

How social exclusion distorts social network perceptions



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ABSTRACT

In two studies we investigate whether social exclusion—a well-studied, common and quite painful social experience—influences people's perceptions of novel social networks. In a first study, exclusion experiences led people to report that novel networks were more dense relative to those who had not been excluded. As predicted, this was true only for social networks; exclusion had no impact on perceptions when networks were described as geographical. In a follow-up experiment, participants watched a custom-created video, depicting avatars interacting in social scenes and they were asked to report the ties among the avatars in the video. Exclusion experiences led people to see network ties where none exist (i.e., false positives), though there was no effect for exclusion (versus inclusion) on reports of false negatives. Results indicate that common social experiences systematically shape network perceptions, leading people to seeing novel social networks as more densely connected than they are.

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To seize profitable opportunities in social networks, people must first spot the opportunity. This means they need to have an accurate read on who is in a network and who is tied to whom. Once this perceptual hurdle of seeing ties as they are is cleared, people can move on to craft a strategy for maneuvering into high-potential positions or for exploiting the network in other ways. Failure to accurately perceive the network, however, can interfere with efficient and effective network exploitation, preventing people from building useful alliances and getting things done (Krackhardt and Hanson, 1993). Seeing a tie where none exists, for instance, would discourage enterprising actors from playing a profitable bridging role. Seeing a gap between actors when in fact they have a relationship could lead one to invest resources in building a redundant bridge.

The importance of accurate network cognition has led researchers to investigate what people see and what they miss when they report on their own networks (Casciaro et al., 1999; Kilduff et al., 2008; Kumbasar et al., 1994) and as they learn novel network structures (Brashears, 2013; De Soto, 1960; Flynn et al., 2010; Janicik and Larrick, 2005; Simpson et al., 2011). Some of this work shows that individual traits like positive affectivity (Casciaro et al., 1999), for instance, improves the accuracy of actors' network perceptions, while a trait like need for closure (Flynn et al., 2010) diminishes it. So, too, can unfamiliarity with particular network structures interfere with people's ability to recognize and learn

novel structures (Janicik and Larrick, 2005). Mounting evidence then suggests that accurately reading a network, even one's own, is no easy task, and one subject to systematic error.

Building on research that examines the psychological bases for network behavior, in general (Kilduff et al., 2008; Krackhardt, 1992; Krackhardt and Kilduff, 1999; Michaelson and Contractor, 1992; Smith and Collins, 2009), and network perceptual accuracy in particular (Casciaro, 1998; Janicik and Larrick, 2005; Simpson and Borch, 2005), we investigate a social antecedent that is likely to impact network accuracy. Specifically, we test whether and how people's recent (negative) social experiences can affect their perceptions of unfamiliar social networks. In two studies we examine how a common, powerful, and especially distressing human experience—social exclusion—undermines a basic social judgment—who knows whom.

Our findings are intended to make two contributions. First, we argue that an individual's experience with a group will affect how he or she perceives the underlying network structure of other groups. Second, we explore whether and how the particular experience of social exclusion can undermine (or enhance) social network accuracy. To the extent that an accurate read of one's social situation is critical for restoring the connections that are broken through exclusion, getting the ties right is fundamental to overcoming the painful and powerful effects of exclusion.

Social experience and social cognition

Network cognition is a precursor to strategic network behavior. People who seek to move into positions rich in social capital need to recognize opportunity by accurately gauging who is connected

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to whom. For the everyday networker, getting an accurate read on a network is particularly challenging when the structure must be discerned from observations of real-time social interactions. Take, for instance, a newly promoted employee who is attending her first major partner meeting. Keen to build ties with people who can help her in her new role, she will try to figure out who is well-connected, and who might be best positioned to make helpful introductions. And she must make these determinations, mapping out people's positions in the network, by watching the interactions around her. Her ability to extract accurate data from her observations is subject to distortion from a host of sources, as we have noted, including her disposition and stable traits, the structure of her own network, and her most recent social experience.

When it comes to network cognition, people's recent experiences make a difference. For instance, studies show that people who have been made to feel relatively more powerful are less accurate in perceptions of who is tied to whom in social networks compared to those who feel less powerful (Simpson et al., 2011). Recent work on network cognition highlights how an individual's status influences his/her reaction to job threat (Smith et al., 2012). Those with relatively higher status activate (that is, call to mind) larger subsections of their networks, whereas those with lower status activate smaller and tighter subsections, with implications for how much job information they will have available. Just as experiences with power, status, and threat can guide people's network perceptions and their cognitive activation, we argue that the experience of social exclusion—both common and painful—can affect network perceptual accuracy.

Being left out of social interaction is profoundly distressing to people (Williams, 2007a), and this is true regardless of who does the excluding. The same feelings of pain, reduced self-esteem, diminished sense of belonging and control occur whether one is rejected by someone close or by members of a despised group (e.g., the Ku Klux Klan) (Gonsalkarole and Williams, 2007), by a real person or by a pre-programmed computer game (Williams et al., 2000; Zadro et al., 2004). Neurobiological studies show that exclusion activates the dorsal anterior cingulate cortex, the part of the brain that also is activated when people experience physical pain (Lieberman and Eisenberger, 2009; Eisenberger et al., 2006), meaning that social and physical pain systems operate similarly with similarly upsetting results (DeWall et al., 2010). Given the pain of exclusion, it is not surprising that people who have suffered it report feeling sad or angry (Chow et al., 2008; for review see Williams, 2007a).

Because exclusion strikes at human's core need to belong (Baumeister and Leary, 1995; Williams, 2007b), people often respond by seeking to restore their sense of belongingness, a process known as social reconnection (Maner et al., 2007). People who have been left out are motivated to restore ties with other people, exhibiting comparatively greater preferences for meeting and working with others. The sadness triggered by a social loss (as opposed to a failure, for instance) appears to account for this, increasing people's desire to seek social affiliation (Gray et al., 2011).

Though they may be motivated to reconnect, the accompanying sadness may undercut accuracy when it comes to reading the social situation, making reconnection that much more difficult. Sad people are relatively poor judges of the social interactions they witness (Gardner et al., 2005). For instance, when observing pairs engaged in conversation, people who were sad were far less accurate than were others in determining whether the pairs were strangers or friends or lovers (Ambady and Gray, 2002). Drawing on this, we expect that the sadness triggered by exclusion will undermine people's accuracy when it comes to perceiving social network ties.

Sadness encourages people to engage in upward social comparison processes (Giordano et al., 2000; Goethals, 1986; Wheeler and Miyake, 1992; Wills, 1981; Wood et al., 2000). Sad people

tend to focus on how others are “better” in some relevant category (Bower, 1981, 1991; Jordan et al., 2006). At the same time, sadness encourages people to judge themselves negatively in the salient category (Forgas and George, 2001; Forgas et al., 1990). This suggests that the sadness that accompanies exclusion will foster upward social comparisons. Here, the relevant comparison context is a social interaction setting, leading the excluded to see themselves as less socially successful than others. We expect, therefore, that those who are sad as a consequence of exclusion will see others as more socially successful, more likely to be included, more connected than they might be. In network terms, we expect that those who have been excluded will see the underlying network structure of a novel social setting as more dense than others will. Moreover, given the emphasis on the impact of social exclusion on social perception, we expect the impact of exclusion to be stronger for perceptions of social networks than for perceptions of other types of networks.

H1. People who have experienced social exclusion will perceive the underlying tie structure in novel social networks less accurately than will those who have not experienced exclusion.

H2. People who have experienced social exclusion will recall the underlying network structure in novel networks as relatively more dense when the network is social (H2a), but not when it is geographical (H2b).

We test these hypotheses in two studies. In Study 1 we rely on people's self-reports of exclusion to establish whether the experience has any significant, systematic effect on network cognition (testing H2a and H2b). In Study 2 we test the robustness of the effect and document its causal link in an experiment. To do this, we manipulate participants' exclusion experiences and have them decode the network structure from their observations of a social interaction. Participants will view a custom-created video of a set of animated characters interacting across several social situations. This method allows us to show people an entire network, and captures the dynamism of social settings that may make it even more difficult to decode network structure. We believe this enables us to more realistically simulate how people perceive structure from situational observations compared to the way it is typically studied (Janicik and Larrick, 2005; De Soto, 1960; De Soto and Bosley, 1962).

Study 1

We begin by investigating whether exclusion experiences influence people's cognitions of novel social networks. To determine whether exclusion systematically affects network cognition generally, or social network cognition specifically, we manipulate the description of the networks participants see. We expect that social exclusion will lead people to recall novel networks as being more dense, but this will only be true for social networks (H2a) not for recall of geographical networks (H2b).

Method

We recruited 138 participants from Amazon's crowd-sourcing platform, Mechanical Turk¹. 130 (63.11%) were male, and their

¹ MTurk was developed as an online labor market. It is being used by experimentalists as a source of experimental data (Kraut et al., 2003). Comparisons of laboratory data and participants (Buhrmeister et al., 2011; Gosling & Johnson, 2010; Gosling et al., 2011, 2004) indicate that the AMT samples are more representative than traditional college samples, and the data are at least as reliable. Results from experiments conducted via AMT were consistent with those collected in the lab of a Midwestern university, and collected on Internet boards (Paolacci et al., 2010).

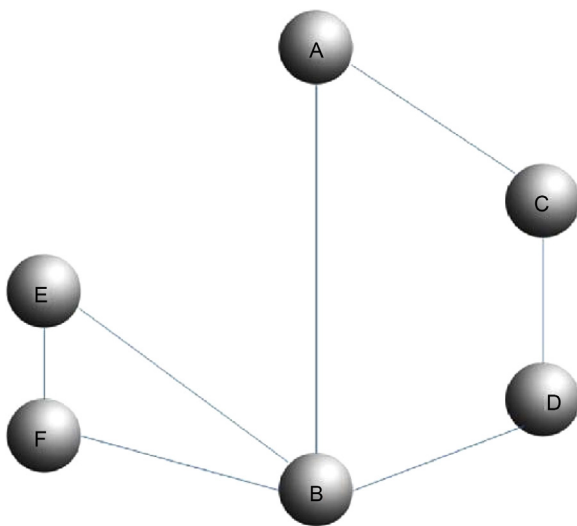


Fig. 1. Study 1: network displayed to participants in both social and geographic conditions.

mean age was 30.63 years ($SD=9.1$) (range: 18–67). Participants earned \$0.15 for the 20 min study. Men and women were randomly assigned to network condition.

Participants began the experiment by rating their current state of feeling socially excluded on a seven-point scale (1 = *not at all*, 7 = *entirely*). Specifically, they rated the extent to which they felt (1) popular (reverse-scored), (2) part of a social group (reverse-scored), (3) included (reverse-scored), and (4) ostracized ($\alpha=0.71$). This exclusion index served as our principle independent variable.

All participants observed a network sociogram for 30 s before the software auto-advanced them to another screen containing questionnaire items. Items contained network judgments as well as demographics (age, sex, and English speaking ability). All participants saw the same network (see Fig. 1). Our manipulation was in the description of the network: social (a network of people) ($N=68$) and geographical (a traffic pattern) ($N=70$). Participants in the social network condition read the following instruction:

Below is a network diagram that depicts a group of people. This group meets for social reasons to discuss cultural and world events. Each circle represents a person, and each line between circles represents a relationship between those two people.

Those in the geographical network condition read:

Below is a network diagram that depicts towns in an American state. Each circle represents a town, and each line between circles represents a road between those two towns.

As Fig. 1 indicates, there were seven relations between nodes. Our dependent variable was the number of relationships/roads participants recalled after seeing the network. Specifically, we instructed participants to “Consider the network. How many

relations/roads are depicted in the entire network diagram? Enter a whole number in the box below.”

Results and discussion

Table 1 shows the means, standard deviations, and correlations among the study variables. Participant sex had no effect on recall in the social network condition ($B=-1.12$, $t(68)=-1.55$, $p=0.13$) nor in the geographical network condition ($B=0.06$, $t(70)<1$, $p=0.86$). Age did not affect recall in the social condition ($B=0.01$, $t(68)<1$, $p=0.94$) or the geographical condition ($B=0.01$, $t(70)<1$, $p=0.93$). Finally, English speaking ability had no impact on whether participants could accurately recall the structure of the network (social condition: $B=0.12$, $t(68)<1$, $p=0.86$; geographical condition: $B=0.51$, $t(70)=1.42$, $p=0.16$).

In the social network condition participants recalled 6.77 ($SD=2.8$) ties and in the geographical condition they recalled 6.87 ($SD=1.51$) (seven was the correct answer), and this difference was not significant, $F(2, 138)=0.06$, $p=0.81$. To test whether social exclusion affected recall for novel social networks but not for novel geographical networks, we estimated two regression models: one examining the effect of exclusion on perceptions of social networks, and a second testing exclusion's effects on recall in geographical networks. As expected (H2a and H2b), exclusion predicted estimates of social network ties, $B=0.99$, $t(68)=3.30$, $p<0.01$, $\eta^2=-0.85$; the more excluded people felt, the more likely they were to report more ties in the network they observed. However, exclusion had no effect on people's recall for geographical networks, $B=0.10$, $t(70)=0.58$, $p=0.60$.

These results suggest that social experiences—here, exclusion—systematically affect how people view others' relationships in novel social networks. People who have been left out of social interactions see groups of others as more interconnected than they are. Because this link was present only for recall of social networks, it suggests that exclusion does not distort network pattern recall in general. Rather, the effect is limited to social cognition.

Whereas the results establish a connection between social experience and network perceptions, this study suffers from shortcomings common to correlational studies. In particular, we cannot rule out the possibility that a variable other than the exclusion experience is driving people's network misperceptions. In a follow-up experiment, we address this limitation and test our remaining hypothesis.

Study 2

Seeking to establish a causal relationship between social exclusion and network cognition, we manipulated participants' experience with exclusion directly. Moreover, we aimed to capture more of the kind of complexity that people face when they try to discern network structures from their observations of real-time social interactions. To do this, we created a video that depicted animated characters interacting in social settings. From

Table 1
Means, standard deviations, and correlations among variables in Study 1.

	M	SD	1	2	3	4	5
1 Sex	1.34	0.47					
2 Age	30.63	9.1	0.00				
3 English speaking	1.41	0.49	−0.10	0.05			
4 Network condition	1.49	0.5	−0.01	−0.01	−0.03		
5 Self-reported exclusion	4.47	1.17	−0.06	−0.05	0.03	−0.06	
6 Total ties recalled	6.82	2.25	−0.11	0.01	0.07	−0.02	0.19*

Note. $N=138$; Sex: 1 = male, 2 = female; English speaking: 1 = first language, 2 = not first language; Network condition: 1 = geographic, 2 = social.

* $p<0.05$.

their observations of these interactions, participants reported their perceptions of the underlying social network structure of the people involved.

Method

87 participants (27 men and 60 women) drawn from a university participant pool of undergraduate and graduate students arrived at a laboratory and were seated at separate computer terminals. Average age of the participants was 21 years ($SD = 3.96$) (range: 18–55). Once they had read a brief overview of the experiment, and had given their consent, participants took part in the first part of the two-part study. They played Cyberball (Williams, 2007a), a three-person computer-based ball toss game designed to manipulate participants' experiences of exclusion. In the version we used, the three-person game appears to the participant to be played with two co-located laboratory participants.

We manipulated two experimental conditions—exclusion and inclusion. In the exclusion condition, simulated players tossed the ball to the participant 1/5 of the time, whereas in the inclusion condition, the participant received the ball 4/5 of the time. After playing for four minutes, the game ended and participants answered a brief questionnaire about their experience.

Participants then moved to the second part of the study. They viewed a custom-created video animation that showed figures (known as avatars) interacting in a number of social settings. The avatars and settings were adapted from Second Life—the online virtual world. The 8-min video depicted avatars out for a weekend evening. Participants viewed three social scenes: people walking together into a club, people interacting in a beer garden, and people dancing and playing darts in a club.

Six avatars were focal in this study, and at least 5 were present in each of the three scenes. The social network structure depicted is identical to the one used in Study 1 (see Fig. 2), with seven ties among the six avatars. Avatars who interacted with each other—for instance, by talking or dancing together—were considered to be tied to each other, and we told participants about this rule.

After watching the video, participants reported the presence of ties between each pair of the six focal avatars. This network estimate was our primary dependent variable. After reporting, participants could go back and select scenes to watch again and then provide another network estimate. They could do this two times, allowing them to watch the video a total of three times. Participants then completed a short questionnaire, were debriefed and dismissed.

Measures

After playing Cyberball, participants estimated the number of times they had received the ball (scale: 1–100) ($M = 24.45$, $SD = 23.05$). Participants also reported the extent to which they felt excluded on a 5-point scale (1 = not at all, 5 = extremely). These measures served as manipulation checks.

Table 2
Means, standard deviations, and correlations among variables in Study 2.

	M	SD	1	2	3	4	5	6
1 Sex	1.68	0.46						
2 Age	21.0	3.96	0.01					
3 Exclusion condition	1.44	0.5	0.05	0.06				
4 Time	1317	336	0.17	0.22*	0.14			
5 Correct ties	11.48	2.83	−0.13	−0.04	−0.37*	0.03		
6 False positives	10.91	4.32	0.05	0.04	0.25*	−0.04	−0.19	
7 False negatives	4.33	1.62	0.04	−0.17	0.01	−0.03	0.06	0.09

Note. $N = 87$; Sex: 1 = male, 2 = female; Exclusion condition: 1 = included, 2 = excluded.
* $p < 0.05$.

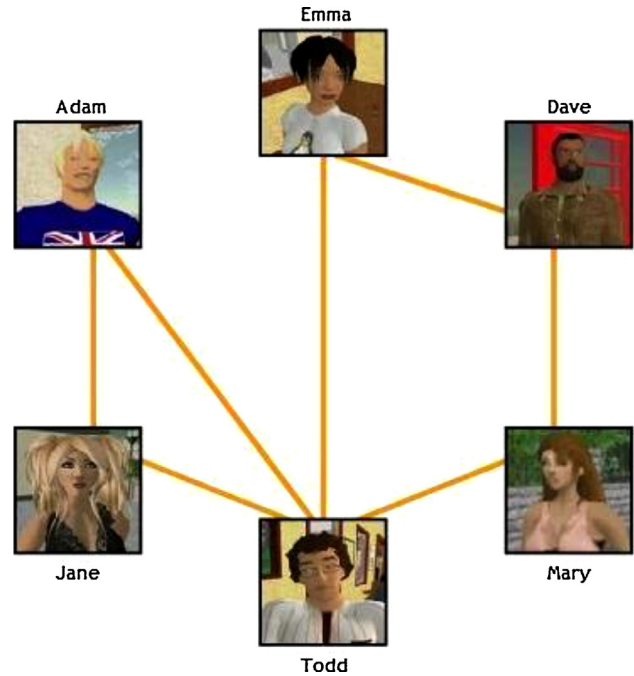


Fig. 2. Study 2: social network structure that participants needed to identify from video.

Our primary dependent variables were (1) number of ties correctly reported by participants across the three rounds, (2) number of false positive ties (i.e., perceiving ties that are not present) reported across the three rounds, and (3) number of false negative ties (i.e., not perceiving ties that are present) reported across the three rounds.

Results and discussion

Table 2 contains the means, standard deviations and correlations among the variables in the study. Participants in the exclusion condition reported receiving fewer ball tosses ($M = 5.63$, $SD = 4.67$) compared to those in the inclusion condition ($M = 43.27$, $SD = 18.11$), $t(87) = -12.23$, $p < .001$. Relative to those who were included, participants who were excluded also reported feeling relatively more excluded (condition: excluded: $M = 3.76$, $SD = 1.28$; included: $M = 2.94$, $SD = 1.67$), $t(87) = 2.38$, $p < 0.05$. Our manipulation of exclusion was effective.

Because participant sex and age had no effect on our dependent variables, we did not include these measures in our hypothesis tests. In keeping with prior research on the speed at which networks are learned (De Soto, 1960; De Soto and Bosley, 1962), we tested whether the time spent on the task had any impact on the dependent variables. All participants finished the task within 32 min, with the average time spent being 19.2 min. This variable

did not have any effect on our dependent variables, and was not included in our analyses.

We predicted that people who have experienced social exclusion will perceive the underlying tie structure in novel social networks less accurately than will those who have not experienced exclusion (H1). Indeed, participants in the exclusion condition recalled significantly fewer total correct ties ($M = 10.50$, $SD = 2.54$) relative to those in the inclusion condition ($M = 12.64$, $SD = 2.77$), $F(2, 87) = 13.50$, $p < .001$, $\eta^2 = -0.92$.

We expected participants who had been socially excluded to report the novel network structure as relatively more dense (H2a). Results showed that people who have been socially excluded were more likely to report ties that do not exist—false positives—relative to those who have not been excluded (exclusion: $M = 11.89$, $SD = 5.3$; inclusion: $M = 9.68$, $SD = 1.84$), $F(2, 87) = 5.85$, $p < .05$, $\eta^2 = -0.83$. To determine whether exclusion leads to inaccurate cognition or systematically biased cognition, we also tested whether participants in the exclusion condition were more likely to report false negatives—failing to report ties that were present—relative to those who had not been excluded. In fact, there was no difference in reports of false negatives by condition: excluded participants reported a mean total of 4.31 false negatives ($SD = 1.58$) whereas those who were not excluded reported a mean total of 4.34 false negatives ($SD = 1.69$), $F(2, 87) = 0.01$, $p = 0.93$.

People who had been excluded did not simply commit more recall errors in general, but rather, they were systematically biased in seeing ties where none was present. Differently put, people who have suffered social exclusion perceive networks as more dense than they are, as we had predicted.

General discussion

To exploit a network opportunity effectively, one must see it first. Recognizing this important step in the process, scholars have investigated what distinguishes those who accurately perceive network opportunity from those who do not (e.g., Flynn et al., 2010; Janicik and Larrick, 2005). These efforts include examinations of how everyday situational forces can shape people's network cognition. Power, status, and job threat, for instance, all have been shown to affect both perceptual accuracy and cognitive activation (Simpson and Borch, 2005; Simpson et al., 2011; Smith et al., 2012).

We hypothesized that a particularly powerful social experience—social exclusion—was likely to distort people's network cognitions. Having been left out of a group, we argued, would affect how people read the relations among group members they observe. Indeed, social exclusion, a widely studied, quite common and painful social phenomenon (Williams, 2007a, 2007b; Zadro et al., 2004), significantly undermined people's ability to decode the network structures embedded in unfamiliar social situations.

In the correlational study, people who reported suffering from social exclusion recalled novel networks as significantly more dense than they were. However, these misperceptions were limited to reporting the structures of social networks, with no effect for exclusion on geographical network recall. The social experience of exclusion undermines perceptions of social interactions, making this finding domain specific rather than a general problem of inaccuracy.

In a second study, we manipulated the exclusion experience and then had people discern the network structure from their observations of social interactions. Here, too, exclusion distorted network perceptions; people who had been left out of a group activity saw others as enjoying greater social connectedness than was the case, as well as more connectedness than others who had not had this experience. Whereas false negatives did not differ by social

experience condition, reporting of false positives did. This pattern indicates that exclusion does not simply interfere with social perception, but it does so in ways that lead people to overestimate network density.

Results from both studies support our primary proposition—social exclusion experiences systematically undercut people's ability to decode the social network structures that are present in novel social settings. And, if getting it wrong means that people misconstrue network opportunity, then these errors are likely to undermine people's effective network exploitation.

Theoretical, methodological, and practical contributions

Our work builds on research that examines the factors that shape network perceptual accuracy (Casciaro, 1998; Janicik and Larrick, 2005). In particular, we focus on how social experiences make a difference to how people perceive networks (e.g., Simpson and Borch, 2005; Simpson et al., 2011). To generate our hypotheses we integrated network cognition research with theoretical work on social exclusion. This allowed us to show that suffering at the hands of a group makes a significant difference to how people understand the underlying network structure of novel groups.

To restore a sense of post-exclusion belongingness and self-esteem, scholars find that people are motivated to connect with others. What we see in our studies, however, is that those who have been socially marginalized have particular difficulty understanding the structure of social relationships. So while motivation to connect may be present, the perception needed to execute effectively appears to be lacking. Getting the perception part wrong may mean even higher barriers to connecting with others. In this way, exclusion may beget exclusion.

Outside the laboratory, the task of detecting network structure from social interactions is likely to be difficult. Complicated by noise, perceivers may find it difficult to pick up the signal in social relations. Yet, much of the psychological research on network perception has relied on rather stylized tasks that we argue underestimates the difficulty of the task as people encounter it in their everyday lives (e.g., Janicik and Larrick, 2005). In our second study, we sought to move the task closer to the kind one might encounter outside the laboratory by having people decode the network from their observations of interactions. This was a quite difficult task. In fact, the results suggest to us that network accuracy may be over-reported in the literature, given how the data are collected.

Limitations and future directions

As with any experiment, we sacrificed elements of realism to exercise enough control to test causal mechanisms. In particular, we generated a social network that, while more realistic than some experimental methods used in assessing cognition and social perceptions (see Brashears, 2013, for additional methods), was still artificial. Additionally, the experience of exclusion we induced in our study participants is likely to be less potent compared to that one would experience in settings that matter. However, this is likely to mean that the effects we identified will only be stronger outside the laboratory.

Being left out encourages people to see others as more connected than they otherwise are. While our investigation was limited to perceptions of unfamiliar networks, there is no theoretical reason to believe that these people would not make the same mistakes when faced with more familiar networks. Exclusion, with its acute need and emotional states, may very well lead to a short-term tendency to perceive one's own network as more densely connected than it is. Perhaps, though, because of prior knowledge of relationships, the effects would be a smaller for these networks.

More work is needed to further explore the effects of social exclusion on network perception.

Participants in our study were never going to interact with the avatars they observed. It may be the case then that participants would do a better job of decoding the network when they have a real stake in getting it right, as they would if they were looking to join the group. This is likely to be true in both the exclusion and inclusion conditions, however, meaning that we are still likely to identify a mean difference in perceptual accuracy between conditions. Still, our results may be limited to settings in which participants are third party observers of networks rather than people who are highly motivated to getting it right. Future work could look to see how the potential to interact may affect perceptual accuracy.

Conclusion

The task for everyday networkers is to accurately detect the network structures embedded in the social contexts they encounter. We find that the barriers to getting it right might be even higher than previously thought, as a common social experience distorts perceptions.

References

- Ambady, N., Gray, H.M., 2002. On being sad and mistaken: mood effects on the accuracy of thin-slice judgments. *J. Pers. Soc. Psychol.* 83 (4), 947–961.
- Baumeister, R.F., Leary, M.R., 1995. The need to belong: the desire for personal attachments as a fundamental human motivation. *Psychol. Bull.* 117 (3), 497–529.
- Bower, G.H., 1981. Mood and memory. *Am. Psychol.* 36 (2), 129–148.
- Bower, G.H., 1991. Mood congruity of social judgments. *Emot. Soc. Judgm.*, 31–53.
- Brashears, M.E., 2013. Humans use compression heuristics to improve the recall of social networks. *Nat. Sci. Rep.* 3, 1–7.
- Buhrmeister, M., Kwang, T., Gosling, S.D., 2011. Amazon's Mechanical Turk: a new source of inexpensive, yet high-quality data? *Perspect. Psychol. Sci.* 6, 3.
- Casciaro, T., 1998. Seeing things clearly: social structure, personality, and accuracy in social network perception. *Soc. Netw.* 20, 331–351.
- Casciaro, T., Carley, K.M., Krackhardt, D., 1999. Positive affectivity and accuracy in social network perception. *Motiv. Emot.* 23 (4), 285–306.
- Chow, R.M., Tiedens, L.Z., Govan, C.L., 2008. Excluded emotions: the role of anger in antisocial responses to ostracism. *J. Exp. Soc. Psychol.* 44 (3), 896–903.
- De Soto, C.B., 1960. Learning a social structure. *J. Abnorm. Soc. Psychol.* 60 (3), 417.
- De Soto, C.B., Bosley, J.J., 1962. The cognitive structure of a social structure. *J. Abnorm. Soc. Psychol.* 64, 303.
- DeWall, C.N., MacDonald, G., Webster, G.D., Masten, C.L., Baumeister, R.F., Powell, C., Combs, D., Schurtz, D.R., Stillman, T.F., Tice, D.M., Eisenberger, N.I., 2010. Acetaminophen reduces social pain: behavioral and neural evidence. *Psychol. Sci.* 21 (7), 931–937.
- Eisenberger, N.I., Jarcho, J.M., Lieberman, M.D., Naliboff, B.D., 2006. An experimental study of shared sensitivity to physical pain and social rejection. *Pain* 126 (1), 132–138.
- Flynn, F.J., Reagans, R.E., Guillory, L., 2010. Do you two know each other? Transitivity, homophily, and the need for (network) closure. *J. Pers. Soc. Psychol.* 99 (5), 855.
- Forgas, J.P., Bower, G.H., Moylan, S.J., 1990. Praise or blame? Affective influences on attributions for achievement. *J. Pers. Soc. Psychol.* 59 (4), 809–819.
- Forgas, J.P., George, J.M., 2001. Affective influences on judgments and behavior in organizations: an information processing perspective. *Organ. Behav. Hum. Decis. Process.* 86 (1), 3–34.
- Gardner, W.L., Pickett, C.L., Jefferis, V., Knowles, M., 2005. On the outside looking in: loneliness and social monitoring. *Pers. Soc. Psychol. Bull.* 31 (11), 1549–1560.
- Giordano, C., Wood, J.V., Michela, J.L., 2000. Depressive personality styles, dysphoria, and social comparisons in everyday life. *J. Pers. Soc. Psychol.* 79 (3), 438.
- Goethals, G.R., 1986. Social comparison theory psychology from the lost and found. *Pers. Soc. Psychol. Bull.* 12 (3), 261–278.
- Gonsalkarole, K., Williams, K.D., 2007. The KKK won't let me play. Ostracism even by despised groups hurts. *Eur. J. Soc. Psychol.* 37 (6), 1176–1186.
- Gosling, S.D., Johnson, J.A., 2010. Advanced Methods for Behavioral Research on the Internet. American Psychological Association, Washington, DC.
- Gosling, S.D., Sandy, C.J., John, O.P., Potter, J., 2011. Wired but not WEIRD: the promise of the Internet in reaching more diverse samples. *Behav. Brain Sci.* 33, 94–95.
- Gosling, S.D., Vazire, S., Srivastava, S., John, O.P., 2004. Should we trust Web-based studies? A comparative analysis of six preconceptions about Internet questionnaires. *Am. Psychol.* 59, 93–104.
- Gray, H.M., Ishii, K., Ambady, N., 2011. Misery loves company: when sadness increases the desire for social connectedness. *Pers. Soc. Psychol. Bull.* 37 (11), 1438–1448.
- Janicki, G.A., Larrick, R.P., 2005. Social network schemas and the learning of incomplete networks. *J. Pers. Soc. Psychol.* 88 (2), 348.
- Jordan, P.J., Lawrence, S.A., Troth, A.C., 2006. The impact of negative mood on team performance. *J. Manage. Organ.* 12 (2), 131–145.
- Kilduff, M., Crossland, C., Tsai, W., Krackhardt, D., 2008. Organizational network perceptions versus reality: a small world after all? *Organ. Behav. Hum. Decis. Process.* 107 (1), 15–28.
- Krackhardt, D., 1992. The strength of strong ties: the importance of Philos in organizations. In: Nohria, N., Eccles, R.G. (Eds.), *Networks and Organizations: Structure, Form, and Action*. Harvard Business School Press, Boston, MA, pp. 216–239.
- Krackhardt, D., Hanson, J.R., 1993. Informal networks. *Harv. Bus. Rev.* 71 (4), 104–111.
- Krackhardt, D., Kilduff, M., 1999. Whether close or far: social distance effects on perceived balance in friendship networks. *J. Pers. Soc. Psychol.* 76 (6), 770–782.
- Kraut, R., Olson, J., Banaji, M., Bruckman, A., Cohen, J., Couper, M.P., 2003. Psychological research online: opportunities and challenges. *Am. Psychol. Assoc.*
- Kumbasar, E., Romney, A.K., Batchelder, W.H., 1994. Systematic biases in social perception. *Am. J. Sociol.*, 477–505.
- Lieberman, M.D., Eisenberger, 2009. Neuroscience: pains and pleasures of social life. *Science* 323 (5916), 890–891.
- Maner, J.K., DeWall, C.N., Baumeister, R.F., Schaller, M., 2007. Does social exclusion motivate interpersonal connection? Resolving the porcupine problem. *J. Pers. Soc. Psychol.* 92 (1), 42–55.
- Michaelson, A., Contractor, N.S., 1992. Structural position and perceived similarity. *Soc. Psychol. Q.* 55 (3), 300–310.
- Paolacci, G., Chandler, J., Ipeirotis, P.G., 2010. Running experiments on Amazon Mechanical Turk. *Judgm. Decis. Mak.* 5 (5), 149–411.
- Simpson, B., Borch, C., 2005. Does power affect perception in social networks? Two arguments and an experimental test. *Soc. Psychol. Q.* 68 (3), 278–287.
- Simpson, B., Markovsky, B., Steketee, M., 2011. Power and the perception of social networks. *Soc. Netw.* 33 (2), 166–171.
- Smith, E.B., Menon, T., Thompson, L., 2012. Status differences in the cognitive activation of social networks. *Organ. Sci.* 23 (1), 67–82.
- Smith, E.R., Collins, E.C., 2009. Contextualizing person perception: distributed social cognition. *Psychol. Rev.* 116 (2), 343–364.
- Wheeler, L., Miyake, K., 1992. Social comparison in everyday life. *J. Pers. Soc. Psychol.* 62 (5), 760.
- Williams, K.D., 2007a. Ostracism. *Ann. Rev. Psychol.* 58 (1), 425.
- Williams, K.D., 2007b. Ostracism: the kiss of social death. *Soc. Pers. Psychol. Compass* 1 (1), 236–247.
- Williams, K.D., Cheung, C.K.T., Choi, W., 2000. Cyberostracism: effects of being ostracized over the Internet. *J. Pers. Soc. Psychol.* 79 (5), 748–762.
- Wills, T.A., 1981. Downward comparison principles in social psychology. *Psychol. Bull.* 90 (2), 245.
- Wood, J.V., Michela, J.L., Giordano, C., 2000. Downward comparison in everyday life: reconciling self-enhancement models with the mood-cognition priming model. *J. Pers. Soc. Psychol.* 79 (4), 563.
- Zadro, L., Williams, K.D., Richardson, R., 2004. How low can you go? Ostracism by computer is sufficient to lower self-reported levels of belonging, control, self-esteem and meaningful existence. *J. Exp. Soc. Psychol.* 40, 560–567.