

Do You Two Know Each Other? Transitivity, Homophily, and the Need for (Network) Closure

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The authors investigate whether need for closure affects how people seek order in judging social relations. In Study 1, the authors find that people who have a high need for closure (NFC) were more likely to assume their social contacts were connected to each other (i.e., transitivity) when this was not the case. In Studies 2 and 3, the authors examine another form of order in network relations—racial homophily—and find that high-NFC participants were more inclined to believe that 2 individuals from the same racial category (e.g., African American) were friends than two racially dissimilar individuals. Furthermore, high-NFC individuals were more likely to make errors when judging a racially mixed group of people; specifically, they recalled more racial homophily (racially similar people sitting closer together) than had actually appeared.

Keywords: need for closure, cognitive networks, homophily, race

People often make mistakes in judging social relations among their peers (DeSoto, Henley, & London, 1968; Rubin & Zajonc, 1969; von Hecker, 1997; Zajonc & Sherman, 1967). For example, rather than assume that two individuals lack a relationship, a focal actor will tend to overestimate the extent to which a social relationship exists. Previous research suggests that common personality constructs cannot explain individual differences in perceiving network relations (Janicki & Larrick, 2005). However, we propose that some individuals, particularly those who have a high need for closure (NFC), are prone to commit these errors because it satisfies their preference for order in understanding social relations.

We advance the idea that cognitive closure and cognitive networks are linked in a way that can account for errors in judging the existence of interpersonal relations. In particular, we suspect that individuals with a high NFC will look for order in patterns of network ties in order to avoid feelings of ambiguity. We focus here on two forms of order in social relations: transitivity and racial homophily. Both represent key areas of interest for network researchers and are stable and reliable trends in how network connections emerge (Lin, 2001; Louch, 2000). Indeed, the concept of closure (connecting two direct contacts) is considered a critical characteristic of social networks (Burt, 1992), and racial homophily is generally viewed as a defining feature of network connections in the United States (McPherson, Smith-Lovin, & Cook, 2001, p. 420).

Our aim in the present research was to make three central contributions to the literatures on NFC and social networks. First, we hypothesize that an individual's NFC affects his or her perception of social networks (i.e., who knows whom). Second, we introduce the concept of network closure to theory and research on cognitive closure. Specifically, we propose that NFC (a personality trait) and network closure (a social structural condition) have a strong, positive connection. Third, we propose that the association between NFC and how people judge the presence of a social relationship will be most pronounced in judgments of racially similar dyads, thereby adding to a growing stream of research on the connection between NFC and perceived homogeneity.

NFC

According to Kruglanski (1990), NFC refers to an individual's desire for "an answer on a given topic, any answer, as compared to confusion and ambiguity" (p. 337). Need for closure can be situationally induced (e.g., by an increase in time pressure or ambient noise), and it can vary in strength across individuals (Webster & Kruglanski, 1994) and cultures (Mannetti, Pierro, Kruglanski, Tavis, & Bezinovic, 2002). As a personality trait, NFC represents a stable difference in an individual's motivation to engage in elaborate thought processes (Neuberg, Judice, & West, 1997). A person with a high NFC prefers order and predictability and experiences discomfort when faced with ambiguity (Van Hiel & Mervielde, 2003). People who rate low on NFC tend to be less decisive and more open-minded, which enables them to express more ideational fluidity and creativity (Chirumbolo, Livi, Mannetti, Pierro, & Kruglanski, 2004).

NFC has been conceptualized as a unidimensional construct, but both theory and research point to its multidimensional quality (Kruglanski et al., 1997; Neuberg et al., 1997). Empirical analyses

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of measures of NFC reveal two underlying factors that are related, but not completely overlapping. One factor refers to the *desire for decisiveness*, which is the motivation to attain closure as soon as possible, and the other refers to the *need for simple structure*, which is the motivation to maintain closure for as long as possible. Kruglanski and Webster (1996) described these two dimensions of NFC as “seizing” (a tendency to value decisiveness in oneself and others) and “freezing” (a tendency to maintain intuitions, attitudes, and social rules with some degree of permanence). Seizing reflects a sense of urgency, in which delays are viewed as bothersome and inefficient. Freezing reflects a preference for permanence, in which knowledge is safeguarded and assumptions are held fast.

Perceiving Network Closure

Social networks depict the pattern of interpersonal relations among a set of individuals (Burt, 1992; Granovetter, 1973). Such patterns can help explain many critical outcomes, ranging from conferrals of power and status (e.g., Brass & Burkhardt, 1993) to intraorganizational job mobility and performance (e.g., Podolny & Baron, 1997). One of the most heavily studied patterns in social networks is network closure. From the perspective of a focal individual (A) who is connected to two peers (B and C), cases in which the peers are not directly connected (B does not know C) are referred to as “structural holes” by network researchers, and cases in which the two peers are connected (A, B, and C all know one another) are referred to as “network closure.” Structural holes have been shown to be advantageous in cases in which being a broker can afford strategic gains (Burt, 1992), and network closure has been shown to be advantageous in cases in which trust is essential for strong performance (Coleman, 1988, 1990). The most advantageous network positions combine both features (Reagans & Zuckerman, 2008).

Although the study of social networks has long been of interest to sociologists, the *perception* of social networks (referred to as “cognitive networks”) has recently become a keen interest of social psychologists (e.g., Flynn, Reagans, Amanatullah, & Ames, 2006; Janicik & Larrick, 2005; Kilduff, Crossland, Tsai, & Krackhardt, 2008; Krackhardt & Kilduff, 1999). Can people judge “Who is friends with whom?” and “Who influences whom?” in their social groups? As Janicik and Larrick (2005) argue,

accurately learning the pattern of interpersonal relations is often critical to predicting future behavior and acting appropriately in important social contexts, such as forming a successful team, inviting the right people to a gathering, or finding critical allies in a work organization (p. 348).

Although people may clearly be motivated to accurately judge their own and others’ network ties, such accuracy may be difficult to obtain (see Ibarra, Kilduff, & Tsai, 2005). People are generally less aware of others’ patterns of interaction, or their feelings of friendship, relative to their own. As a result, we must often judge the existence of social relations by relying on cues, hearsay, or our own assumptions. Armed with such indirect sources of information, our judgments may be invalid and full of systematic errors. Indeed, in a recent study, Kilduff et al. (2008) found that most people tend to assume their social networks are characterized by higher levels of network closure (i.e., people arranged in dense clusters) than is actually the case.

The notion that people make mistakes in judging the existence of a social tie is well established (Janicik & Larrick, 2005). Early psychological studies suggested that individuals were prone to commit numerous errors when learning the structure of ties in social networks (see De Soto, 1960; Zajonc & Burnstein, 1965a, 1965b; Zajonc & Sherman, 1967). In particular, individuals more often misperceive social ties by assuming a relationship exists when it does not rather than assuming a relationship does not exist when in fact it does (e.g., De Soto et al., 1968; Freeman, 1992; Goldstone, 2000; Picek, Sherman, & Shiffrin, 1975). This tendency is presumed to characterize all individuals, but we wonder whether it characterizes some more than others. In particular, are those individuals who prefer closure more likely to see it in their social world?

The Link Between NFC and Network Closure

Research on the factors that lead to closure in cognitive networks (i.e., assuming two people have a relationship) has tended to focus on situational conditions that increase the perception of closure (e.g., Rubin & Zajonc, 1969; von Hecker, 1997). In contrast, individual differences in perceiving network relations have only recently begun to receive attention. Janicik and Larrick (2005) found that people who were more exposed to “missing” relations could more easily recognize and learn other missing relations. The authors did not find much evidence that a specific set of personality traits, including agreeableness, Machiavellianism, and self-monitoring, could influence an individual’s ability to accurately recall incomplete networks. However, Flynn et al. (2006) found evidence that high self-monitors were better judges of others’ relations, in general (though the researchers did not distinguish between judgments of present and absent relationships).

In judging social relations, people are inclined to assume that social relations are present rather than absent (De Soto et al., 1968; Janicik & Larrick, 2005). One special case of this “presence versus absence” heuristic is the principle of transitivity. According to Janicik and Larrick,

if a transitive relation exists among three members of a set, such as X, Y, and Z, then the existence of a relation between X and Y ($X \text{ r } Y$) and between Y and Z ($Y \text{ r } Z$) implies that it will also exist between X and Z ($X \text{ r } Z$) (p. 348).

Transitivity is an intuitively appealing rule that can be applied quickly and easily in attempting to understand a set of social relations. It may be particularly appealing to individuals with a high NFC who seek clarity in perceiving the social relations that surround them.

We suggest that the personality construct of NFC may influence the perception of network closure because it leads people to overuse the rule of transitivity. Such an effect could be driven by multiple factors. For example, a critical cause of cognitive closure is the strong desire for decisiveness in perceiving and understanding the social world (Neuberg et al., 1997). Such a keen desire for decisiveness can begin with seizing (prompting people to apply simple heuristics to a wide range of complex problems) and eventually develop into freezing, or maintaining a firm belief in the value of such rules, even in the presence of conflicting information (Jost, Glaser,

Kruglanski, & Sulloway, 2003; Tetlock, 2005). This “freezing” dynamic is often referred to as *specific* closure, which is the desire for a specific answer, one that creates or maintains a clear structure. In the context of judging social relations, transitivity would provide a specific answer to a complex problem.

Another factor that may lead individuals with a high NFC to overuse the rule of transitivity is their preference for stability in distributed knowledge across individuals. Networks with more structural holes are characterized by a high level of diversity (in terms of attitudes, perspectives, and access to resources). Conversely, networks with fewer structural holes (i.e., more closure) tend to be characterized by greater redundancy and consensus (see Burt, 1992, for evidence). As Kruglanski and Webster have argued (e.g., Kruglanski & Webster, 1996; Webster & Kruglanski, 1994), individuals with a high NFC crave shared reality. Such a sense of shared reality, or social consensus, might only be obtained if individual members of their social system had relations with each other and were capable of forming consensus (i.e., the network had a high level of closure).

Presumed Racial Homophily and NFC

The principle of homophily—the tendency for individuals to associate and bond with similar others—has received rich support in research by social psychologists, sociologists, and anthropologists. Similar people are physically attracted to one another (Buss & Barnes, 1986; Watson et al., 2004), tend to communicate more often (Newcomb, 1961), and are even likely to show mutual preference in hiring decisions (Sacco, Scheu, Ryan, & Schmitt, 2003). The phenomenon of homophily is well understood by most individuals, even those who lack sophisticated training and education about human relations. But, are some people less accurate in detecting homophily? Specifically, do those individuals with a high NFC overestimate the extent to which homophily characterizes social relations, particularly relationships among members of the same racial group?

NFC has been linked to racial judgments before. Studies of authoritarianism, which has long been connected to racial prejudice, show a moderately strong association with NFC (Webster & Kruglanski, 1994). In addition, Shah, Kruglanski, and Thompson (1998) found that having a high NFC strengthened ingroup/outgroup bias: simultaneously increasing ingroup favoritism and outgroup derogation. A series of studies conducted by Kruglanski, Shah, Pierro, and Mannetti (2002) went one step further, arguing that individuals with a high NFC liked ingroups and outgroups more to the extent that the groups were composed of highly homogeneous group members. That is, having a high NFC predisposed individual perceivers to evaluate homophilous affiliations more favorably than heterophilous affiliations.

People with a high NFC clearly *prefer* homophily, but could it be that the same people clearly *perceive* homophily, even in situations in which it does not exist? When presented with a question about the existence of a social relationship, such as “Are John and Mark friends?”, an individual’s NFC may prompt a narrow information search in an effort to identify the correct response as soon as possible (Van Hiel & Mervielde, 2003). In these judgments, one of the most salient pieces of information available to the focal individual is whether two individuals are members of the same racial category. Given that racial homophily

is a strong feature of network connections in the United States (e.g., McPherson et al., 2001, p. 420),¹ individuals with a high NFC may seize on similar racial categories as being diagnostic of some personal affiliation.

There may also be a freezing dynamic that links NFC to judgments of racial homophily. Individuals with a high NFC tend to perceive collections of individuals as entitative groups (Kruglanski et al., 2002). This allows the application of knowledge across individual cases rather than having to form new knowledge with every new individual, or every new pair of individuals. In this sense, a high-NFC individual can avoid epistemic instability in judging social relations by imposing a sense of order on their understanding of the social world (i.e., racial homophily is the rule rather than the exception). Consequently, when people are asked to judge the existence of racially similar and racially dissimilar social relations, those high in NFC may be more likely to assume social ties exist among racially similar pairs than racially dissimilar pairs (i.e., presumed racial homophily), whereas those low in NFC will distinguish less between these two cases.

Overview of Studies and Predictions

We make two central predictions that relate to two powerful features of social network structure. First, we posit that individuals with a high NFC will perceive more evidence of network closure than those individuals with a low NFC. That is, people with a high NFC will be more likely to assume that two people they know also know each other when in fact they do not. Second, we expect to find strong evidence of a “presumed racial homophily” effect in judgments made by high-NFC individuals of others’ interpersonal relations.

We tested these predictions in three studies. In Study 1, we measured people’s perceptions of interpersonal relations among members of their social group to determine whether NFC led to greater perceptions of network closure (via the principle of transitivity). In Study 2, we asked people to sketch diagrams of social relations among a group of unfamiliar targets to test whether those with a high need for closure were more likely to draw direct ties among racially similar people rather than racially dissimilar people. In a third study, we asked participants to review and then recall pictures of people gathered in small groups and investigated whether participants who had a high NFC were more likely to erroneously recall racial homophily in each picture.

Study 1

Method

Participants. Fifty-three students enrolled in a 1-year Master’s of Business Administration (MBA) program at a West Coast university participated in this study. During their time in the

¹ We considered whether our effects could be replicated using gender rather than race as the demographic variable of interest. Our suspicion is that the effect of gender will not be as pronounced, primarily because individuals both experience and observe more gender intermixing (McPherson et al., 2001). Thus, a “gender homophily” heuristic may be less likely to develop than a “racial homophily” heuristic.

program, students were required to take courses with the same group of fellow students. Of the participants, 75% were men, 42% were White, 34% were Asian, 20% were Hispanic, and 2% were Black (4% did not report race). The composition of the group was stable (no change in membership over the course of the year). Furthermore, the participants had ample opportunity to observe interactions among their colleagues because they spent a considerable amount of time with each other, as a group, in and outside of the classroom.

Procedure. Participants were asked to complete a questionnaire that assessed their relationships with classmates, as well as their perceptions of relationships among classmates. The questionnaire was administered 6 weeks into the students' classroom experience. The design of the questionnaire followed closely on that originally developed by Krackhardt (1987) and later adapted by Flynn et al. (2006). The first section presented a complete list of students in the program. Using this list, participants were asked to indicate "Whom would you go to for help or for advice if you had a question or a problem? Such help or advice might include assistance on a course assignment, copies of notes from classes you may have missed, career consultations, or other things." Piloting of the survey suggested that these kinds of behaviors were both typical and meaningful.

On a separate page, participants were presented with the same list of individuals, but in this case they were asked to indicate who might come to them for help or advice. We measured both sides of each dyadic relation because people can have different impressions of the same relationship (Krackhardt, 1987; Laumann & Knoke, 1987).

In addition to reporting their own ties, participants were also asked to describe ties among other members of their class (see Krackhardt, 1987). Given our classroom size, asking participants to rate every possible dyadic relation would have been time-consuming and could have affected the quality of their responses; instead, we randomly selected five classmates for each participant and asked him or her to describe the advice/helping relations for each of these five individuals. Specifically, participants were presented with a customized grid, which included the names of each individual in the class in the rows and the five randomly assigned colleagues in the columns. Following others (e.g., Flynn et al., 2006; Krackhardt, 1987), each participant was asked to indicate which of their classmates listed in each of the columns would go to those listed in the rows for help or advice.

Participants were also asked to complete the 47-item Need for Closure Scale developed and validated by Webster and Kruglanski (1994). Items were rated on a 6-point scale ranging from 1 (*Strongly disagree*) to 6 (*Strongly agree*) ($M = 152.13$, $SD = 18.308$). Sample items include "I think that having clear rules and order at work is essential for success"; "I dislike questions which could be answered in several different ways"; and "I enjoy the uncertainty of going into a new situation without knowing what might happen" (reverse scored). To ensure the validity of responses, the Need for Closure Scale includes five items (e.g., "I have never hurt another person's feelings" and "I believe that one should never engage in leisure activities") that one would expect to receive low ratings of agreement. Following the guidelines outlined by Webster and Kruglanski, we summed a "lie score" for these five items and removed individuals from the sample who received a score of 15 or higher ($n = 3$). For the remaining individuals, we summed

the other 42 items (including reverse-scored items) to create an overall NFC score. The overall reliability (coefficient alpha) for this scale was .86.

The response rate for the questionnaire, which took about 20 min to complete, was 96%.

Results

To test our prediction about the link between NFC and transitivity (i.e., perceived network closure), we analyzed participants' reports of the relationships that exist among their colleagues. For any relationship between two colleagues, our dependent variable ("connection in cognitive network") is binary: The value is 1 if the respondent believed two of his or her colleagues were connected by a helping or advice relationship, and the value is 0 if he or she believed these two colleagues were not connected by such a relationship. We focus our analysis on cases in which the two individuals being rated were not connected (according to their own reports). Thus, any factor that affected the dependent variable reflected an individual's ability to recognize structural holes or to accurately describe missing network connections.

To analyze these data, we used a two-way random effects model (see Rabe-Hesketh & Skrondal, 2005) rather than other multi-level models, like hierarchical linear modeling (HLM). HLM is appropriate when lower order units (e.g., students) are nested within higher order units (e.g., classrooms), but that is not the case here. In this case, each respondent is asked to evaluate relationships among a subset of his or her colleagues, and multiple respondents are asked to evaluate the same relationship. If each respondent was asked to evaluate a distinct set of relationships, our relationships would be nested, but instead our respondents and relationships are "crossed." A two-way random effects model is better suited to analyze these crossed data (Rabe-Hesketh & Skrondal, 2005).

Two other advantages of the two-way random effects model stand out. First, we have multiple observations for each individual respondent, and this kind of clustering violates the independence assumption in regression analysis. The random intercepts for individual respondents allow us to adjust our standard errors for clustering of this kind. Second, unmeasured features of a specific pair of classmates could have affected the judgment of their relationship. In a two-way random effects model, the random intercepts for classmates allow us to control for unmeasured features of a specific pair of classmates that could have affected how their relationship was perceived.

We are interested in the tendency for individuals with a high NFC to assume network connections are transitive, or characterized by closure. To examine this issue, we first created a categorical variable describing the relationship from the focal individual to specific pairs of classmates. The focal individual could have been disconnected from both classmates, connected to one but not the other, or connected to both. We then created two categorical variables to measure the strength of the relationship from the respondent to a specific pair of classmates. Connected to one was set equal to 1 if the focal individual was connected to only one colleague but remained equal to 0 otherwise. Connected to both was set equal to 1 if the focal individual was connected to both colleagues but remained equal to 0 otherwise.

Our dependent variable (connection in cognitive network) was regressed on the two tie strength variables, the NFC variable, and the interaction between the NFC and two tie strength variables. We mean centered the NFC variable before multiplying it with each tie strength variable to create the relevant interaction terms. The coefficients for each variable in the regression are reported in Table 1. As shown in the table, the main effects for the tie strength variables are not significantly different from zero. However, the interactions are significant and indicate that if a high-NFC individual was connected to one ($\beta = .030, p < .05$) or both ($\beta = .103, p < .05$) classmates, he or she was more likely to report the classmates were connected to each other, whereas low-NFC individuals were less likely to report the classmates were connected to each other. Given that the classmates were, in fact, not connected, low-NFC individuals were more likely to describe these relationships accurately.

The empirical results are illustrated in Figure 1. The vertical axis is the predicted probability the respondent (i.e., A) reports a tie between two classmates (i.e., B and C) in the cognitive network. The horizontal axis is NFC. When A was connected to both colleagues, an increase in NFC was associated with an increased tendency to report a tie between B and C. Thus, as an individual's NFC increased, he or she was more likely to assume the triad involving B and C was transitive or characterized by closure. We observed a similar pattern when the respondent was connected to only one colleague, but the increase was not as dramatic.

Finally, when A was not connected to either colleague, an increase in NFC reduced the likelihood of reporting a tie between B and C (instances in which A, B, and C are disconnected often are referred to as *vacuous* transitivity; see Holland & Leinhardt, 1971, p. 123). The fact that NFC increased the accuracy of network perception when a triad was vacuous but reduced accuracy when a triad was imbalanced might indicate that consensus is a viable explanation for the link between NFC and transitivity. Shared reality cannot be provided by the absence of ties, and so the tendency for high-NFC individuals to accurately describe vacuous triads suggests that high-NFC individuals are more likely to exaggerate the presence of relations rather than their absence.

Noting that previous research using the Need for Closure Scale has occasionally found different effects for the subscale of Decisiveness, we separated the NFC measure into two separate measures—the Decisiveness subscale ($\alpha = .64$) and the remainder of the scale (i.e., Need for Simple Structure, $\alpha = .87$). Looking at these subscales individually, in separate regressions, we do not find any significant interaction effect between these measures and the tie strength variables on transitivity.

Overall, the empirical results indicate that high-NFC people have a clear preference for transitivity (in particular, the existence of a relationship) in perceiving social networks. The pattern of findings in our empirical analysis is consistent with our hypothesis that individuals with a high NFC would be more likely to erroneously assume their relationships with others were transitive (i.e., they are more likely to perceive closure in their own social relations even when it does not exist).

Discussion

In Study 1, we found that individuals who had a high NFC were more likely to make errors that reflected transitivity, or closure, in their cognitive networks. In other words, high-NFC individuals were more prone to assume that two direct contacts in their social network knew each other when in fact this was not the case (according to the other parties' reporting of their own network ties). Put differently, high-NFC individuals appear to be less able than low-NFC individuals to recognize structural holes in their social networks (cf. Janicik & Larrick, 2005).

In the next study, we move from an actual social network to an artificial network that is constructed by the participant. With these data, we aim to test our second prediction that high-NFC people may be especially inclined to assume the existence of a relationship when asked to evaluate racially similar ties, compared with racially dissimilar ties. Unfortunately, we were unable to test this idea using the data from Study 1, partly because we did not have sufficient diversity (there was only one African American student) and partly because many of the students could not be reliably categorized as racial minorities by a pair of independent raters (e.g., many of the Hispanic students were mislabeled as "Caucasian"). Thus, in our second study we turned to a laboratory setting in which we could control the number of connections in the network, the ratio of racially similar and dissimilar relationships, and whether the race of each individual in the network could be easily recognized.

Study 2

In Study 2, we tested our assumption that people with a high NFC would show a stronger preference for racially homophilous ties than would individuals with a low NFC by asking participants to draw network diagrams using photographs of individuals they had never seen before. We expected that people with a high NFC would draw a higher percentage of racially homophilous connections (e.g., two African American photos). Furthermore, we expected that people with a high NFC would locate these racially homophilous individuals closer together in a network diagram (i.e., draw lines of a shorter distance to connect them).

Method

Participants. Forty-nine students at a West Coast university participated in this study in exchange for a \$10 gift card from a popular online retailer. Two participants were removed from the data set for having lie scores that exceeded 15 on the Need for Closure Scale. Our sample consisted of 20 men (43%) and 27 women (57%); 13 of the participants were White, five were Black, 22 were Asian, four were Hispanic, and three reported their race as "other."

Procedure. Participants were asked to draw a diagram of the relationships that existed between 16 people described to them only as "fellow students." At the beginning of the session, participants were given a set of 16 2 in. \times 2 in. color photographs, in which an individual was shown, from the shoulders up, smiling directly into the camera. The individuals depicted in the photographs included eight White students (four male and four female),

Table 1
Summary of Regression Analyses for Studies 1, 2, and 3

Predictor variable	Study 2				Study 3	
	Study 1: Connection in cognitive network	Connection in network diagram	Connection in network diagram	Closeness in network diagram	Closeness at cafeteria table	Closeness at cafeteria table
Constant	-3.806* (2.174)	-1.125* (.261)	-1.112* (.258)	18.280* (4.449)	18.280* (4.449)	1.844* (.075)
NFC	-.008 (.014)	-.004* (.001)	-.004* (.001)	.015 (.028)	.015 (.028)	-.0001 (.0004)
Connected to one	-.257 (.262)					
Connected to both	-.732 (.810)					
NFC × Connected to One	.030* (.014)					
NFC × Connected to Both	.103* (.051)					
Same race		1.346* (.105)		4.420* (.392)		
NFC × Same Race		.010* (.002)		.060* (.009)		-.008* (.008)
Both White			1.107* (.104)			.0006* (.0002)
Both Asian American			1.631* (.191)		3.684* (.424)	-.009 (.008)
Both African American			2.063* (.192)		5.865* (.818)	-.0137 (.0275)
NFC × Both White			.008* (.002)		6.408* (.818)	.0213 (.0275)
NFC × Both Asian American			.013* (.004)		.051* (.010)	.0005† (.0002)
NFC × Both African American			.014* (.004)		.099* (.020)	.0018† (.0009)
Log likelihood	-643.58	-2812.05	-2799.89	-20454.56	-20449.86	.0019* (.0009)
Wald chi-square	36.98	181.15	246.82	169.04	200.21	-33107.32
Degrees of freedom	4	3	7	3	7	6.42
Number of observations	8,735	5,640	5,640	5,640	5,640	30,870

Note. Table includes unstandardized regression coefficients with standard error of coefficient in parentheses. NFC = need for closure.
† $p < .10$. * $p < .05$.

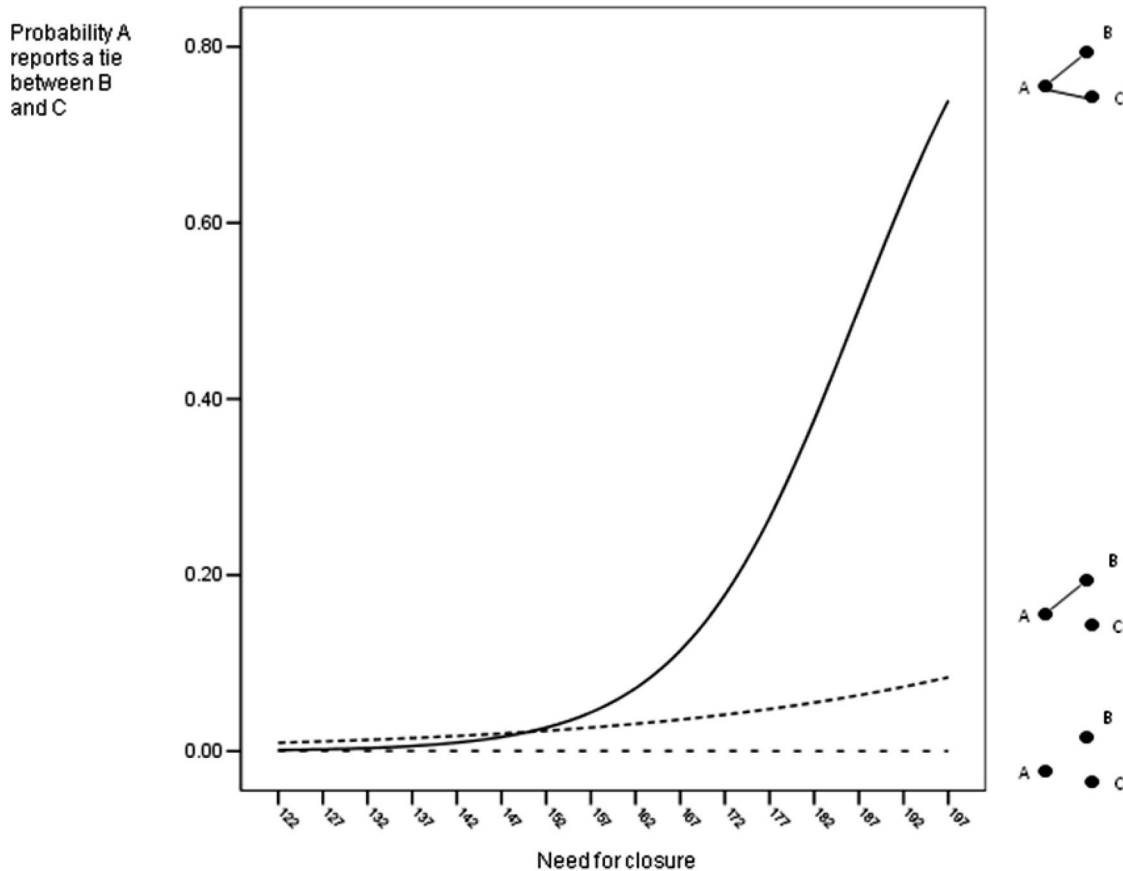


Figure 1. The positive relationship between need for closure and transitivity in a cognitive network.

four African American students (two male and two female), and four Asian American students (two male and two female).² Before proceeding, the experimenter asked participants whether they knew any of the individuals shown in the photographs. Each participant confirmed that they did not.

To ensure the participants could easily recognize the race of the individuals depicted in the photograph, an independent sample of 50 individuals was asked to review the photos and guess whether the person shown was (a) White, (b) African American, or (c) Asian American. Out of 800 responses, only eight were incorrect, which assured us that the racial categories were clear. Nevertheless, the individuals depicted in the photographs may come across as “atypical” members of their racial category (see Eberhardt, Davies, Purdie-Vaughns, & Johnson, 2006). To ensure these individuals were not atypical, members of the independent sample were asked to rate the typicality of each photo (after they had sorted the photographs into racial categories). When asked to evaluate White photos, raters were asked “How much does this person look like a typical White person?” and instructed to provide their responses using an 8-point scale ranging from 1 (*not typical at all*) to 7 (*very typical*) (the wording was adjusted for African American and Asian American photos). The mean typicality scores for each photo ranged from 4.98 to 6.55, all well above the midpoint of the scale. More importantly, the typicality ratings did not differ significantly across racial categories ($p = .99$).

The experimenter explained to the participants that 30 actual relationships existed among the 16 individuals shown in the photographs (in fact, these individuals were unfamiliar with one another). The participant’s task was to guess “who knows whom” and to indicate each of these 30 relationships by drawing a line from one picture to another. Participants were given a 22 in. \times 28 in. poster board and some adhesive tape to construct a network diagram using the 16 photos. Participants had 15 min to complete this task (pilot testing confirmed that this was ample time). To motivate participants to give us their honest guesses of “who knows whom,” the additional incentive of an iPod Nano was offered for the participant who was most “accurate” in predicting the actual network of relationships. One randomly selected participant received the iPod Nano after the study was completed.

Each participant completed their diagrams in the time allotted. After the participants had finished, the experimenter collected the diagram materials and replaced them with the Need for Closure

² We wanted to have at least four people from each minority racial category (Asian and Black) to minimize the possibility of an idiosyncratic photo driving the effect (thus two men and two women for both the Asian and Black category). In addition, we did not wish to go beyond this number because we did not want participants to think that the study was about race and that the distribution seemed notably atypical.

Scale (Webster & Kruglanski, 1994) described in Study 1. Again, sample items from the Need for Closure Scale include “I don’t like situations that are uncertain” and “I enjoy having a clear and structured mode of life.” Participants were instructed to rate the extent to which they agreed with each item on a 6-point scale ranging from 1 (*strongly disagree*) to 6 (*strongly agree*). Following Webster and Kruglanski (1994), responses to the scale’s 47 items (excluding the “lie” items) were summed to create an overall measure of each participant’s need for closure ($M = 151.17$, $SD = 26.61$; $\alpha = .63$).³

Results

Given that relationships between photo pairs (i.e., dyadic relationships) were the unit of analysis, we had multiple observations for each individual participant in our sample. Again, this kind of clustering violates the independence assumption in regression analysis. Moreover, unmeasured features of a particular photo pair could have affected how their relationship was perceived. As in the previous study, we address these methodological concerns by estimating a two-way random effects model. The random intercepts for individual respondents allow us to adjust our standard errors for clustering, and the random intercepts for photo pairs allow us to control for unmeasured features of a specific pair that could have affected how their relationship was perceived.

We hypothesized that individuals with a high NFC would predict the existence of more racially homophilous ties than would individuals with a low NFC. Our dependent variable (connection in network diagram) was binary and set equal to 1 if the respondent indicated that the individuals in two photos were connected by drawing a line between them. The variable was assigned a value of 0 otherwise. Using logistic regression, we regressed our dependent variable on a categorical variable that was set equal to 1 if the members of the photo pair were racially similar (both African American, both Asian American, or both White) and 0 if they were racially dissimilar, the participant’s NFC score, and an interaction term (the racial similarity variable multiplied by the participant’s mean-centered NFC score).

Consistent with our prediction, as a respondent’s NFC increased, he or she was more likely to assume that racially similar individuals were connected (see Table 1, Column 2; $\beta = .010$, $p < .05$). It is possible that our racial similarity effect reflected a specific kind of racial similarity (i.e., both Asian), rather than a consistent effect across categories, particularly because there were more pairs of White photos than African American or Asian American photos. However, when analyzed separately (see Table 1, Column 3), the effect of NFC was positive and significant for all three categories of racial similarity: African American ($\beta = .014$, $p < .05$) pairings, Asian American ($\beta = .013$, $p < .05$) pairings, and White pairings ($\beta = .008$, $p < .05$).

We expected that participants with a high NFC would be prone to not only connect people of the same race but also position these individuals more closely together in terms of physical proximity. To test this idea, we calculated the distance between every pair of images in the diagram ($N = 120$ pairs). However, noting that some participants drew much larger network diagrams (photos widely spaced apart) than did others, we adjusted this measure by subtracting the distance between every pair of photos from the maximum distance between any two pairs of photos in an individual’s

network diagram. Thus, for each of the 120 photo pairs, our measure of proximity captured the difference between the greatest distance in a diagram and the distance between the focal pair of images. Larger values indicate that the photos were placed closer together.

Our measure of proximity (“closeness in network diagram”) was regressed on a categorical variable that equaled 1 if the members of the photo pair were racially similar (0 if they were not), or on the basis of the participants’ NFC scores and an interaction between the two variables. Again, our NFC variable was mean centered before calculating the interaction term. We found that participants with a high NFC were more likely to put racially similar photos closer together than were people with a low NFC (see Table 1, Column 4; $\beta = .060$, $p < .05$). Again, this effect was positive and significant (see Table 1, Column 5) for Asian American pairs ($\beta = .099$, $p < .05$), African American pairs ($\beta = .058$, $p < .05$), and White pairs ($\beta = .051$, $p < .05$). Thus, in addition to assuming that racially similar individuals were more likely to be connected to each other, participants with a high NFC were more likely to cluster racially similar photos in the same geographic space.⁴

The empirical results from Study 2 are illustrated in Figures 2 and 3. The vertical axis in Figure 2 is the predicted probability that the respondent connected a network pair in his or her diagram, and the vertical axis in Figure 3 is the predicted proximity of a network pair in the respondent’s network diagram. The horizontal axis in each case is the respondent’s NFC. Two lines are illustrated in each figure, one for when the individuals in the network pair were racially similar (i.e., same race) and another for when they were racially dissimilar (i.e., different race). The results shown in the two figures indicate that as an individual’s NFC increased, he or she was more likely to place racially similar photos closer together and was more likely to connect racially similar individuals in a network diagram. Thus, the results support our prediction that high-NFC individuals were more likely than low-NFC people to assume racial homophily, in terms of racially similar individuals being connected to each other and being in close proximity.

Supplementary analyses. Given that the subscale of Decisiveness tends to have different effects from the rest of the Need for Closure Scale, we conducted separate analyses for decisiveness ($\alpha = .46$) and the remainder of the scale ($\alpha = .57$) to determine whether one may have been relatively more or less powerful than the other in explaining these results. As it turns out, the separate measure of decisiveness had no significant impact, in terms of moderating the effect of racial similarity on observing a tie in the network diagram ($\beta = .039$, $p = .743$) or proximity ($\beta = .368$, $p = .416$). However, the rest of the scale, when substituted for the

³ Given this lower alpha, we decided to contact the 49 participants several weeks later and asked them to complete the NFC scale again. We were able to gather responses from 45 of the 49 participants, and we found that, using this follow-up measure (which had an alpha of .88, and a Time 1–Time 2 correlation of .43, $p < .01$), our results from Study 2 replicated.

⁴ It is possible that our results reflect a tendency for members of one racial group to assume that members of another racial group are connected to each other but that such assumptions do not generalize across racial categories. However, our results hold (here and in Study 3) even when accounting for these additional control variables.

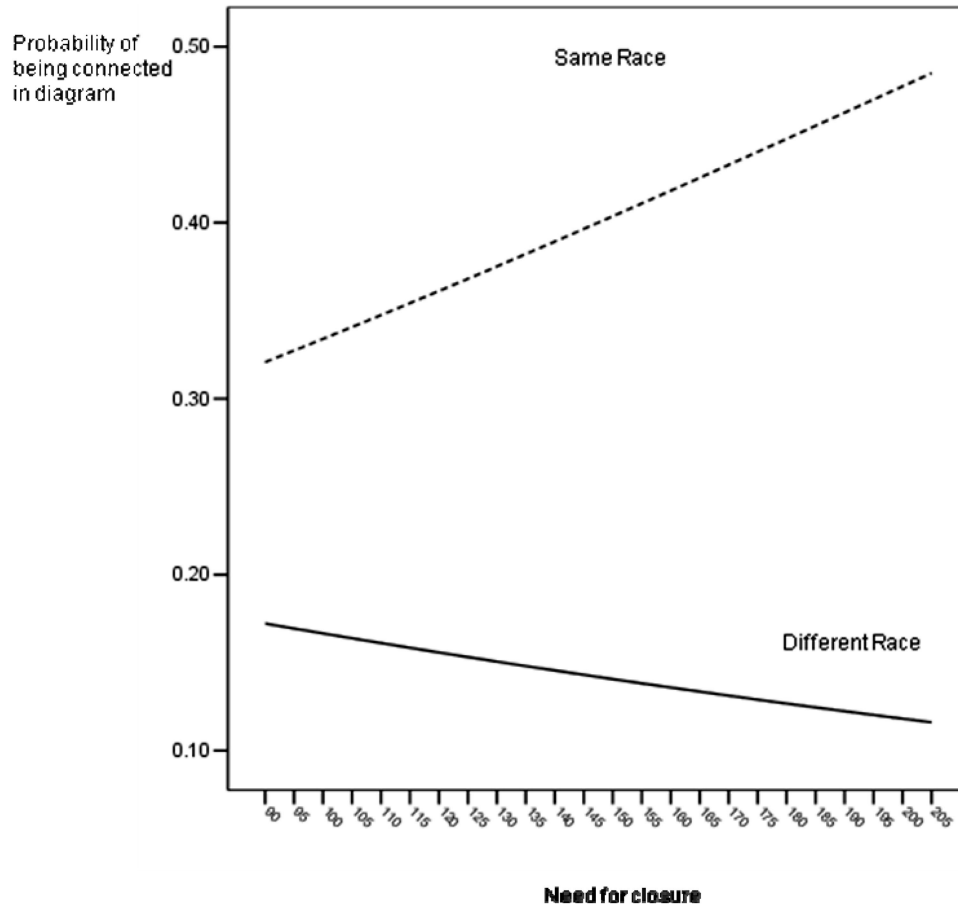


Figure 2. The positive relationship between need for closure and presumed racial homophily.

overall NFC measure in the interaction term (NFC multiplied by the general same-race variable), remains a strong predictor of observing a tie in the network diagram ($\beta = .467, p < .001$) and proximity ($\beta = 2.42, p < .05$). Albeit far from conclusive, this result might suggest that decisiveness is a relatively weaker driver of the perceived racial homophily effect.

Discussion

In Study 2, we moved from the field to the lab, asking participants to construct a diagram of a social network using a set of photographs depicting unfamiliar people and a limited number of social ties. Forced to predict “who was friends with whom,” participants were more likely to assume the existence of ties between racially similar people rather than racially dissimilar people. More importantly, we found that this effect was stronger for individuals who had a high NFC relative to those individuals with a low NFC. In other words, high-NFC individuals were more prone to assume that two strangers were friends when they were racially similar to each other.

Although this is clear evidence of presumed racial homophily, such thinking is not necessarily erroneous. Homophily does exist, and it may be the case that racial homophily would appear among this set of individuals if they were given the opportunity to interact

with one another. To test whether high-NFC individuals are more likely to make *errors* in reporting the presence of racially homophilous ties, we focus on a recall task in Study 3—one in which accuracy in participants’ reporting can be carefully tracked.

Study 3

In our third study, we turn to a common paradigm in the judgment of racially similar ties—a cafeteria table. At many college campuses across the United States, students report that cafeteria seating reflects strict racial groupings (e.g., the African American students sit at one table). Although seating is not assigned, the tendencies toward racial homophily seem overwhelmingly clear to some observers. In this study, we examined whether such assumptions of racial homophily are exaggerated in the minds of observers, particularly those observers who are high in NFC.

Method

Participants. Forty-nine participants (35 women, 14 men; 39 White, nine Asian, one Black), with ages ranging from 20 to 62 ($M = 35.39, SD = 9.88$), were recruited from a national pool of people interested in participating in online studies. Participants accessed the study materials by following a link provided in an e-mail

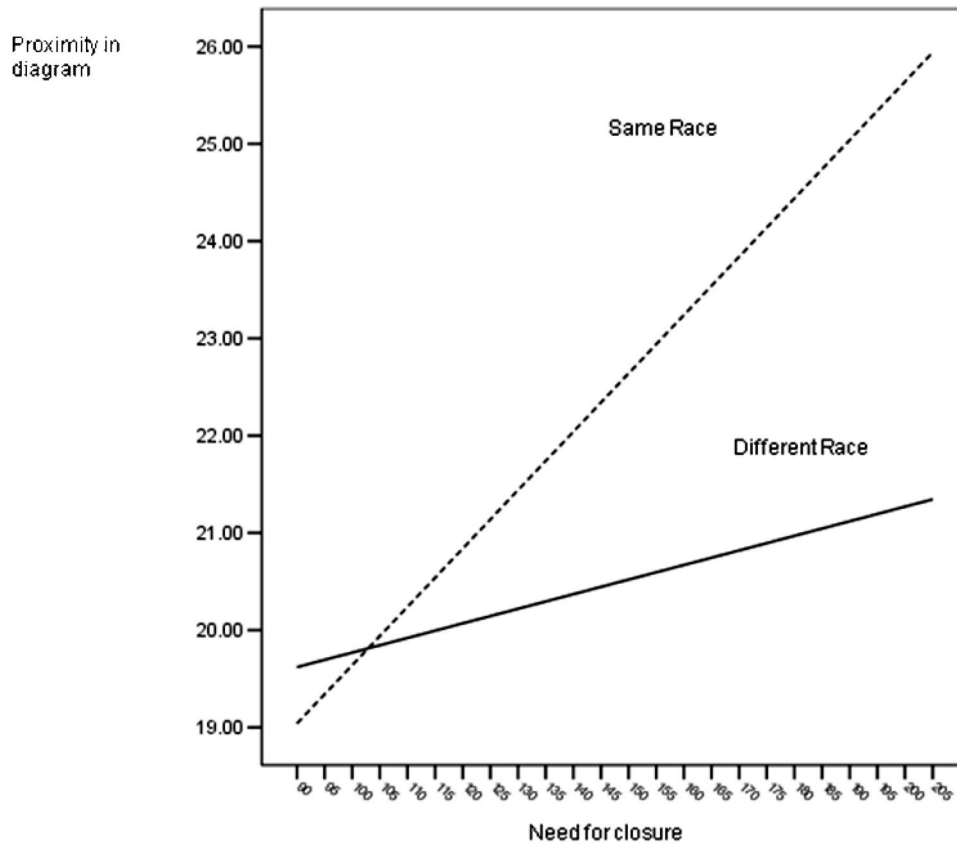


Figure 3. The positive relationship between need for closure and presumed racial proximity.

advertisement. Upon reaching the study site, participants read a consent form, completed a personality inventory, performed several cognitive tasks, provided demographic information, and, minutes after the study was completed, received a gift certificate to an online retailer (\$10) in return for their participation.

Procedure. Participants were instructed to complete the Need for Closure Scale developed by Webster and Kruglanski (1994). The order in which questions appeared, the scales used to capture participants' agreement with each item, and the scoring procedure were the same as that described in the two previous studies ($\alpha = .88$). After completing the Need for Closure Scale, participants moved to the next section of the survey, where they were asked to read the following instructions:

On the next screen, you will be asked to envision the following scene. Imagine that you've walked into a cafeteria and you see six tables full of people. Each cafeteria table holds three people on each bench, which means that you will see a total of 36 people. You will have 30 seconds to review all the photos that are shown. Try to recall where each of the people shown are located (i.e., where they are sitting and whom they are sitting next to). After 30 seconds, the picture will disappear and you will automatically move to the next screen.

After reading the instructions, participants viewed the scene described above. The 36 photos shown on the screen, including the 16 photos used in Study 2, were head shots of 20 White adults (10 men, 10 women), eight Asian American adults (four men, four

women), and eight African American adults (four men, four women). Each individual was pictured from the shoulders up. Following the same steps described in Study 2, a pretest confirmed that the individuals pictured in these photos were easily recognizable as being White, Asian American, or African American. The photos were randomly assigned to different "seats" at each of the cafeteria tables. Each participant saw a different arrangement of photos in order to minimize the chance that one arrangement would lead to spurious effects.

After 30 s, the image disappeared, and the participants were asked to spend the next 10 min working on a set of complex logic problems. Participants were encouraged to solve as many of the problems as they possibly could during the time allotted, and they were prohibited from moving to the next part of the survey until the entire 10-min period had elapsed. After 10 min, the image of the cafeteria tables reappeared on the screen, but in this case, the seats were empty, and the 36 photos appeared at the right side of the screen in a randomly assigned order. Participants were instructed to "recreate the seating layout shown previously. 'Drag' and 'drop' the pictures from the pool below to the seating area." Participants were allowed to make changes to their selections at any time. That is, they could move a picture to a designated spot and then relocate that picture to another spot if they wished to do so. Participants were not allowed to continue the survey until they had populated the seating area with all 36 photos. Once the

participant had finished recreating the “cafeteria scene,” they were allowed to complete the remainder of the survey.

Results

We are interested in the tendency for individuals with a high NFC to assume that racially similar people sat closer together. We tested this prediction by calculating the distance between every photo pair, once using the pair’s position at the original table and once again using the pair’s position at the participant’s reconstructed table. Our dependent variable (“closeness at the cafeteria table”) is the ratio of these two distances (the natural log of actual divided by perceived distance). We created a same-race indicator variable that was set equal to 1 if members of a photo pair belonged to the same racial group (i.e., both White, both Asian American, or both African American) and set equal to 0 otherwise. We created a separate interaction term (we multiplied the same-race variable and the mean-centered NFC variable) to examine the extent to which an increase in NFC was associated with a tendency to place racially similar people closer together.

Because photo pairs were the unit of analysis, we had multiple observations for each individual respondent (as in Studies 1 and 2). Once again, we address this concern by estimating a two-way random effects model. The random intercepts for individual respondents allow us to adjust our standard errors for clustering, and the random intercepts for photo pairs allow us to control for unmeasured features of a specific pair that could have affected the perceived proximity of a photo pair.

The results from the regression analysis are reported in Table 1. Of greatest interest is the influence of the interaction term on the dependent variable. As predicted, the coefficient for the interaction between the same race variable and the NFC variable is positive and significant (see Table 1, Column 6; $\beta = .0006, p < .05$). This indicates that as an individual’s need for closure increases, he or she was more likely to place racially similar photos closer together.

Next, we distinguished the link between need for closure and perceived physical proximity in judging different kinds of racial similarity (White, African American, and Asian American) by replacing the general same-race variable with three specific same-race variables. The African American indicator variable was set equal to 1 if both target individuals were African American (0 otherwise). The Asian American indicator variable was set equal to 1 if both target individuals were Asian American (0 otherwise). Finally, the White indicator variable was set equal to 1 if both target individuals were White (0 otherwise). Each of the three specific same-race indicator variables was multiplied by the mean-centered NFC variable and included in a separate regression equation. As shown in Table 1 (Column 7), individuals with a high NFC were more inclined than those with a low NFC to place White pairings ($\beta = .0005, p < .10$), African American pairings ($\beta = .0019, p < .05$), and Asian American pairings ($\beta = .0018, p < .10$) closer together (note the effects for White and Asian American pairings only approached significance).

Our basic findings are illustrated in Figure 4. The vertical axis is the proximity of a photo pair at the cafeteria table, and the horizontal axis is the respondent’s NFC. Two lines are illustrated, one for when the individuals in the network pair were racially similar and another for when they were racially dissimilar. The results indicate that as an individual’s NFC increases, he or she

was more likely to place racially similar photos closer together. Thus, the results support the prediction that high-NFC individuals were more likely than low-NFC individuals to assume racial homophily, when racial homophily is defined in terms of physical proximity.

Again, we considered whether Decisiveness or the remainder of the NFC scale would have a relatively larger effect on the present findings by conducting separate analyses for decisiveness ($\alpha = .85$) and the remainder of the scale ($\alpha = .91$). The results reveal no significant impact of decisiveness, in terms of moderating the effect of racial similarity on proximity ($\beta = .002, p = .781$). However, as reported in Study 2, the rest of the scale, when used in place of the overall NFC measure in the interaction term (NFC multiplied by the general same-race variable), remains a marginally significant predictor of proximity ($\beta = .019, p < .10$). When decisiveness was removed from the scale, the racial similarity effect was significant for African Americans ($\beta = .105, p < .05$) and approached significance for Asians ($\beta = .070, p < .10$), but was no longer significant for White pairs ($\beta = .011, p = .34$). Unlike Study 2, these results do not clearly suggest that decisiveness or the remainder of the NFC scale was a relatively stronger driver of the presumed homophily effect.

General Discussion

On one hand, knowledge about others’ social relations can be a useful source of social influence (Flynn et al., 2006). On the other hand, false assumptions about whether two individuals know each other can be a painful source of social embarrassment. Most of us can recall an awkward encounter in which two strangers were casually introduced as though they were friends (e.g., “You two know each other, right?”), but in fact were not (e.g., “No, we’ve never met.”). These encounters are especially awkward when the individuals being introduced are members of the same racial category. Although people tend to be homophilous in their social relations, are we likely to assume racial homophily exists? In particular, are individuals with a high NFC likely to make such assumptions because they have an appetite for applying social rules in order to understand social relations?

In the present research, we argue that the tendency to seek order in judging social networks is more characteristic of some individuals than it is of others. People with a high NFC may have a tendency to see social networks as having a high degree of closure by invoking the principle of transitivity as well as a low degree of racial diversity by invoking the principle of homophily. We found evidence of the transitivity bias in a set of real relationships (Study 1). In reporting their cognitive networks (i.e., who knows whom?), high-NFC individuals were more prone to erroneously assume that two individuals in their social network knew each other. In general, people tend to misperceive social ties by assuming a relationship exists when it does not rather than assuming a relationship does not exist when in fact it does (e.g., De Soto et al., 1968; Freeman, 1992; Picek et al., 1975). But this tendency to apply the rule of transitivity in judging social relations appears to be stronger for high-NFC individuals than their low-NFC peers.

Beyond projecting network closure, individuals high in NFC may hold strong assumptions about the affiliation of racially similar dyads. Specifically, high-NFC individuals are more likely to assume that two African Americans, two Whites, or two Asian

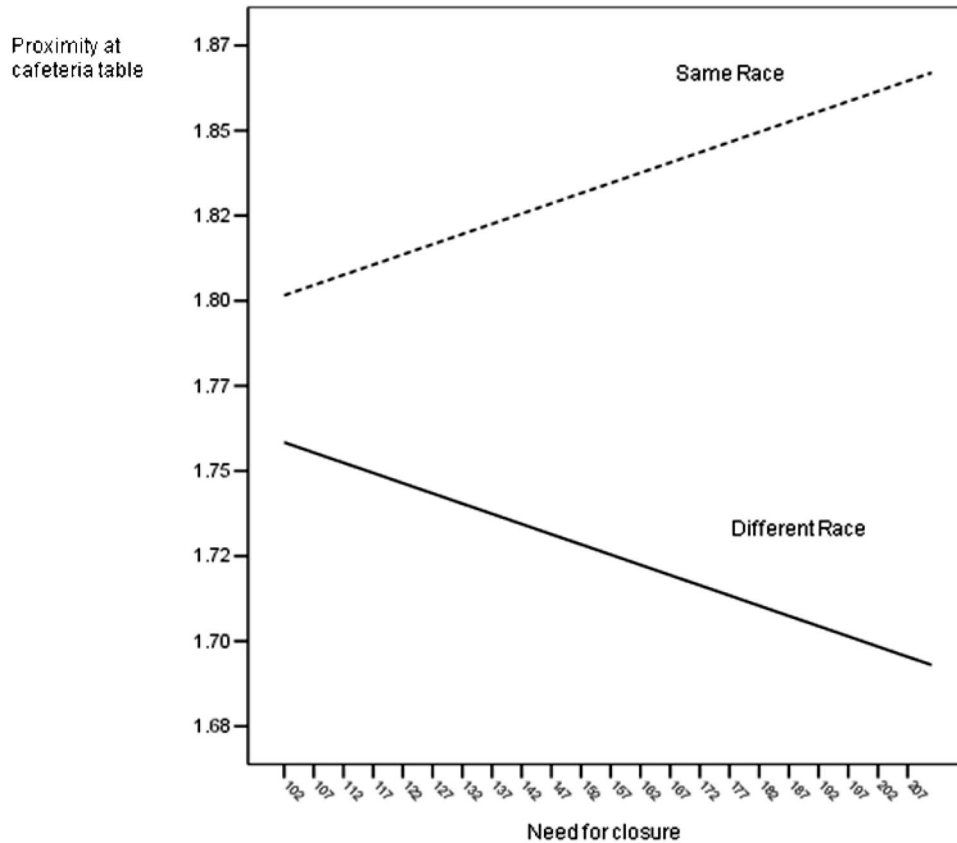


Figure 4. The positive relationship between need for closure and presumed racial homophily.

Americans are friends, rather than an Asian American and an African American, or a White person and an Asian American. In Study 2, when asked to draw network diagrams, high-NFC participants were more likely to draw connections between racially homophilous pairs. Of course, such reliance on the principle of homophily in perceiving social relations may be well founded rather than misguided. Noting this, we examined a recall task in Study 3, in which participants were asked to recreate a scene with randomly arranged photos. In performing this task, high-NFC individuals were more likely to place the racially homophilous photos closer together, which indicated that high-NFC participants were more likely than low-NFC participants to *exaggerate* racial homophily.

Motives That Might Explain the Link Between Need for Closure, Transitivity, and Homophily

A recent article by Fu et al. (2007) proposed three powerful motives for the effects of NFC. First, an individual may be driven by consensual validation, a concern that drives cultural conformity according to their findings. Second, those individuals with a high NFC may be motivated primarily by expediency; that is, they attempt to minimize the amount of effort expended in making everyday decisions. Third, according to recent evidence, those with a high NFC may demonstrate an affinity for political conservatism and the status quo.

In explaining the present findings, the third option seems less likely, given that (a) the context in which we tested the link between NFC and transitivity had no political content and (b) the results supporting the link between NFC and presumed racial homophily held firm when controlling for attitudes toward diversity, which are often correlated with political conservatism. As for the first and second motivational accounts, both seem plausible in helping to explain the present findings. For example, the use of a heuristic might be efficient, and therefore appealing, for high-NFC individuals to use in judging complex social relations (effort minimization). High-NFC individuals evince higher levels of heuristic information processing, including primacy effects (Webster & Kruglanski, 1994) and the activation of stereotypes (e.g., de Dreu et al., 1999). Their reliance on heuristics may lead high-NFC individuals to assume that two of their direct contacts will likely know each other (because they quickly seize on the transitivity heuristic) and that members of the same racial category know each other (because they quickly seize on the homophily heuristic).

Individuals with a high NFC might also perceive higher levels of transitivity and racial homophily in social relations because it conforms to their preferences for a shared reality (consensus). Previous research suggests that high-NFC individuals are more motivated to reach agreement with their peers (Kruglanski, Webster, & Klem, 1993), are more disturbed by violations of social norms (Pierro, Mannetti, Kruglanski, & Sleeth-Keppeler, 2004),

and have a tendency to perceive collections of individuals as entitative, homogeneous groups (Kruglanski et al., 2002). Their taste for consensus might drive high-NFC individuals to assume the presence of both transitivity and racial homophily in the broader social system because these features suggest that their knowledge of social networks is relatively consistent and stable across situations (Kruglanski & Webster, 1996).

Future Directions

We focus on how NFC can impact an individual's cognitive network—their mental representation of social relations. Future research might build on these findings by examining the link between an individual's NFC and his or her *actual* network relations. Are people with a strong need for cognitive closure bothered by so-called structural holes—maintaining friendships with two individuals who are not friends with each other? Do these high-NFC individuals feel compelled to introduce their friends to one another, or connect them in some other way? Maintaining closure in their personal networks might entail trade-offs for high-NFC individuals. On one hand, network closure may satisfy their need for firm social reality. On the other hand, given the strong evidence that structural holes in one's social network can yield instrumental rewards (Burt, 1992), high-NFC individuals might pay a dear price for maintaining such closure in their social networks.

Future research might also examine different kinds of transitivity. In Study 1, when a high-NFC individual was disconnected from two colleagues, he or she was more likely to accurately report those colleagues were also disconnected (“vacuous” transitivity). When a high-NFC individual was connected to both colleagues, he or she was more likely to erroneously report the colleagues were connected. The outcomes are related but could result from different underlying mechanisms. A more in-depth analysis of these kinds of triads might shed some light on the mechanism underlying the link between NFC and transitivity. Furthermore, we operationalize NFC as a chronic individual characteristic, but it can also be situationally induced. Future research might attempt to replicate the present findings by inducing NFC in a way that highlights a specific psychological motive. For example, if the effect were to replicate when using an increase in time pressure, it might indicate that the “effort minimization” motive was partly responsible for the outcome.

Another variable that may be worth exploring further is tie strength or the content of a network connection. An interesting finding from Studies 2 and 3 was high-NFC individuals' tendency to not only link racially similar people but also link them more closely together, in terms of physical space. Are high-NFC individuals more inclined to not only see connections among other individuals in their social world but also presume that these connections are strong and meaningful, particularly if the individuals in question are racially similar? Put differently, individuals with a high NFC might not stop at assuming that people in their network, particularly racially similar people, know one another, but that they know one another *well* (i.e., they engage in frequent communication and share a familiar rapport).

Following other researchers (e.g., Kruglanski & Webster, 1996; Shah et al., 1998), we argue that high-NFC individuals are driven by a desire for “firm social reality”—a sense of permanence and stability in the social world. This suggests that a potential bound-

ary condition for our findings should be the extent to which the circumstances provide a firm social reality. Our analysis suggests that NFC will augment the tendency to assume relationships exist among racially homophilous pairs. But such effects may be attenuated when the context does not activate assumptions about homophily. For example, one might conduct an alternative version of Study 3, in this case clarifying that individuals seated at the cafeteria tables were randomly seated. This might undermine high-NFC individuals' motivation to apply a social rule (i.e., homophily) when attempting to recall where these individuals were seated. As for transitivity, one could conduct the same task as that performed in Study 1, but in this case use inanimate objects instead of people. If concern for shared reality drives the NFC–transitivity link, then the same effect should not hold when the targets are not human beings.

The link between need for cognitive closure and a preference for similarity may be stronger for some social categories than for others. For example, we found consistent effects in Studies 2 and 3 for how high-NFC individuals view racially similar and dissimilar dyads. However, in a set of separate analyses, we found no consistent patterns in how they view same-sex or mixed-sex dyads in any of the three studies. This suggests that high-NFC individuals may be more prone to apply a rule of racial homophily rather than gender homophily in encoding and recalling social relations. Perhaps racial homophily is more in line with high-NFC individuals' sense of firm social reality (i.e., they may assume that gender intermixing is much more likely than racial intermixing). Indeed, there is evidence that individuals both experience more gender intermixing and observe more gender intermixing (McPherson et al., 2001). Perhaps high-NFC people would be more motivated to apply a rule of gender homophily in judging social relations in a racially homophilous group. This question might be worth exploring in future research.

Conclusion

Previous research has focused on how the NFC can affect individual cognition. In the present research, we consider whether such a need can affect the perception of social relations, specifically whether NFC leads to a presumption of *network* closure or physical closeness. The evidence suggests that people who have a high NFC were more likely to assume that other individuals, particularly those who are racially similar, knew each other or were close in some way, even when this was not the case. Why does this happen? It may be that the NFC prompts people to value “social rules,” such as the principles of homophily and transitivity, and apply these social rules to their own social context. Our findings suggest that the application of such rules may be exaggerated, in ways that suggest greater affiliation (same-race or otherwise) than actually exists.

References

- Brass, D. J., & Burkhardt, M. E. (1993). Potential power and power use: An investigation of structure and behavior. *Academy of Management Journal*, *36*, 441–470. doi:10.2307/256588
- Burt, R. S. (1992). *Structural holes*. Cambridge, MA: Harvard University Press.
- Buss, D. M., & Barnes, M. (1986). Preferences in human mate selection.

- Journal of Personality and Social Psychology*, 50, 559–570. doi:10.1037/0022-3514.50.3.559
- Chirumbolo, A., Livi, S., Mannetti, L., Pierro, A., & Kruglanski, A. W. (2004). Effects of need for closure on creativity in small group interactions. *European Journal of Personality*, 18, 265–278. doi:10.1002/per.518
- Coleman, J. S. (1988). Social capital in the creation of human capital. *American Journal of Sociology*, 94, S95–S120. doi:10.1086/228943
- Coleman, J. S. (1990). *Foundations of social theory*. Cambridge, MA: The Belknap Press of Harvard University Press.
- de Dreu, C. K., Koole, S. L., & Oldersma, F. L. (1999). On the seizing and freeing of negotiator inferences: Need for cognitive closure moderates the use of heuristics in negotiation. *Personality and Social Psychology Bulletin*, 25, 348.
- De Soto, C. B. (1960). Learning a social structure. *Journal of Abnormal and Social Psychology*, 60, 417. doi:10.1037/h0047511
- De Soto, C. B., Henley, N. M., & London, M. (1968). Balance and the grouping schema. *Journal of Personality and Social Psychology*, 8, 1–7. doi:10.1037/h0025321
- Eberhardt, J. L., Davies, P. G., Purdie-Vaughns, V. J., & Johnson, S. L. (2006). Looking deathworthy. *Psychological Science*, 17, 383–386. doi:10.1111/j.1467-9280.2006.01716.x
- Flynn, F. J., Reagans, R. E., Amanatullah, E. T., & Ames, D. R. (2006). Helping one's way to the top: Self-monitors achieve status by helping others and knowing who helps whom. *Journal of Personality and Social Psychology*, 91, 1123. doi:10.1037/0022-3514.91.6.1123
- Freeman, L. C. (1992). Filling in the blanks: A theory of cognitive categories and the structure of social affiliation. *Social Psychology Quarterly*, 55, 118–127. doi:10.2307/2786941
- Fu, J. H., Morris, M. W., Lee, S., Chao, M., Chiu, C., & Hong, Y. (2007). Epistemic motives and cultural conformity: Need for closure, culture, and context as determinants of conflict judgments. *Journal of Personality and Social Psychology*, 92, 191–207.
- Goldstone, R. L. (2000). Unitization during category learning. *Journal of Experimental Psychology: Human Perception and Performance*, 26, 86–112. doi:10.1037/0096-1523.26.1.86
- Granovetter, M. S. (1973). The strength of weak ties. *American Journal of Sociology*, 78, 1360. doi:10.1086/225469
- Holland, P. W., & Leinhardt, S. (1971). Transitivity in structural models of small groups. *Small Group Research*, 2, 107–124.
- Ibarra, H., Kilduff, M., & Tsai, W. (2005). Zooming in and out: Connecting individuals and collectivities at the frontiers of organizational network research. *Organization Science*, 16, 359. doi:10.1287/orsc.1050.0129
- Janicik, G. A., & Larrick, R. P. (2005). Social network schemas and the learning of incomplete networks. *Journal of Personality and Social Psychology*, 88, 348–364. doi:10.1037/0022-3514.88.2.348
- Jost, J. T., Glaser, J., Kruglanski, A. W., & Sulloway, F. J. (2003). Political conservatism as motivated social cognition. *Psychological Bulletin*, 129, 339–375. doi:10.1037/0033-2909.129.3.339
- Kilduff, M., Crossland, C., Tsai, W., & Krackhardt, D. (2008). Organizational network perceptions versus reality: A small world after all? *Organizational Behavior and Human Decision Processes*, 107, 15–28. doi:10.1016/j.obhdp.2007.12.003
- Krackhardt, D. (1987). Cognitive social structures. *Social Networks*, 9, 109–134. doi:10.1016/0378-8733(87)90009-8
- Krackhardt, D., & Kilduff, M. (1999). Whether close or far: Social distance effects on perceived balance in friendship networks. *Journal of Personality and Social Psychology*, 76, 770–782. doi:10.1037/0022-3514.76.5.770
- Kruglanski, A. W. (1990). Motivations for judging and knowing: Implications for causal attribution. In E. T. Higgins & R. M. Sorrentino (Eds.), *The handbook of motivation and cognition* (Vol. 2, pp. 333–386). New York, NY: Guilford Press.
- Kruglanski, A. W., Atash, M. N., DeGrada, E., Mannetti, L., Pierro, A., & Webster, D. M. (1997). Psychological theory testing versus psychometric nay-saying: Comment on Neuberg et al.'s (1997) critique of the Need for Closure Scale. *Journal of Personality and Social Psychology*, 73, 1005–1016. doi:10.1037/0022-3514.73.5.1005
- Kruglanski, A. W., Shah, J. Y., Pierro, A., & Mannetti, L. (2002). When similarity breeds content: Need for closure and the allure of homogeneous and self-resembling groups. *Journal of Personality and Social Psychology*, 83, 648–662. doi:10.1037/0022-3514.83.3.648
- Kruglanski, A. W., & Webster, D. M. (1996). Motivated closing of the mind: "Seizing" and "freezing." *Psychological Review*, 103, 263. doi:10.1037/0033-295X.103.2.263
- Kruglanski, A. W., & Webster, D. M., & Klem, A. (1993). Motivated resistance and openness to persuasion in the presence or absence of prior information. *Journal of Personality and Social Psychology*, 65, 861–876.
- Laumann, E. O., & Knoke, D. (1987). *The organizational state: Social choice in national policy domains*. Madison: University of Wisconsin Press.
- Lin, N. (2001). *Social capital: A theory of social structure and action*. London, England: Cambridge University Press.
- Louch, H. (2000). Personal network integration: Transitivity and homophily in strong-tie relations. *Social Networks*, 22, 45–64. doi:10.1016/S0378-8733(00)00015-0
- Mannetti, L., Pierro, A., Kruglanski, A., Taris, T., & Bezinovic, P. (2002). A cross-cultural study of the Need for Cognitive Closure Scale: Comparing its structure in Croatia, Italy, USA and the Netherlands. *British Journal of Social Psychology*, 41, 139–156. doi:10.1348/014466602165108
- McPherson, M., Smith-Lovin, L., & Cook, J. M. (2001). Homophily in social networks. *Annual Review of Sociology*, 27, 415–444.
- Neuberg, S. L., Judice, T. N., & West, S. G. (1997). What the Need for Closure Scale measures and what it does not: Toward differentiating among related epistemic motives. *Journal of Personality and Social Psychology*, 72, 1396–1412. doi:10.1037/0022-3514.72.6.1396
- Newcomb, T. M. (1961). *The acquaintance process*. New York, NY: Holt, Rinehart, & Winston.
- Picek, J. S., Sherman, S. J., & Shiffrin, R. M. (1975). Cognitive organization and coding of social structures. *Journal of Personality and Social Psychology*, 31, 758–768. doi:10.1037/0022-3514.31.4.758
- Pierro, A., Mannetti, L., Kruglanski, A. W., & Sleeth-Keppler, D. (2004). Relevance override: On the reduced impact of "cues" under high-motivation conditions of persuasion studies. *Journal of Personality and Social Psychology*, 86, 251–264.
- Podolny, J., & Baron, J. (1997). Resources and relationships: Social networks and mobility in the workplace. *American Sociological Review*, 62, 673–693. doi:10.2307/2657354
- Rabe-Hesketh, S., & Skrondal, A. (2005). *Multilevel and longitudinal modeling using Stata*. College Station, TX: Stata Corp.
- Reagans, R., & Zuckerman, E. (2008). All in the family. *Industrial and Corporate Change*, 17, 979–999. doi:10.1093/icc/dtn037
- Rubin, Z., & Zajonc, R. B. (1969). Structural bias and generalization in the learning of social structures. *Journal of Personality*, 37, 310–324. doi:10.1111/j.1467-6494.1969.tb01747.x
- Sacco, J. M., Scheu, C. R., Ryan, A. M., & Schmitt, N. (2003). An investigation of race and sex similarity effects in interviews: A multi-level approach to relational demography. *Journal of Applied Psychology*, 88, 852–865. doi:10.1037/0021-9010.88.5.852
- Shah, J. Y., Kruglanski, A. W., & Thompson, E. P. (1998). Membership has its (epistemic) rewards: Need for closure effects on in-group bias. *Journal of Personality and Social Psychology*, 75, 383–393. doi:10.1037/0022-3514.75.2.383
- Tetlock, P. E. (2005). *Expert political judgment: How good is it? How can we know?* Princeton, NJ: Princeton University Press.
- Van Hiel, A., & Mervielde, I. (2003). The need for closure and the spontane-

- ous use of complex and simple cognitive structures. *The Journal of Social Psychology*, 143, 559–568. doi:10.1080/00224540309598463
- von Hecker, U. (1997). How do logical inference rules help construct social mental models? *Journal of Experimental Social Psychology*, 33, 367–400. doi:10.1006/jesp.1997.1325
- Watson, D., Klohnen, E. C., Casillas, A., Nus, S. E., Haig, J., & Berry, D. S. (2004). Match makers and deal breakers: Analyses of assortative mating in newlywed couples. *Journal of Personality*, 72, 1029–1068. doi:10.1111/j.0022-3506.2004.00289.x
- Webster, D. M., & Kruglanski, A. W. (1994). Individual differences in need for cognitive closure. *Journal of Personality and Social Psychology*, 67, 1049–1062. doi:10.1037/0022-3514.67.6.1049
- Zajonc, R. B., & Burnstein, E. (1965a). The learning of balanced and unbalanced social structures. *Journal of Personality*, 33, 153–163. doi:10.1111/j.1467-6494.1965.tb01378.x
- Zajonc, R. B., & Burnstein, E. (1965b). Structural balance, reciprocity, and positivity as sources of cognitive bias. *Journal of Personality*, 33, 570–583. doi:10.1111/j.1467-6494.1965.tb01403.x
- Zajonc, R. B., & Sherman, S. J. (1967). Structural balance and the induction of relations. *Journal of Personality*, 35, 635–650. doi:10.1111/j.1467-6494.1967.tb01453.x

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