models 1-6 are based on the addition of ties or holes in the directed network. If we instead model the count of new reciprocal ties (i.e., the number of ties in which both the focal person and the other person cited one another at Time 2, but at least one of them did not cite the other at Time 1), the effects are even stronger: in the model of reciprocal ties added, $\beta_{SM\times Empathy} = 3.19 (p < 0.01)$; in the model of structural holes added in the reciprocal ties network, $\beta_{SM\times Empathy} = 5.05 (p < 0.015)$. To conserve space, we do not report full tables (they are available upon request), but we note that support for Hypothesis 2 appears to be very robust.
9, and 12, we introduce the interaction between self-monitoring and empathy. Results indicate that the interaction is positive and significant on the addition of both ties (Model 3; \( p < 0.05 \)) and structural holes (Model 6; \( p < 0.051 \)): similar to the cross-sectional results of Table 2, the evidence marshaled in Table 3 shows that high self-monitors experience greater network churn than low self-monitors, but that high self-monitors augment their networks at a faster rate when they are also perceived to be high in empathy. The results in Models 3 and 6 thus support Hypotheses 2b and c, respectively. Finally, and for comparison, we note that the interaction between self-monitoring and perceived empathy is insignificant in Models 9 and 12. These results suggest that, consistent with our theoretical argument, when an individual is not motivated to form a connection with another person, perceptions of her empathy matter little.

In our alter-centric hypothesis, we argued that the mechanism by which empathy moderates the effect of self-monitoring on brokerage lies in the greater ability of high-empathy people to induce others to reciprocate social ties, compared to low-empathy people. To test this hypothesis, we estimated dyad level logit models of tie formation or dissolution by Time 2, conditional on the dyadic relation at Time 1. Across all the models in Table 4, our dependent variable is a binary indicator for whether the other member of the dyad reports a tie to the focal member at Time 2, as a function of the focal actor’s empathy and self-monitoring scores and their interaction.

[TABLE 4 HERE]

In Models 1–3, we examine the subset of our sample (N = 61,180 dyads) in which neither member of the dyad reported social relations with the other at Time 1; this is the risk set of dyads in which the formation of a new tie is possible. Results in Model 1 indicate a significant (\( p < 0.01 \)) effect of the focal actor’s level of self-monitoring on whether others report new ties with
them: a one-standard-deviation increase in self-monitoring score (over the mean value) implies a 17% increased likelihood of tie formation. In Model 2, we add the main effect of others’ perceptions of the focal actor’s empathy to the model and find that it, too, exerts a strong independent effect on whether others report socializing ties with her; increasing perceived empathy score from its mean by one standard deviation implies an 8% higher probability of tie formation. Model 3 adds an interaction between perceived empathy and self-monitoring and, consistent with our earlier findings, their interaction is positive and significant ($\beta = 2.100; p < 0.01$). High-empathy high self-monitors are better able to induce others to form new ties with them than are people who are lower in these qualities.

In Models 4–6 of Table 4, we zero in on those dyads in which the focal actor may be actively trying to form a tie: specifically, we look at the subset of dyads ($N = 2,926$) in which the focal actor reported a tie at Time 1 but the other actor did not. Results in Models 4 and 5 indicate that in these dyads, neither self-monitoring nor perceived empathy has a significant main effect on the propensity of the other actor to reciprocate the tie to the focal actor by Time 2. But in Model 6, we see that their interaction is positive and significant ($\beta = 2.155; p < 0.05$): consistent with our hypothesized moderating effect, high empathy high self-monitors are better able to induce reciprocity in others than are people who are lower in one or both of these qualities. Thus, we also find support for Hypothesis 3.

Finally, and for comparison, we also examine dyads in which the focal actor did not report a Time 1 tie, but the other member of the dyad did. In such dyads, there is little evidence that the focal actor wants a social relation; as such, neither her motivation nor her ability to engender positive affect in others should matter for whether or not the other person continues to report a tie at Time 2. And indeed, in Models 7–9, self-monitoring, perceived empathy, and their
interaction are all statistically insignificant predictors of a Time 2 tie. Thus, the evidence marshaled in Table 4 supports Hypothesis 3: the mechanism for the moderating effect of perceived empathy lies in its role in engendering reciprocity in social relations.

**DISCUSSION AND CONCLUSION**

We have long known that social networks confer advantages to well-connected individuals. In seeking to unpack the antecedent conditions for the formation of networks rich in brokerage, the self-monitoring personality type has drawn significant scholarly interest. In this paper, we build on the self-monitoring research by developing an alter-centric theoretical perspective that integrates macro-structural views of networks and their benefits with micro-level views on the social psychology of brokerage, focusing on interactions at the dyad level. Consistent with this perspective, we find positive interactions of self-monitoring and perceived empathy in their effect on: brokerage in the cross-section; the formation of new ties and new structural holes over time; and the successful inducement of reciprocity in dyads. Together, these findings lend support to the view that greater consideration of others’ interest in forming ties with high self-monitors is one path by which we may be able to advance understanding of the micro level processes underlying the formation of social networks.

This research offers several contributions to research and practice. Theoretically, researchers have tended to focus either on a broad, macro-structural level, describing the structure of network advantage, or on a more micro, intra-personal level, describing the psychological antecedents to network structure. In this paper, we argue that significant theoretical purchase can be gained by focusing on an intermediate level of analysis: the potential interaction partners of the focal individual. Based on this alter-centric perspective, we argue, and
find empirical evidence, that the effect of self-monitoring on brokerage will be moderated by the degree to which others perceive the focal individual as empathic and, consequently, choose to reciprocate her ties. More generally, we hope this alter-centric perspective will serve to stimulate more middle-range theories of social network evolution.

An interesting implication of our findings regarding perceived empathy lies in their potential to re-cast a widespread scholarly view of brokers. Contemporary work on brokerage originates with Burt (1992), who fleshed out Simmel’s (1902) notion of the broker as tertius gaudens, or the third who benefits. While brokerage has been associated with positive consequences, the broker has implicitly been portrayed as achieving these benefits through devious or duplicitous means. The tertius gaudens model of brokerage is often perceived as strategic at best and manipulative at worst. Burt (1992: 24-25) himself acknowledges as much when he colorfully concedes that “judging friends on the basis of efficiency is an interpersonal flatulence from which friends will flee.” Nevertheless, virtually all research on brokerage implicitly assumes that the act of deliberately building and maintaining structural holes in one’s network requires strategic behavior that may border on the unsavory. In contrast, the present findings offer a more positive view of brokers: that their ability to build a diverse set of ties rests, in part, on others’ perceptions that they are highly empathic. By adding empathy – an emotional competence that most people view as a positive interpersonal quality – to the empirically-documented repertoire of brokers, our findings paint brokers in a more favorable light in terms of process, as well as consequences.

By highlighting perceived empathy as a moderator of the self-monitoring effect on brokerage, we also help refine the specification of social psychological models of the antecedents of brokerage. High self-monitors, by virtue of their amplified attention to social cues and
concern for impression management, might be expected to convey empathy more effectively than low self-monitors to interaction partners, and one might assume this to be one of the mechanisms by which high self-monitors accrue positions of greater network brokerage. However, we found no positive correlation between self-monitoring and perceived empathy in our data. There was even a negative coefficient on the “other directedness” component of self-monitoring in a regression on perceived empathy, further supporting the importance of including empathy, alongside self-monitoring, in individual-differences models of brokerage acquisition. While additional evidence is needed to more definitively establish the empirical relationship between self-monitoring and perceived empathy, our analysis points to the importance of recognizing the interplay of these two constructs on the processes by which both ties and structural holes get formed, giving rise to brokerage.

More generally, our prediction about the moderation of the self-monitoring–brokerage relationship by perceived empathy is an illustration of the broader principle that achieving interpersonal goals often requires not just intent but also ability. This principle is supported by recent research suggesting that possessing emotional competencies can amplify the effects of individual differences in behavioral preferences or interests. For example, in two studies, the relationships between moral identity and actual prosocial behavior, and between Machiavellianism and observed interpersonal deviance at work, were stronger for individuals higher in emotion-regulation knowledge (Côté et al. 2011). In these cases, successful regulation of one’s own emotions facilitated the achievement of interpersonal goals, whether prosocial or antisocial in nature. In the present research, we found that others’ perception that high self-monitors accurately understand their emotions and perspectives enabled them to fit into diverse social settings, thereby capturing brokerage opportunities.
Of course, this research is not without limitation. Most notably, our sample may lack external validity to the extent that it is difficult to generalize from a population of MBA students. For the present research, we believe that this limitation is both mitigated and offset by compensatory benefits. The validity concern is mitigated because the covariates of interest to us — self-monitoring and perceived empathy — are individual, psychological variables, which we might reasonably expect to be similar in students in a top MBA program, compared to practicing managers. Furthermore, the validity concern may be offset by the fact that we are able to observe the network as it forms, an opportunity that could never occur in a real corporation with on-going operations. Additionally, the fact that MBA student interactions are relatively unaffected by organizational structure (cf. Kleinbaum, Stuart and Tushman 2009) leaves much of the variation to be explained by the covariates of interest to us: personality. For these reasons, we believe that the limitations inherent in an MBA student sample are justified for this research.
Table 1. Descriptive statistics of individual-level variables, including means, standard deviations, and an inter-correlation matrix.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Mean</th>
<th>SD</th>
<th>(1)</th>
<th>(2)</th>
<th>(3)</th>
<th>(4)</th>
<th>(5)</th>
<th>(6)</th>
<th>(7)</th>
<th>(8)</th>
<th>(9)</th>
<th>(10)</th>
<th>(11)</th>
<th>(12)</th>
<th>(13)</th>
<th>(14)</th>
<th>(15)</th>
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<tr>
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<tr>
<td>(3) Reciprocal Ties Added</td>
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<td>6.69</td>
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<tr>
<td>(4) Inward Ties Lost</td>
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<tr>
<td>(5) Reciprocal Ties Lost</td>
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<td>4.13</td>
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<td>0.31*</td>
<td>0.15*</td>
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<tr>
<td>(6) Inward Holes Added</td>
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<td>(7) Reciprocal Holes Added</td>
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<td>0.27*</td>
<td>0.3*</td>
<td>0.22*</td>
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<td>(11) Perceived Empathy</td>
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<td>0.11</td>
<td>0.24*</td>
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<td>(14) U.S. Citizen</td>
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<td>0.29*</td>
<td>0.16*</td>
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<td>0.07</td>
<td>-0.13*</td>
<td>0.54*</td>
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*p < 0.05
Table 2. Regression models of brokerage at the individual level in the Time 2 network. Substantively identical results obtain in a cross-sectional analysis of the Time 1 network.

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<th></th>
<th>DV: Perceived Empathy</th>
<th>DV: Time 2 Brokerage</th>
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<tr>
<td></td>
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<td>(2)</td>
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<tr>
<td>Self-Monitoring</td>
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<tr>
<td>Other-Directedness component (items based on our factor analysis)</td>
<td>-0.066</td>
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<tr>
<td>Other-Directedness component (Briggs &amp; Cheek 1988)</td>
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<td></td>
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<tr>
<td>Perceived Empathy</td>
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<tr>
<td>Self-Monitoring × Perceived Empathy</td>
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<tr>
<td>Female</td>
<td>0.007</td>
<td>0.003</td>
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<td></td>
<td>(0.018)</td>
<td>(0.018)</td>
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<tr>
<td>On Campus Residence</td>
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<td>-0.036</td>
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<td>(0.022)+</td>
<td>(0.022)</td>
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<td>U.S. Citizen</td>
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<td>(0.022)+</td>
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<td>Age ≤ 30</td>
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<td>0.030</td>
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<td>(0.028)</td>
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<td>-0.024</td>
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<tr>
<td>Constant</td>
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<td>0.638</td>
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<td>(0.048)**</td>
<td>(0.045)**</td>
</tr>
<tr>
<td>Observations</td>
<td>266</td>
<td>266</td>
</tr>
<tr>
<td>R-squared</td>
<td>0.05</td>
<td>0.06</td>
</tr>
</tbody>
</table>

Cluster-robust standard errors in parentheses
Section dummies included, but not significant
+ p < 0.10; * p < 0.05; ** p < 0.01.
Table 3. Individual-level Poisson quasi-maximum likelihood regression models of the number of ties added and lost and of the number of structural holes added and lost from Time 1 to Time 2.

<table>
<thead>
<tr>
<th>DV:</th>
<th>Inward Ties Added</th>
<th>Inward Holes Added</th>
<th>Reciprocal Ties Lost</th>
<th>Reciprocal Holes Lost</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(1)</td>
<td>(2)</td>
<td>(3)</td>
<td>(4)</td>
</tr>
<tr>
<td>SM</td>
<td>0.505</td>
<td>0.515</td>
<td>-0.227</td>
<td>1.134</td>
</tr>
<tr>
<td></td>
<td>(0.131)**</td>
<td>(0.134)**</td>
<td>(0.402)</td>
<td>(0.285)**</td>
</tr>
<tr>
<td>Perceived Empathy</td>
<td>0.259</td>
<td>-0.468</td>
<td>0.886</td>
<td>-0.696</td>
</tr>
<tr>
<td></td>
<td>(0.147)+</td>
<td>(0.359)</td>
<td>(0.299)**</td>
<td>(0.822)</td>
</tr>
<tr>
<td>SM × Empathy</td>
<td>1.286</td>
<td>(6.24)*</td>
<td>2.661</td>
<td>1.655</td>
</tr>
<tr>
<td>Female</td>
<td>-0.039</td>
<td>-0.041</td>
<td>-0.031</td>
<td>-0.197</td>
</tr>
<tr>
<td></td>
<td>(0.066)</td>
<td>(0.067)</td>
<td>(0.065)</td>
<td>(0.122)</td>
</tr>
<tr>
<td>On Campus</td>
<td>0.120</td>
<td>0.129</td>
<td>0.127</td>
<td>0.356</td>
</tr>
<tr>
<td></td>
<td>(0.053)*</td>
<td>(0.055)*</td>
<td>(0.053)*</td>
<td>(0.109)**</td>
</tr>
<tr>
<td>U.S. Citizen</td>
<td>0.211</td>
<td>0.197</td>
<td>0.192</td>
<td>0.360</td>
</tr>
<tr>
<td></td>
<td>(0.079)**</td>
<td>(0.077)*</td>
<td>(0.078)*</td>
<td>(0.166)*</td>
</tr>
<tr>
<td>Age ≤ 30</td>
<td>0.244</td>
<td>0.238</td>
<td>0.233</td>
<td>0.610</td>
</tr>
<tr>
<td></td>
<td>(0.104)*</td>
<td>(0.100)*</td>
<td>(0.098)*</td>
<td>(0.224)**</td>
</tr>
<tr>
<td>White</td>
<td>-0.009</td>
<td>0.000</td>
<td>0.006</td>
<td>-0.145</td>
</tr>
<tr>
<td></td>
<td>(0.071)</td>
<td>(0.069)</td>
<td>(0.072)</td>
<td>(0.157)</td>
</tr>
<tr>
<td>Constant</td>
<td>2.113</td>
<td>1.949</td>
<td>2.369</td>
<td>4.803</td>
</tr>
<tr>
<td></td>
<td>(0.105)**</td>
<td>(0.136)**</td>
<td>(0.217)**</td>
<td>(0.250)**</td>
</tr>
<tr>
<td>Observations</td>
<td>266</td>
<td>266</td>
<td>266</td>
<td>266</td>
</tr>
</tbody>
</table>

Cluster-robust standard errors in parentheses
Section dummies included, but not significant
+ p < 0.10; * p < 0.05; ** p < 0.01
Table 4. Dyad-level logistic regression models of reciprocity over time. Models 1–3 show the effects of self-monitoring and empathy on the formation of new ties by including in the model only those dyads in which both dyad members report no tie at Time 1; the dependent variable is a binary indicator of whether the other person cites the focal person at Time 2. In Models 4–6, observations were included when the focal actor reported a tie to the particular contact at Time 1, but that tie was not reciprocated at Time 1; the models show the role of self-monitoring and empathy in inducing reciprocity by Time 2. In contrast, Models 7–9 include observations in which a particular contact reported an unreciprocated tie to the focal actor at Time 1; in this case, empathy and self-monitoring played no role in determining whether that tie persisted to Time 2.

<table>
<thead>
<tr>
<th>Subset:</th>
<th>No Time 1 Tie</th>
<th>Time 1 Tie Outward only</th>
<th>Time 1 Tie Inward only</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(1)</td>
<td>(2)</td>
<td>(3)</td>
</tr>
<tr>
<td>Self-Monitoring</td>
<td>0.715</td>
<td>0.730</td>
<td>-0.491</td>
</tr>
<tr>
<td>Perceived Empathy</td>
<td>0.478</td>
<td>-0.707</td>
<td>-0.190</td>
</tr>
<tr>
<td>SM × Perceived Empathy</td>
<td>2.100</td>
<td>(0.61)**</td>
<td>0.355</td>
</tr>
<tr>
<td>Female</td>
<td>0.066</td>
<td>0.061</td>
<td>0.078</td>
</tr>
<tr>
<td>On Campus Residence</td>
<td>-0.040</td>
<td>-0.022</td>
<td>-0.024</td>
</tr>
<tr>
<td>U.S. Citizen</td>
<td>0.215</td>
<td>0.194</td>
<td>0.187</td>
</tr>
<tr>
<td>Age ≤ 30</td>
<td>0.293</td>
<td>0.281</td>
<td>0.274</td>
</tr>
<tr>
<td>White</td>
<td>0.042</td>
<td>0.054</td>
<td>0.063</td>
</tr>
<tr>
<td>Same Section</td>
<td>0.740</td>
<td>0.740</td>
<td>0.741</td>
</tr>
<tr>
<td>Same Study Group</td>
<td>1.590</td>
<td>1.600</td>
<td>1.598</td>
</tr>
<tr>
<td>Both On Campus</td>
<td>0.350</td>
<td>0.350</td>
<td>0.350</td>
</tr>
<tr>
<td>Same Gender</td>
<td>0.312</td>
<td>0.312</td>
<td>0.313</td>
</tr>
<tr>
<td>Constant</td>
<td>-4.456</td>
<td>-4.762</td>
<td>-4.074</td>
</tr>
<tr>
<td>Observations</td>
<td>61,180</td>
<td>61,180</td>
<td>61,180</td>
</tr>
</tbody>
</table>

Standard errors in parentheses are robust to clustering around both dyad members simultaneously. Section dummies included, but not significant.

+ p < 0.10; * p < 0.05; ** p < 0.01
Figure 1. Illustration of the dynamic process of the formation and loss of structural holes. When a structural hole is added through expansion, the two alters are left unlabeled at Time 1 because it is arbitrary whether $j$ or $k$ is connected to $i$ at Time 1. Similarly, when a structural hole collapses, it may be because $i$’s tie to either $j$ or $k$ was severed; for this reason, the alters are left unlabeled at Time 2.
REFERENCES


