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Networks as Covers: Evidence from an On-Line Social Network

Mikołaj Jan Piskorski

Working Paper

13-083

March 26, 2013

NETWORKS AS COVERS:
EVIDENCE FROM AN ON-LINE SOCIAL NETWORK

Mikołaj Jan Piskorski
Harvard University

Morgan 243
Harvard Business School
Boston, MA 02163

ABSTRACT

This paper proposes that networks give actors a cover by giving them the excuse of sociability to engage in normatively prohibited market behaviors. I apply this hypothesis to actors in long-term exclusive relationships who are surreptitiously seeking new relationships without jeopardizing their current ones. I hypothesize that these actors will be drawn to social environments where others socialize with their friends, and that they will establish numerous relationships in these environments to cover up their real intent. I find significant support for these predictions using data from a large on-line social network.

Introduction

Economic sociologists and organizational scholars have proposed two ways in which networks impact market outcomes (see Podolny 2001, for an analysis). First, networks can act as pipes that transfer trustworthy information about exchange opportunities and facilitate exchange of resources at low cost. Research on job searches (Granovetter 1974), interlocking directorates (Burt 1983; Mizruchi 1996) and alliances (Gulati and Gargiulo 1999) lends credence to this view, and suggests that actors seek out structural holes or positions of power in networks (Burt 1992; Pfeffer and Salancik 1978). Second, networks can act as prisms whereby a relationship between two actors is scrutinized by uninvolved observers to infer the two actors' quality (Han 1994; Podolny 1993; Stuart, Hoang and Hybels 1999), or their identities in a way that affects their market outcomes (Zuckerman 1999; Zuckerman 2000). Prescriptively, this view recommends that actors choose relationships carefully to signal quality (Jensen 2003) and project clear identities; otherwise they will face significant penalties (Zuckerman 2004; Zuckerman et al. 2003).

This paper proposes a third way that networks can impact outcomes, which I call *cover*. Networks can provide cover by allowing actors to use the excuse of sociability to engage in normatively prohibited behaviors. I apply this thesis to actors in long-term exclusive relationships who are seeking new relationships surreptitiously so as not to jeopardize their existing relationships. To achieve their goal, I argue, these actors will participate in social environments where they and others interact with friends. These social environments are useful to such actors in at least two ways. First, because such environments attract both those who are seeking new relationships and those who are not,

current partners will find it difficult to distinguish whether actors are looking for a new relationship or merely socializing. Second, current partners may obtain benefits from actors' interactions with friends, which can offset the costs associated with a higher likelihood that the actors will leave the relationship. When either of these mechanisms is in place, an actor in a long-term exclusive relationship will be able to look for a new relationship without jeopardizing the current relationship.

This interpretation of networks builds on two existing approaches. Specifically, cover relies on the benefits of socializing highlighted by the pipes view. Cover also assumes the ability to signal information to strangers highlighted by the prisms view. But the interpretation of networks as cover relies on a mechanism diametrically opposed to those described by the other two accounts. Both the pipes thesis and the prisms thesis argue that actors enter into exchanges with strangers because social relationships reduce information asymmetries. In contrast, the cover hypothesis argues that actors enter into exchanges with strangers to *create* information asymmetries with people the actor already knows. The cover thesis also makes very different recommendations. The pipes approach implies that individuals should aim to capture positions of power or brokerage; the prisms approach urges actors to form ties carefully to maintain distinct and hard-won identities. In contrast, the cover approach implies that actors should form ties to generate easily attainable network benefits no different from those that others enjoy in order to disguise their true intent (cf. Padgett and Ansell 1993).

The remainder of the paper is organized as follows. The next section examines why a participant in a long-term exclusive relationship faces a trade-off between seeking a new relationship and jeopardizing the current one. Subsequent sections identify two

types of cover that can alleviate this trade-off and describe how social networks enable the creation of such covers. On this basis, I propose that participants in long-term relationships who are seeking new relationships will be attracted to platforms where they can interact with friends, and that they will establish many friendships there. Finally, I test these propositions using quantitative data from an on-line social network and find significant support for them. The paper concludes with a discussion of the implications of these findings.

Constraints on the market participation of actors in relationships

Consider a social situation in which an actor is in an exclusive relationship with a partner—either an organization, in the case of an employment relationship, or another person, as in the case of a romantic relationship. The partner is making costly investments in the relationship that yield direct benefits to the actor. The partner will obtain future returns from these investments only if the relationship continues; otherwise, the current partner will bear the investment costs but obtain no returns. The actor can always leave his partner and establish a new relationship in which he may obtain higher rewards.[1] He has some probability of doing so, but the current partner does not know what that probability is. She can only estimate it, and hypothesize probability that the actor wants to continue the relationship. Thus she will invest in the relationship only if the expected value of doing so is higher than zero.

Though the current partner cannot know the probability that the actor will stay in the relationship, she can infer it from his actions. Specifically, she can infer that he is

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[1] For simplicity and clarity, I will consistently refer to the actor as *he* and his current partner and the potential new partner as *she*.

more likely to exit the relationship if he participates in a social environment where he can display detailed information about himself. By doing so, he can represent himself to a potential new partner or improve the chances that he will be found by such a prospective partner. In the employment sphere, for example, he would start sending out his résumé or join an employment website like Monster.com. In the romantic sphere, he would start frequenting bars or join a dating website.

When the current partner observes these actions, she lowers her estimate of the probability that the actor intends to stay in the relationship. This revised estimate will reduce the expected value of investing in the relationship and thus shrink such investments.[2] When, for example, a manager makes it known that he is looking for a new job, generating skepticism about his commitment to the organization, the result is a reciprocal withdrawal of commitment by his bosses or subordinates and even possible dismissal. The same reasoning applies to a participant in a long-term relationship, who is not supposed to be looking for a new romantic partner. If his current partner discovers such intentions, she will drastically reduce her investments in the relationship.

The exact degree to which the actor's current partner lowers her estimate that he intends to stay depends on whether others in the same social environment leave their current relationships at a rate higher or lower than the perceived population average. If the social environment in question really increases the likelihood of departure, or attracts only people whose probability of leaving is unusually high, the current partner lowers her estimate steeply. If, on the other hand, the social environment does not increase the

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[2] This is a very important scope condition in the model. There are some employment relationships in which the fact that the employee is looking for a job has no impact on the relationship between the employer and the employee. For example, academics are not penalized for looking for a new job. This is largely because universities do not undertake relationship-specific investments into academics and have little to lose when an academic leaves. For this reason, the model does not apply to academic markets, but it does apply to a great number of employment relationships in which such investments are present. Also see footnote 5.

likelihood of departure, or attracts both those content with their current relationships and those prowling for new relationships, the current partner increases her estimate of departure only slightly.

A costly trade-off

This scenario creates a trade-off for the actor. On the one hand, participation in a social environment where he can display information about himself increases the likelihood of finding a partner who will give him higher rewards. On the other hand, participation in such an environment sends a strong signal that he intends to abandon the relationship with his existing partner, which will reduce her investments and hence the actor's rewards in the current relationship.

The various ways in which the actor can attenuate this trade-off have substantial costs. First, he can exit the current relationship before seeking a new one. But by doing so he will forgo the benefits of the current relationship while looking for a new relationship: in the employment context, income; in the romantic context, pleasure. Second, if the actor does not find a better partner, the new rewards may be inferior to the existing rewards; thus he may choose to leave the current relationship only when he is certain that the new relationship will be preferable. Third, the status of being in a relationship may serve as a signal of his quality, such that exiting it will degrade the quality of new partners available to him. This mechanism is particularly salient in the employment arena, where new employers are apt to interpret a period of unemployment as an adverse signal of employee quality.

Second, the actor can participate in a social environment but disclose limited or false information about himself. Doing so will reduce the likelihood that his current partner will discover his intentions and stop investing, but it will interfere with a potential new partner's ability to find him and with his own ability to represent himself accurately to such a new partner. As a consequence, the likelihood that the actor identifies the best possible new partner declines, resulting in lower future rewards. Alternatively, the actor can avoid social environments altogether and seek a new relationship through a broker. Using a broker can ensure that his current partner will not learn about his intentions, but brokers can be costly and may expose the actor only to a limited segment of the market.

Pooling cover

Thus far we have assumed that participation in a social environment only benefits an actor seeking a new relationship. Now we will consider the possibility that participation in a particular social environment generates benefits for all actors, whether seeking new relationships or not (c.f. Spence 1974). As we will see, the existence of such generalized benefits creates cover that allows the actor seeking a new relationship to participate and display information about himself without provoking his current partner to reduce her investments. Because this mechanism relies on the pooling of different types of people in the same social environment, I refer to it as *pooling cover*.

Consider the motivations of an actor who is not looking for a new relationship. He will not want to participate in a social environment frequented by those who are looking, because he does not want to send an inaccurate signal to his current partner. Now consider a social environment that generates benefits for actors of all types. An actor who is not seeking a relationship knows that participation in such a social environment may

prompt accusations that he is looking for a new relationship. On the other hand, some of the ensuing withdrawals of investment on the part of his partner can be offset by the benefits of participation. If these benefits are substantially enough to offset the costs of his partner's lower investment, he will participate in such a social environment. When actors who are not seeking new relationships participate in a social environment, the average increase in the likelihood that any given participant will leave his current relationship decreases; thus the signal that participation conveys is weaker. In other words, the benefits that attract varied types of actors enable those seeking a new relationship to participate without suffering an increase in their current partners' suspicions.

For example, consider an ordinary workplace. People at work display a substantial amount of information about themselves, which can lead to new romantic relationships at work (Lawson 1988). When an actor starts a new job, therefore, his partner may worry that the probability that he will find a new relationship increases. Even so, most people go to work regardless of their relationship intentions, and it is rare for a current partner to interpret the mere act of going to work as a sign of a desire for a new relationship. Therefore a participant in a long-term relationship who is actually seeking a new relationship can find a new partner at work without incurring the cost of lower investment by his partner.[3]

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[3] Most workplaces explicitly prohibit dating co-workers and impose penalties for doing so. Such a policy can counterintuitively strengthen the cover that work provides, and might even attract those seeking a workplace relationship. This is the case because such restrictions attract actors who are not seeking a relationship and want to signal this credibly to their current partners. This reduces the average probability that those who work in such places will initiate relationships there, and therefore attracts those seeking a relationship surreptitiously. This counterintuitive effect implies that certain social environments ought to relax their rules to create ambiguity that will put off such participants.

Networks as pooling cover

The foregoing discussion suggests that a participant in a particular social environment can display information about himself and seek a new relationship without jeopardizing his current relationship as long as the environment in question generates benefits for a wide array of actors. The preceding examples suggest that social environments like workplaces, schools and conferences can function as covers. But these examples also point to some of the inherent limitations of social environments that function as covers by appealing to participants who are not seeking new relationships. Specifically, these environments rarely allow for broad market exposure; they typically expose the participant to the same people on a daily basis. To overcome these constraints, such an actor would prefer social environments like bars that allow for exposure to a broader swath of people. But because those who are not looking for relationships avoid such environments, they provide no cover.

One way in which an actor can encounter many new people while maintaining cover is to participate in a given social environment along with others in his network, as shown in Figure 1. Joint participation with friends generates cover in at least two ways. First, interacting with friends is likely to generate benefits whether or not the actor is looking for a new relationship. Second, almost everyone has friends; thus, social environments in which friends interact will attract all types of people, providing cover for those who are seeking new relationships.

Insert Figure 1 around here

This can be easily seen by considering what happens when an actor attends a bar alone: he encounters a broad array of potential new relationships but enjoys very little cover. Now assume that he goes to the same bar with friends. Since interaction with friends in a bar generates benefits of pure sociability for all types of people (Simmel 1971), and all types of people are likely to attend to interact with friends, such environments will enable him to seek a new relationship without appearing to do so.[4]

The foregoing argument suggests that an actor in an exclusive long-term relationship who is seeking a new relationship will be attracted to social environments where the prevailing activity is interaction with friends. Having joined such a social environment, he will seek to interact with as many friends to make himself indistinguishable from those present who are not seeking a relationship. Hence,

Proposition 1:   An actor in an exclusive long-term relationship who is surreptitiously seeking a new relationship will socialize with friends in environments that generate network benefits for all sorts of people.

Beneficial cover

Thus far I have explored the effects of participation in a social environment that generates benefits for all types of actors. Now let us examine what happens when participation in a particular social environment allows an actor to display relevant information to potential new partners but also benefits his current partner. As I examine below, such benefits will lead the current partner to accept a higher expected rate of leaving the relationship participation on the actor's part without reducing her investment.

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[4] The emphasis here is on the actor's own friends as these will not share the actor's intent with his partner.

Because this mechanism relies on benefits to the current partner, I refer to it as *beneficial cover*.

To see this mechanism at work, consider that when the actor participates in such a social environment, the likelihood that he will leave his current relationship increases. Thus, the likelihood that his current partner will obtain returns on her investments decreases. These potential losses are counterbalanced, however, by additional benefits for the current partner during the lifespan of the relationship. As long as these additional benefits offset the reduced benefits associated with earlier termination of the relationship, the current partner will not reduce her investment even if she anticipates that the actor is more likely to terminate the relationship. Thus, the production of benefits for the current partner gives the actor cover to participate in a particular social environment without incurring a cost in reduced investment by his current partner. The two types of cover thus differ in that pooling cover assumes that the current partner is unclear regarding the actor's intentions. Beneficial cover, by contrast, does not exclude the possibility that the current partner knows his intentions. It does suggest, however, that even if the current partner suspects that the actor intends to leave, the benefits she enjoys will prevent her from reducing her investments.

Consider, for example, a pharmaceutical company that allows its researchers to present their research findings at conferences. Such presentations allow a researcher to display his skills and achievements to other companies, and the result may be a job offer that causes the current employer to lose its investments in him. On the other hand, such presentations can benefit the company; the researcher may receive useful feedback or invitations to collaborate that will improve the quality of his research and increase the

chances that the company will develop a blockbuster drug. Because such presentations make the scientist more productive during his tenure there, the company will be willing to accept a higher likelihood of earlier departure.[5]

Networks as beneficial cover

The foregoing discussion suggests that certain social environments generate benefits for an actor's current partner that allow him to seek a new relationship without jeopardizing his relationship with her. The example of a researcher at a conference suggests that an actor can engage in such behavior even if his current partner understands the increased likelihood that the relationship will end. But this example also points to some inherent limitations of such covers. For instance, the cover is only available to an actor who can display information and receive explicit feedback that translates into benefits for his current partner. Mere display of information to the market without such feedback will not generate such benefits, and will therefore provide no cover. It is easy to see how research scientists produce such benefits. But a manufacturing manager who decides to give presentations on his achievements is unlikely to generate benefits for his employer sufficient to justify his doing so.

An actor can remedy this situation if he can find a social environment that helps him utilize his social network to create benefits for his current partner. Social networks can generate benefits for the partner in at least two ways. First, if the actor and his current partner have friends in common, the social environment can strengthen relationships between the actor and these friends in ways that benefit the partner by enlivening her

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[5] This mechanism may also help us why universities do not frown on academics presenting their work elsewhere, even though doing so may actually increase the chances that they will be poached. Also see footnote 2.

social life. Second, if the current partner cannot access a particular set of resources, such as a job referral or advice on a hotel in San Francisco, the actor can use his network to obtain them for her. If a particular social environment helps the actor use his network more effectively to obtain such resources, and to display information about himself in the process, it is likely to serve as cover if he is seeking a new relationship. Given that almost everyone has a circle of friends, and can activate it to obtain benefits, this second mechanism is apt to apply to a broad set of actors.

To see an example, consider participants in the on-line business-oriented social network LinkedIn, which has attracted over 100 million users worldwide. LinkedIn enables users to post their educational and workplace histories and achievements. This publicly traded company earns most of its revenue from recruiters who pay LinkedIn for access to its members. LinkedIn's competitive advantage is its ability to offer information about and access to the currently employed, who are otherwise often hard to identify. By no means everyone on LinkedIn is seeking a new job, but many people join the platform for that purpose.

Nevertheless, firms do not penalize their employees for joining LinkedIn. This is the case largely because LinkedIn also allows users to publicly display their business relationships with others and to contact friends of friends, or even friends of friends of friends (with the permission of the intermediary friends).[6] Both capabilities make individuals more productive at their jobs by enabling them, for example, to look for sales leads through their on-line social networks. Even individuals whose work does not call for contacting people outside the organization, such as accountants, can create benefits

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[6] These relationships can also help an actor find a new job while on the job. The pertinent mechanism, described by the pipes literature (c.f. Granovetter (1994)), differs from the mechanism described here.

for the employer because searches on LinkedIn take the form of friend-to-friend referrals. If, for example, someone at the company identifies a sales lead, it is possible that the connecting link will be an accountant. Such potential benefits prompt firms to encourage their employees to join LinkedIn, and to publicly display their ties to others, even though doing so may cause them to leave the organization at a higher rate.

The foregoing discussion suggests that an actor intent on finding a new relationship without first ending his existing relationship will be attracted to social environments that generate benefits for his existing partner. Social networks can provide such benefits. Thus, an actor in a relationship who joins social environments with the intent of finding a new relationship will continue to nurture his social relationships to benefit his current partner. Hence,

Proposition 2: An actor in an exclusive long-term relationship who is seeking a new relationship will join social environments where he can develop social relationships to benefit his current partner.

Our examination of the theoretical distinction between the two types of cover has assumed that either the actor alone or his current partner alone obtains benefits. In many circumstances this is accurate. For example, an actor can attend a party with his friends, which generates no benefits for his current partner. Similarly, certain users of LinkedIn may obtain no private benefits even though their associations help their employers. In other cases, however, social networks generate benefits for both. For example, an actor who works generates benefits for himself and his partner. Similarly, LinkedIn members can generate benefits for themselves and their employers.

Under most conditions, both types of cover can operate simultaneously. However, under some conditions, a beneficial cover can negatively impact a pooling cover. Suppose, for example, that the availability of benefits for the current partner attracts only actors in a relationship who are seeking a new one. This scenario will increase the ratio of such actors to those who are not seeking a new relationship, negatively impacting the pooling cover. But if the existence of benefits for the current partner attracts both types of actors, both types of covers can coexist.

Search types

Thus far I have not distinguished between an actor seeking a new partner and a potential new partner seeking him; the theory of cover applies no matter who initiates the search. But when a potential new partner initiates the search, the theory acquires some additional characteristics.

First, the theory assumes that an actor's interactions with friends simply provide cover. But when it is a potential new partner who initiates a search, these interactions can also help overcome problems of asymmetric information by helping the potential new partner to identify the appropriate actor to approach (Spence 1974). This is the case because individuals are less likely to misrepresent themselves when they interact with friends; thus, to the extent that the new partner can observe such interactions, she can obtain accurate information about the actor. This dynamic is apparent on LinkedIn, where individuals are unlikely to lie about their professional achievements because such assertions will be seen by their friends and possibly corrected. The value of such truthful information is lower when the actor himself initiates the search, but even in this scenario

the potential partner may value access to interactions between the actor and his friends to ascertain the veracity of his claims.

Second, when a potential new partner initiates a search, she faces the risk of committing the type-II error of approaching an actor who is not seeking a new relationship. This problem is likely to be salient in the pooling-cover scenario, where only a fraction of actors are seeking a new relationship. If such errors are costly, the potential new partner is likely to refrain from reaching out; hence the utility of the cover will be restricted to searches by the actors themselves. This scenario is apt to be less of an issue in social environments that serve as beneficial covers, where most actors are likely to seek a new relationship.

Third, if a potential new partner reaches out to an actor who was not initially seeking a relationship, he may change his mind once contacted. For example, a LinkedIn member who did not initially join to look for a job might nevertheless accept one if offered. Thus when new potential partners scour a social environment for actors in relationships, it becomes a place where individuals can establish new relationships regardless of their initial intentions. In environments where only the actor himself can initiate a search, by contrast, seeking a new relationship is more premeditated.

Ethical considerations

The study of covers raises a number of ethical issues. Most people consider job-market covers ethically acceptable, and few would insist that an actor give up his current job before seeking a new one. When it comes to personal relationships, however, most people are likely to find the notion of seeking a new romantic relationship while

maintaining an existing one ethically repugnant. Objection is apt to be more strenuous when the current partner is unaware that the actor is looking for a new relationship (the pooling-cover scenario) than when she knows but chooses not to act (the beneficial-cover scenario).

I am acutely aware of this ethical issue and do not want to endorse pooling-cover behavior. My intent here is to identify the kinds of social environments that attract self-interested actors who choose to ignore ethical guidelines. The theory's counterintuitive predictions can help us design better social environments that make it more difficult to transgress ethical boundaries. Specifically, the theory implies that it is a mistake to design social environments that are designed only to strengthen relationships with friends. Such environments will attract actors who are not seeking new relationships and will thus provide better cover for those who are doing so. Instead, the theory recommends designing social environments that allow for some meeting new people. Such environments will attract single people looking for new relationships, and thus provide no cover for those in relationships but looking for new ones.

Connections to the existing literature

The concept of networks as covers exhibits clear connections to the existing literature on networks as pipes and prisms. Although the concept of networks as covers differs from that of networks as pipes, it critically relies on the latter. This is the case because networks can only operate as covers if they also operate as pipes to generate benefits for individuals and/or their partners. In other words, if social networks generated no pipe benefits, they could not function as covers. Even so, the respective mechanisms

whereby networks generate benefits differ. Networks can function as pipes because they overcome informational asymmetries that would otherwise prevent a mutually valuable exchange from occurring. They work as covers because they generate informational asymmetries that allow actors to enter into exchanges. This distinction between the two mechanisms leads us to a more contingent view of what constitutes an optimal position in a social network.

Specifically, the view of networks as pipes suggests that actors become brokers between disconnected others, or affiliate with those who have few exchange opportunities (Burt 2005). But because only a few actors can attain brokerage or high-power positions (Mizruchi et al. 1986), such a position may not provide cover, particularly if other actors who are seeking new relationships occupy the same position. When that happens, the view of networks as pooling cover implies that such an actor should seek a less unique position in the social structure in order to blend in with those who are not on the prowl. Although an actor may obtain fewer direct benefits by occupying an inconspicuous position, the forgone benefits of prominence may be more than compensated for by the ability to establish a new relationship surreptitiously. Furthermore, the concept of beneficial cover suggests that such an actor might want to occupy the network position that generates the greatest benefits for his partner rather than himself. Even though he may thus sacrifice some personal network benefits, the resulting beneficial cover may outweigh these costs.

The concept of networks as cover resembles the networks-as-prisms view in that both assume that a relationship between two parties is used by third parties to make inferences about them (Podolny 2001; Zuckerman 1999). However, the two views differ

in who makes what kinds of assumptions. In the prisms view, it is the potential partner that makes observations of the relationships between actor and others, and makes the decisions accordingly. In the cover view, it is the current partner that makes the observations related to the actor and his friends, and makes decisions accordingly. The mechanism is different too. In the prisms view, relationships serve to reduce information asymmetries, but in the covers view they create these asymmetries. This leads to differences in the kinds of relationships that actors should pursue to influence third parties' inferences. The networks-as-prisms view implies that an actor should cultivate relationships with an eye to signaling high status and maintaining a coherent identity in the eyes of people he does not know. In contrast, the networks-as-cover view implies that an actor should establish ties with a variety of people to disguise his true intentions from people he does know. Thus, the networks-as-cover view offers a more contingent view of the most beneficial position in the network structure. For example, if all the high-status positions are held by actors seeking new relationships, it suggests, an actor in a relationship who is pursuing a new one may wish to forgo a high-status position for a lower-status position that will provide pooling cover.

Multivocality

The view of networks as cover also closely parallels the research on ambiguity and multivocality in social situations (cf. Padgett and Ansell 1993). This line of research suggests that actors should make their social roles as ambiguous as possible to avoid being trapped in expected role performances that will constrain their actions (Leifer 1991; White 1985). The seminal literature on this topic recommends only non-role-specific

actions that leave open a spectrum of roles and do not appear inconsistent with any role that may be claimed later (Leifer 1988). Subsequent work suggests that behaving ambiguously is insufficient because others can easily see through behavioral facades to identify self-interested motivations (Padgett and Ansell 1993). To act credibly in a multivocal fashion, therefore, an actor's attributed interests must themselves be multivocal, such that different people attribute different interests to him. Furthermore, such multivocality can only be sustained if the actor's contacts are not connected to each other and thus cannot compare their perceptions of the actor's goals (Burt 2001).

Our earlier discussion of pooling cover suggests that goal multivocality can be achieved when actors with a particular aim join social environments frequented by actors with a different aim. As long as the participation of the first type does not drive away the second type, such a social environment can sustain multivocality. But our discussion of beneficial cover suggests that multivocality is not always necessary for an actor to pursue his goal and free himself from the role claims of others. As long as an actor with a particular intent can compensate affected parties for his freedom to pursue his goal, multivocality will not be necessary. In other words, multivocality is particularly important when not all of the actor's partners can be compensated.

Empirical test

This section will test the two key predictions of the view of networks as cover, in the context of an on-line social network that people use largely for personal rather than business reasons. On-line social networks are a fairly new invention that has revolutionized the Internet. The first U.S.-based online network, SixDegrees, was

founded in 1997 and folded in 2000. Two years later Friendster rolled out a new social-networking site, many of whose 7 million users abandoned the site because its technology was unable to handle the traffic they generated. The next on-line social network, MySpace, boasted 80 million visitors a month but was eclipsed by Facebook, which by 2011 had attracted over 750 million users worldwide, and 60 percent of Internet U.S. users. Social networking has become the leading on-line activity: users spend more time on social networks than on e-mail (Nielsen 2011).

On-line social networks enable users to construct personal profiles, to publicly name their on-line friends and to interact with them. Two activities are central to these interactions: generating content and viewing content. Content generation typically entails writing posting status updates, uploading photographs and commenting on others' posts and photos. Users who generate content do not typically have a specific recipient in mind, which differentiates on-line social networks from directed media like e-mail, telephone and regular mail. Once posted, content can be viewed by many other people unless specific privacy controls restrict access. On most on-line social networks, viewing someone's profile or photos leaves no visible trace (but is recorded by the website). This feature differentiates on-line social networks from off-line reality, where it is hard to inquire into someone else's life without the target's knowledge. As we will see, viewing others' content without their knowledge accounts for the vast majority of activity on on-line social networks—in fact, approximately ten times more activity than does content contribution.

Meanwhile, however, many social networks restrict interactions between people who have not publicly declared friendship on-line. To achieve this goal, most social

networks make users' content visible only to their on-line friends. However, users can choose to make their content visible to everyone on the social network. In my sample, I estimated 30 percent of users do this, but this percentage varies from one on-line social network to another. Most sites impose restrictions on users' ability to search for and contact non-friends, even if the targets' information is publicly available, but none restricts this ability completely. Thus users can explore profiles and contact people who are not among their on-line friends. As we will see, many users search for people who are not on-line friends, examine their profiles and photos and contact some of them.

Thus on-line social networks clearly serve a dual function. First, in keeping with their commonly understood role, on-line social networks allow individuals to interact with their friends more effectively. Second, in keeping with the implications of the thesis presented here, interactions with friends can serve as cover for seeking new relationships while maintaining plausible deniability. In other words, on-line social networks can provide pooling cover. This is the case because both those who are seeking new relationships and those who are not doing so enjoy improved relationships by interacting with their friends on-line, and both are therefore attracted to social-network sites. Thus, even if the existence of on-line social networks increases the rate at which relationships dissolve,[7] the fact that most users have more innocent aims dampens the association between joining the site and looking for a new relationship. Therefore we can expect an actor in an exclusive long-term relationship looking for a new one will join on-line social networks with the intent of seeking a new relationship, and to form connections with many other people to create a cover for his behavior. Hence,

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[7] Casual evidence seems to support this claim. Informal surveys have suggested that 20 percent of all divorce cases cite infidelity initiated on an on-line social network.

Hypothesis 1:   An actor in an exclusive long-term relationship who is seeking a new relationship will build multiple social contacts with friends on on-line social networks.

On-line social networks can also serve as beneficial covers, even when they are not work-related. For example, an actor who joins a social network may build relationships with his partner's friends and family. By strengthening his relationships with people who are valuable to his partner, he creates benefits for her. To conceptualize the point differently, an actor who refuses to befriend and interact with his partner's friends and family will raise skepticism about his intention to stay in the relationship; such questions are best avoided by interacting with his partner's friends and family on-line and off-line. Thus an actor in an exclusive long-term relationship who is seeking a new relationship will establish contacts with his partner's friends to create benefits for her and thus create beneficial cover for himself. Hence,

Hypothesis 2:   An actor in a long-term relationship who is seeking a new relationship will establish social contacts with his current partner's friends.

This interpretation of activity on on-line social networks may strike many readers as inconsistent with their own personal experience and on-line behavior. But refraining from the behavior described here is entirely consistent with the theory. Recall that for a social environment to act as pooling cover, it must attract all sorts of people; otherwise the cover is blown. Thus readers of this article who use on-line social networks only to interact benignly with their friends unwittingly provide cover for those who behave

otherwise. This observation underscores the dual function of online social networks and the critical importance of networking abilities for many for covers behaviors for some.

Data

To test these hypotheses, I rely on a unique dataset provided by a large international on-line social network that has asked to remain anonymous. The site stores these data to improve its performance and develop new features. The data consist of webserver weblogs, which record every action that a user takes on the website, together with the timestamp of the request, the ID number of the user who initiated the request, and the function requested by the user. The record could also contain the identification number of the member with whom the focal member interacted. For example, if one user viewed the profile page of another, both ID numbers would be recorded.

Many on-line social networks now possess a "newsfeed" feature that shows users an aggregated set of their friends' status updates and photographs, thus directing their attention to certain pieces of content. Initially, the algorithms that selected the content to display were largely chronological, but with time they have become sophisticated enough to allow the site to manipulate user behavior, e.g. by sending them to view more photographs. To avoid potential biases I have restricted my analysis to a period of time before the site's introduction of newsfeed, allowing me to observe user behavior in the absence of site intervention.

Specifically, I chose three random one-hour time blocks in April 2007: Friday, April 6, 1-2 p.m.; Sunday, April 8, 6-7 p.m.; and Sunday, April 22, 3-4 p.m., all Eastern Standard Time. I collected a random sample of 320,000 worldwide users active on the

site during any of the three time blocks and identified their on-line friends and relationships among these on-line friends. Then, for each of the 320,000 users, I identified the users with whom he or she had interacted by (1) sending a message, (2) allowing network access or (3) simply viewing their profiles, for a total of 904,000 such target users. Then, for each of the 1,224,000 focal and target users, I collected basic demographic characteristics as reported to the social networking platform: geographic location, age, gender, marital status, sexual orientation and whether the user was seeking activity partners or a date. Because the data collection was retrospective, users were unaware that their actions had been observed. The data were anonymized to prevent identification of the users and kept on secure servers with double password protection.

Coding On-Line Activities

On-line social networks differ from other forms of electronic communication in that their users typically engage in a range of activities on the network. To capture users' activities on the site, I used five categories: (1) *Write*, for all contributions of content, including creating or modifying status updates, uploading photographs, and contributing comments to one's own or others' profiles and group profiles; (2) *Read*, for viewing one's own or others' profiles and group profiles; (3) *Network*, for any action to change the user's on-line networks; (4) *Private*, for private communications between users, such as e-mail, and one unidirectional "smileys" or "pokes"; and (5) *Miscellaneous*, for login and logout screens, navigation activities and confirmation screens.

I then wrote an algorithm that assigned codes to all user actions. For instance, suppose a user clicked on the button to establish a new relationship with someone, and

the site then asked for confirmation of this action and the user confirmed it; the first action was coded *Miscellaneous* and the second *Network*. If a user uploaded a photograph and marked it as depicting one of his friends, both actions would be coded *Write*. Visiting another user's profile would be coded *Read*. The data I collected on individuals' networks enabled me to determine whether the visited individual was an on-line friend or not.[8]

Descriptive Statistics

I focused further on categorizing and counting unique actions within each dyad. Thus, viewing 50 photographs of another user counted as a single action, but viewing a single photograph of each of two users counted as two actions. Similarly, writing two comments on a given friend's photo counted as a single action. I also excluded the category *Miscellaneous*, which consists of actions specified by site requirements rather than user behaviors. The sample population's actions are summarized in **Figure 2**. By far the largest category is *Read*; 79 percent of all unique clicks are accounted for by users viewing profiles and photos of themselves and others.[9] The second and third most frequent actions are adding content (*Write*) and adding and deleting friends (*Network)*, each responsible for roughly 8 percent of all clicks. The *Private* category comprising e-mail, "smileys" and "pokes" accounts for 5 percent of all activities.

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[8] Some on-line social networks have developed platforms that allow third-party developers to build applications using user data with user permission. Because these applications are hosted and administered by the developer, the on-line social network cannot observe what the user does on the application; it can only observe when the user starts using the application and when he or she returns to the network. For this reason, I do not have data on any such activities. Nor do I have data on instant-messenger activities between users, which the company chose not to share with me.

[9] A key reason why I chose to restrict analysis to unique categories of actions within a directed dyad is that otherwise *Read* would account for almost 99 percent of all actions, making the analysis harder to interpret.

Given its size, I further subdivided the *Read* category to distinguish between accessing profiles and photos of on-line friends and accessing those of people who are not on-line friends. I found 35 percent of all actions (44 percent of unique *Read* clicks) to be directed at to content belonging to on-line friends. But a staggering 35 percent of all actions (44 percent of unique *Read* clicks) were aimed at content belonging to people who were not on-line friends.[10] This finding is surprising, given that on-line social networks are designed to enable people to interact with friends rather than non-friends. But it is entirely consistent with the networks-as-covers theory that some people use social environments designed for interaction with friends in order to interact with non-friends. The remaining 9 percent of all actions (12 per cent of all *Read* clicks) are accounted for by users viewing their own profiles.

I next examined whether the foregoing patterns varied by gender. Men comprise roughly 50 percent of the social network's members, and were responsible for 53 percent of log-ins during the observation period. *Read* clicks fell into eight possible categories: (1) men looking at male friends, (2) men looking at male non-friends, (3) men looking at female friends, (4) men looking at female non-friends, (5) women looking at male friends, (6) women looking at male non-friends, (7) women looking at female friends and (8) women looking at female non-friends. The results appear in **Table 1**. With 8 categories, the expected value in every cell is 12.5 percent. The resulting distribution is very lopsided: the largest category is men looking at female non-friends (22 percent), followed by men looking at female friends (19 percent). In contrast to men, women look largely at

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[10] In an auxiliary analysis I took a 10% sample of all users, and identified all of the pictures and profiles they examined, and then constructed a list of unique id numbers of these profiles. For the id numbers not connected to the focal user, I examined the path length between the viewer and the target user, and found that 35% of users who were viewed were friends of friends, 35% were friends of friends of friends, and the remaining 30% were fourth degree of separation or higher.

their own gender, with a focus on their female friends (17 percent); women show relatively little interest in women they do not know (10 percent) or men. Overall, therefore, women receive as many as two-thirds of all profile and picture views.

Regression Analysis

This preliminary analysis suggests that focusing on *Read* actions offers a promising opportunity for testing our hypotheses. Within the category of *Read* actions, I will focus on distinguishing users who look at friends from users who look at non-friends. I will start by examining these patterns for men who look at female friends and female non-friends on-line. The sample consists of approximately 154,000 men and 1.6 million clicks, which account for 37 percent of all *Read* actions (excluding looking at one's own profile).[11] To test whether these *Read* actions translate into actual contact, I will examine *Private* communications actions.

Dependent Variables

I constructed six dependent variables for every man *i*. First, because over 25 percent of men did not look at any female friends, and 35 percent of men did not look at any female non-friends, I constructed two binary dependent variables: *Man Looks at a Female Friend$_i$*, equal to 1 if a man looked at least one profile or photo of a female friend, and *Man Looks at a Female Non-Friend$_i$*, equal to 1 if a man looked at least one profile or photo of a female non-friend. I then used logit models to estimate the impact of

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[11] There are almost 170,000 men in the sample. I exclude from the analysis of men looking at women approximately 16,000 men who express an interest in men only. These men account for approximately 200,000 clicks, or roughly 4 percent of the *Read* actions.

various independent variables on these dependent variables.[12] Second, I constructed two dependent variables—*Number of Female Friends a Man Looks at$_i$* and *Number Female Non-Friends a Man Looks at$_i$*—and then employed negative binomial models to estimate the impact on them of various independent variables.

Separately, I construct two binary dependent variables: *Man Contacts a Female Friend$_i$* which is equal to one if a man sends at least one message or one "smiley" to a female friend, and *Man Contacts a Female Non-Friend$_i$* which is equal to one if a man sends at least one message or one "smiley" to a female non-friend, and then use logit models to estimate the impact of various independent variables on these dependent variables.

Independent Variables

I also constructed the following independent variables for every male *i*. First, I constructed *Log(Months as a User$_i$)*, which captures the log of the number of months user *i* had been on the on-line network. Second, I constructed three age variables: *Unknown Age$_i$* equal to 1 if user *i* did not disclose his age or reported his age to be 69, 99 or 100; *Age$_i$* equal to the self-reported age of user *i* and *Age^2_i / 100* equal to the square of the self-reported age of user *i*.[13] Next I constructed *Private Profile$_i$* equal to 1 if user *i* left his privacy settings intact and made his profile and photos visible only to friends, and 0 if he changed these settings to allow anyone on the network to see them. I also constructed *Only friends can message$_i$*, which takes the value of 1 if user *i* changed the default setting

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[12] Since very few men show up in the sample more than once in a given time period, changing the analyses to viewing profiles at least once during a particular time period yields very similar results.
[13] The choice of 69, 99 and 100 was not random: many users choose these numbers when they do not want to disclose their age.

so that only his on-line friends could message him. Next I derived *Log(Own Pictures$_i$)* equal to the log of the number of photos on user *i*'s profile (self-posted only), *Log(Friends' Comments$_i$)* equal to the number of comments user *i*'s friends left on his page, and *Log(Total Clicks By User$_i$)* equal to the total number of clicks by user *i*, including actions other than looking at women.

The next set of variables is designed to test the hypotheses presented in the paper. *On-Line Friends$_i$* is equal to the count of user *i*'s on-line friends. *In relationship$_i$* is equal to 1 if user *i*'s profile states that he is in a relationship (including "in relationship," "engaged" and "married.") *Not in relationship$_i$* is equal to 1 if user *i*'s profile declares himself to be single. All the estimated effects are with respect to the baseline of not disclosing the relationship status. Finally, I constructed interactions between user *i*'s relationship status, the number of his on-line friends and the number of photos that user *i* has. We use these interactions to test Hypothesis 1. Finally, for roughly 40 percent of users in relationships we also know a self-reported user id of their long-term partner. When we have that information, we can construct a variable *Share of Friends with Partner$_i$* equal to the number of on-line friends that are joint friends of user *i* and the named partner of user *i* divided by all of the on-line friends that user *i* has. We use this variable to test Hypothesis 2.

Regression results

   Table 2 reports regression results. The positive coefficient estimates on *Log(Months as a User$_i$)* in Models 1 and 2 show that men who have been members of the on-line social network for longer are more likely to look at female friends. In contrast, the

negative coefficient estimates on *Log(Months as a User$_i$)* in Models 3 and 4 show that these men are less likely to look at female non-friends. These results imply that the first wave of men who joined the network may have done so for purely social reasons. Once the on-line social network was established, it appears, a new wave of men joined to look at female non-friends, possibly using the profile of earlier users as cover.

Age. The negative coefficient estimates on *Unknown Age$_i$* in Models 1 and 2 imply that men who did not disclose their age were less likely to look at female friends, but the positive coefficient estimates on *Unknown Age$_i$* in Models 3 and 4 suggest that they were much more likely to view profiles of female non-friends. Among those who disclosed their age, the negative coefficient estimates on *Age$_i$* in Models 1 and 2 suggest that older men were less likely to look at female friends. The positive coefficient estimates on *Age^2_i / 100* in Models 1 and 2 suggest that this effect is attenuated for much older men, but it never changes direction within observed ranges. In contrast, the positive coefficient estimates on *Age$_i$* in Models 3 and 4 show that older men were more likely to look at profiles and photos of female non-friends. The negative coefficient estimates on *Age^2_i / 100* in Models 3 and 4 suggest that this effect is attenuated as men age, but the effect of age on viewing female non-friends does not change within the observable ranges.

Privacy settings. The positive coefficient estimates on *Private Profile$_i$* in Models 1 and 2 suggest that men who restricted the visibility of their profiles to their friends were more likely to view profiles of female friends than were men who allowed open access to their profiles. Similarly, the positive coefficient estimates on *Only friends can message$_i$* in Models 1 and 2 indicate that men who allowed only their friends to e-mail them were more likely to view female friends. In contrast, the negative coefficients on *Private*

Profile$_i$ in Models 3 and 4 suggest that men who restricted their profiles to friends were less likely to view profiles of female non-friends than were men who allowed open access to their profiles. Furthermore, the negative coefficients on *Only friends can message$_i$* in Models 3 and 4 suggest that men who allowed only friends to message them were less likely to look at female non-friend than men who allowed anyone to e-mail them.

Positive coefficient estimates on *Log(Own Pictures$_i$), Log(Friends' Comments$_i$)* and *Log(Total Clicks By User$_i$)* across all four models indicate that users with more photos and more friends' comments on their profiles, as well as those who click more often, are more likely to view profiles and pictures of both female friends and female non-friends.

Number of on-line friends. Having established these baseline results, I turned to examining independent variables related to the hypotheses. The positive coefficient estimate on *On-Line Friends$_i$* in Models 1 and 2 implies that men with more on-line friends were more likely to view profiles of female friends. In contrast, the negative coefficient estimate on *On-Line Friends$_i$* in Models 3 and 4 were less likely to view profiles of female non-friends. At first glance, the latter result may seem to contradict the theory of networks as covers. But in these Models the effect applies only to people who did not publicly articulate their relationship status. Thus, we need to dig further.

Declared relationship status. The negative coefficient estimate on *In relationship$_i$* in Models 1 and 2 implies that men whose profiles declare them to be in a relationship were less likely to view profiles and pictures of female friends. At the same time, the positive coefficient estimate on *Not in relationship$_i$* in Models 1 and 2 implies that men self-described as not in a relationship were more likely to view profiles and pictures of

female friends. Furthermore, the positive coefficient estimate on *In relationship$_i$* in Models 3 and 4 implies that men self-described as in a relationship were more likely to view female non-friends. At the same time, the negative coefficient estimate on *Not in relationship$_i$* in Models 3 and 4 implies that men self-described as not in a relationship were less likely to view female non-friends. This pattern of results paints a consistent picture: men who declare themselves to be in a relationship are more likely to view profiles of female non-friends. Furthermore, men who declare themselves to be in a relationship are less likely to view profiles of female friends. This finding is very consistent with the view of networks as pooling covers. That is, actors in exclusive relationships will be attracted to social environments in which other actors socialize with their friends.

Relationship status and number of friends. For further evidence that on-line social networks act as pooling cover, I looked at the interaction between a user's relationship status and the number of his friends. The negative coefficient estimate on *On-line Friends$_i$ * In relationship$_i$* in Models 1 and 2 implies that the marginal effect of an increase in the number of a user's friends on the likelihood that he looks at profiles and pictures of female friends is smaller. In fact, the negative effect on the interaction effect is so large that it outweighs the positive effect of the number of on-line friends in Models 1 and 2. Thus, for men who do not declare their relationship status, an increase in the number of friends is associated with more views of female friends. For men who declare themselves to be in a relationship, however, an increase in the number of friends makes them less likely to view female friends. Furthermore, the positive coefficient estimate on *On-line Friends$_i$ * Not in relationship$_i$* in Models 1 and 2 suggests that the effect of an

increase in number of friends on the likelihood that he looks at female friends is larger for men self-described as not in a relationship.

In comparison, the coefficient estimate on *On-line Friends$_i$*In relationship$_i$* in Models 3 and 4 is positive, implying that the marginal effect of an increase in the number of friends on the likelihood that a man looks at profiles and pictures of female non-friends is larger. In fact, the positive effect on the interaction effect is so large that it outweighs the negative effect of the number of on-line friends in Models 3 and 4. This finding implies that, for men who do not describe themselves as in a relationship, an increase in the number of friends makes them less likely to view female non-friends. For men in relationships, however, an increase in the number of friends makes them more likely to view female non-friends. Furthermore, the negative coefficient estimate on *On-line Friends$_i$ * Not in relationship$_i$* in Models 3 and 4 suggests that the effect of an increase in the number of friends on the likelihood of viewing female non-friends is smaller for men who describe themselves as not in a relationship than for men who make no such declaration. This pattern of results is highly consistent with the view of networks as pooling cover, and thus supports Hypothesis 1. For completeness, I tested whether behavior unrelated to networks as covers functions in the same manner. I therefore introduced *Log(Own Pictures$_i$) * In relationship$_i$* and *Log(Own Pictures$_i$) * Not in relationship$_i$* and found that neither interaction was statistically significant. This finding suggests that networks do act as covers but activities do not.

Friends in common. I test Hypothesis 2 by estimating the effect of *Share of Friends with Partner$_i$* on the likelihood that a man *i* views profiles and pictures of female friends and non-friends, as indicated in Models 3 and 6. Because *Share of Friends with*

Partner$_i$ is only defined for certain users in relationships, the values of *In Relationship$_i$ and Not in Relationship$_i$* are always one and zero respectively. Thus, I drop these variables as well as their interactions with other variables from the analysis. For brevity, I focus only the key variable of interest and find that the effect of *Share of Friends with Partner$_i$ i*s negative in Model 3, but positive in Model 6. This implies that controlling for a number of on-line friends, the percentage of friends shared with named partner reduces the likelihood that a man in relationship will examine pictures and profiles of female friends. Moreover, controlling for a number of on-line friends, the percentage of friends shared with named partner increases the likelihood that a man in relationship will examine pictures and profiles of female non-friends. This finding combined with the negative effect in Model 6 yields support for Hypothesis 2.

Likelihood of contact. Finally, I estimate the likelihood that a man contacts female friends and non-friends and report the results in Models 4 and 8. For brevity I only report on key variables of interest. The coefficient estimates in Model 4 show that the two variables related to relationship status or their interactions with the number of friends are not statistically significant. This implies that men are equally likely to contact female friends regardless of their relationship status, and the positive effect of the number of on-line friends does not differ by relationship status. Furthermore, the coefficient estimates in Model 8 suggest that men who are not in relationships are less likely to contact female non-friends, but this effect is not significantly from zero. The interactions with the number of on-line friends are also not significantly different from zero. However, most importantly for my purposes I find that men *In relationship$_i$* are more likely to contact female non-friends, and the positive effect on *On-line Friends$_i$ * In relationship$_i$* indicates

that they are even more likely to do that when they have more on-line friends. This is very consistent with what I found in Models 5 and 6 and yields further support for Hypothesis 1 according to which on-line social networks do act as pooling covers.

Scope Conditions

Since the results are broadly consistent with the view of networks as covers, I report on conditions under which the results disappear to establish boundary conditions for the theory and the results. First, I first split the *In Relationship$_i$* into *Married$_i$* and *In Relationship, but Not Married$_i$,* and found that both have a positive effect on the likelihood that a man looks at a profile of female non-friend, but the effect size is significantly larger for *In relationship, but Nor Married*. Furthermore, the coefficient estimates on *On-line Friends$_i$ * Married$_i$* and *On-line Friends$_i$ * In relationship, but Not Married$_i$* are also positive. But the magnitude of the coefficient estimate on the former is smaller than on the latter. In fact, the coefficient estimate on the former interaction is not sufficiently high to counteract the negative effect of having more friends on the likelihood that a man views female non-friends. Thus, an increase in the size of a married man's network still reduces the likelihood that he will look at profiles and pictures of female non-friends. In contrast, an increase in the size of a network of a man in relationship, but not married, increases the likelihood that he will look at profiles and pictures of female non-friends.

At first sight, it may seem that this result for married men is inconsistent with the view of networks as covers. However, this finding is easily understood when we consider that both married men and men who are in relationship, but not married, face the

constraint of not being able to look for a new relationship without exiting the current one. At the same time, married men are more likely to have gone through the process of sifting many partners to find a partner with whom they fit. As a consequence, the likelihood that they will want to look for a new partner outside the confines of the existing relationship is lower. In contrast, men in relationships, but not married, are likely in the process of looking for that best partner. For them the pronounced need to look for new partners combined with the restrictions on such contact attracts them to on-line social networks to look at and contact female non-friends. Viewed as such, these results are compatible with scope conditions of the view of networks as covers. Actors need to want to find a new partner for the cover behaviors to surface and when these needs are not present individuals will not engage in such behaviors. [14]

Second, I undertook a similar analysis to see whether the same pattern holds for women looking at pictures and profiles of male friends and non-friends. The results are similar to those related for men in that the number of *On-line Friends$_i$* increases the likelihood that a woman who did not disclose her relationship status will look at pictures and profiles of male friend, but decreases the likelihood that she will look at pictures and profiles of male non-friend. Similarly, being *In Relationship$_i$* reduces the likelihood that a woman will look at pictures and profiles of male friend, while *Not in Relationship$_i$* has a positive effect on that likelihood. In contrast to men though, the interactions between *On-line Friends$_i$ * In relationship$_i$* and *On-line Friends$_i$ * Not in relationship$_i$* do not have statistically significant effect on likelihood of viewing profiles and pictures of male

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[14] It is important to remember that when the data were collected there were very few people on on-line social networks over the age of 35, a fact also reflected in my data. As more people over that age joined on-line social networks in early 2009, it is possible that married men over the age of 35 engage in behaviors that are no different from men in relationships who are not married.

friends. Also, neither *In Relationship$_i$* or *Not in Relationship$_i$* has a significant effect on the likelihood that a woman looks at profiles or pictures of male non-friend. Interactions between these two variables and the number of friends are also insignificant.

At first sight, it may seem that these results are inconsistent with the view of social networks as covers. However, this finding is quite understandable in the view of substantial amount of literature which found that women are less likely to seek new partners when in a relationship, even after controlling for the opportunity structure for such behaviors (Atkins, Baucom and Jacobson 2001; Laumann et al. 1994).[15] Viewed as such, it is possible to interpret this lack of result as a straightforward boundary condition for the theory again – actors need to want to find a new partner for the cover behaviors to surface. Absent such underlying needs, a social environment will not be used as a cover, and it will only be used for networking purposes.

Conclusions

The existing literature has offered two views of networks: networks can act as pipes, conveying privileged information or good and services; they can also act as prisms whereby actors observe others' exchanges and infer their status or identities. This paper has advanced a third view of networks as covers, whereby relationships provide cover that allows actors to behave surreptitiously under the guise of sociability. Such cover is very useful to those in long-term relationships unwilling to tell their employers or long-term romantic partners that they want to put themselves on the market while maintaining the existing relationship. The data I supplied from a global on-line social network are

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[15] Similarly, analyses for women contacting men they were not connected to did not reveal significant results with respect to their relationship status and the interactions with the number of on-line friends.

supportive of this view. However, I believe that these results should also generalize to off-line activities as nothing in the view of networks as covers restricts its predictive power to the on-line world. After all, people use networks as covers in the real world too. On-line networks' only advantage over off-line networks is that in the on-line world people are always with their friends, albeit virtually. Because one's friends are always technically accessible even if they are not logged in, on-line networks provide stronger cover than the off-line networks can.

It is also likely that the theory and the results may apply to organizations, rather than simply individuals. For example, organizations often promise their workers not to outsource their jobs; the threat of outsourcing makes employees invest less in relationship-specific assets. But organizations can enter into joint ventures or other agreements whereby other firms provide services that could at some point entail outsourcing. Employees may worry about such arrangements and limit their specific investments accordingly. As long as such agreements somehow benefit the employees, however, the employees face a dilemma. On the one hand they may suspect that the firm wants to outsource their jobs via its interorganizational exchanges. On the other hand, the employees know that these interorganizational exchanges make them more productive and therefore willing to invest further in the relationship with the firm. As long as the potential cost is lower than the potential benefit, the firm can easily use its interorganizational exchanges as covers. It is to be hoped that future research will begin to examine such scenarios.
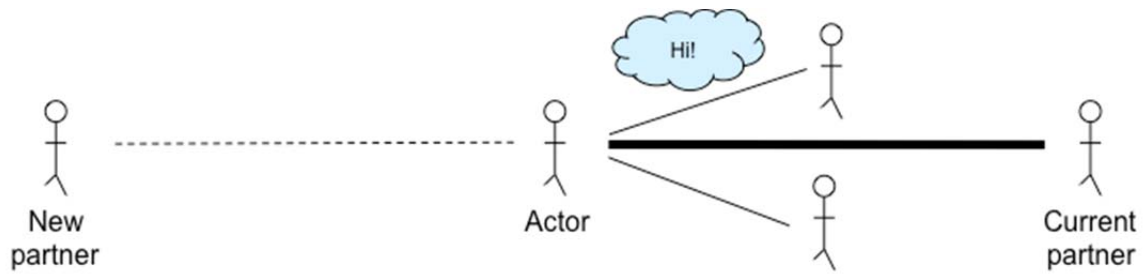
Figure 1 Networks as Covers

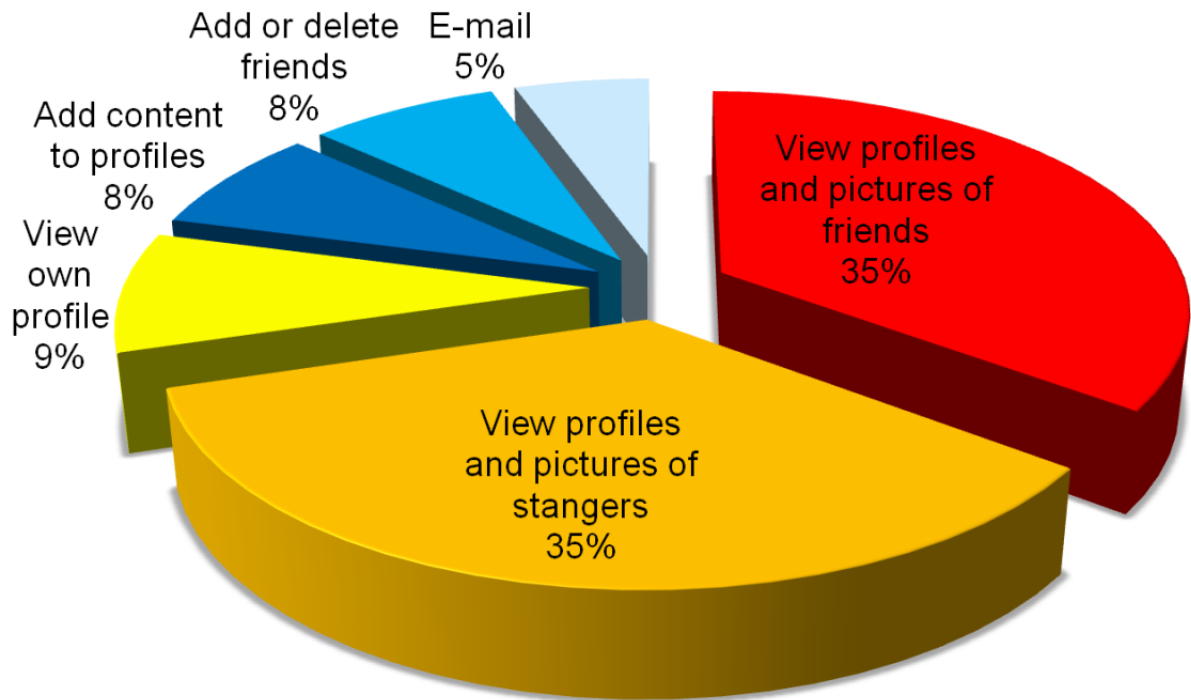**Figure 2** What do users do on an on-line social network?

Table 1 Who is viewing whom?

	Profiles and Pictures of Men		Profiles and Pictures of Women	
	Friends	**Non-Friends**	**Friends**	**Non-Friends**
Male Viewers	8%	8%	19%	22%
Female Viewers	10%	8%	17%	10%
Proportion of Total Views	1/3		2/3	

Table 2   Characteristics of men to predict that he examines profile or pictures of a female friend and non-friend and contacts them

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Model type	Logit	Neg Bin	Logit	Logit	Logit	Neg Bin	Logit	Logit
Dependent Variable	Views Friend	Views Friend	Views Friend	Contacts Friend	Views Non Friend	Views Non Friend	Views Non Friend	Contacts Non Friend
$Log(Months\ as\ a\ User_i)$	.15***	.03***	.07**	.29***	-.12***	-.23***	-.07***	.46***
	(.02)	(.01)	(.03)	(.03)	(.02)	(.02)	(.03)	(.04)
$Unknown\ Age_i$	-1.67***	-1.20***	-.67***	.64***	.96***	.62***	.89***	1.48***
	(.07)	(.03)	(.12)	(.11)	(.07)	(.03)	(.11)	(.15)
Age_i	-.09***	-.06***	-.02***	.03***	.04***	.03***	-.04***	.07***
	(.003)	(.001)	(.006)	(.01)	(.003)	(.001)	(.01)	(.01)
$Age^2_i\ /\ 100$	.07***	.06***	.03***	-.03***	-.04***	-.03***	-.04***	-.07***
	(.003)	(.001)	(.006)	(.01)	(.003)	(.001)	(.01)	(.01)
$Private\ Profile_i$	.92***	.61***	.16***	-.43***	-.12***	-.15***	-.06	-.45***
	(.02)	(.01)	(.06)	(.06)	(.034)	(.01)	(.06)	(.07)
$Only\ friends\ can\ message_i$	.31***	.10***	.27***	.14***	-.23***	-.11***	-.16**	-.16
	(.04)	(.02)	(.07)	(.06)	(.03)	(.02)	(.06)	(.10)
$Log(Own\ Pictures_i)$	.19***	.08***	.06***	.13***	.10***	.01***	-.07***	.01
	(.01)	(.003)	(.01)	(.01)	(.03)	(.001)	(.01)	(.02)
$Log(Friends'\ Comments_i)$	.25***	.14***	.03***	-.10***	.07***	.03***	-.02	-.10***
	(.01)	(.002)	(.01)	(.01)	(.02)	(.01)	(.02)	(.02)
$Log(Total\ Clicks\ By\ User_i)$	.66***	.85***	.67***	.74***	1.42***	1.41***	1.43***	1.14***
	(.01)	(.003)	(.02)	(.01)	(.01)	(.003)	(.02)	(.02)
$On\text{-}Line\ Friends_i$	.40***	.19***	-.09***	.16***	-.20***	-.12***	.22***	-.09**
	(.01)	(.01)	(.02)	(.01)	(.03)	(.002)	(.02)	(.04)
$Share\ of\ Friends\ with$ $Partner_i$			-.98***				.24***	
			(.10)				(.03)	
$In\ relationship_i$	-.07***	-.09*		.28	.08***	.07***		.66***
	(.01)	(.03)		(.18)	(.02)	(.02)		(.17)
$Not\ in\ relationship_i$	.30***	.26***		.35	-.16***	-.13***		-.34
	(.10)	(.05)		(.19)	(.05)	(.04)		(.19)
$On\text{-}line\ Friends_i\ *$ $In\ relationship_i$	-.57***	-.36***		-.06	.46***	.54***		.12***
	(.01)	(.02)		(.04)	(.02)	(.02)		(.04)
$On\text{-}line\ Friends_i\ *$ $Not\ in\ relationship_i$	.03*	.05**		-.08	-.03***	-.05***		-.09
	(.02)	(.03)		(.04)	(.01)	(.01)		(.05)
$Log(Own\ Pictures_i)\ *$ $In\ relationship_i$	-.05	-.09		-.04	.03	-.10		.04
	(.03)	(.06)		(.04)	(.03)	(.08)		(.04)
$Log(Own\ Pictures_i)\ *$ $Not\ in\ relationship_i$	-.01	-.01		.01	.04	.003		.03
	(.01)	(.01)		(.01)	(.04)	(.003)		(.04)
-Log Likehood	46,185	159,790	16, 327	23,872	54,479	156,010	19,910	13,532

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