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Validation of tie corroboration and reported alter characteristics among a sample of young men who have sex with men

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ABSTRACT

The differences between direct ties (i.e., ties between a respondent and their nominees) and ties between nominees (indirect) are key to understanding network structure, yet remain understudied. Within a sample of 175 young men who have sex with men, we explored the corroboration of sex and drug ties, and factors associated with corroboration. The majority of instances in which there was no corroboration for either sex or drug ties was due to one individual not appearing in another respondent's network. When an individual did appear in another respondent's network, direct sex and drug ties were corroborated in most cases. We also found that more indirect sex ties were corroborated than direct sex ties (95.7% vs. 88.9%), but the reverse was true for indirect versus direct drug ties (73.1% vs. 84.1%). Strength of relationship and frequency of communication were both associated with confirmed direct ties, but not with indirect ties. Based on these findings, we recommend that direct and indirect ties be treated differently in network analyses.

1. Introduction

Due to a greater focus on social contextual influences on health, network data are increasingly of interest to social and behavioral researchers. However, the capture and analysis of these data brings with it numerous methodological complexities (Adams and Moody, 2007; Bell et al., 2007; Marsden, 1990). Much of this complexity stems from the fact that information about a network is typically self-reported by a single individual. Information reported by a single study participant (ego) relies on that individual's perceptions of their network members (alters), and their accurate recall of alter names and report of alter characteristics. However, there are two major instances in which omission in recall could affect the network structure:

1) An ego has a tie with an alter, but does not nominate them – Research has found that egos often omit known alters within network interviews (Bell et al., 2007; Brewer et al., 1999). This pattern of omission can at least partially be explained by cognitive biases toward remembering long-term stable relationships and forgetting short-term interactions regarding particular events (Freeman et al., 1987; Marsden, 1990).

2) An ego is aware of a tie between two alters, but does not indicate this in the network interview – Similar to research done with alter reporting, it is highly probable that an ego would omit a tie between two alters if they were not close or if their connection only occurred once (i.e., one-night stand). A third explanation for the omission of a tie between two alters is the simplest one – the ego is not aware of this tie, and therefore could not report on it.

Beyond mere alter recall is the need for the ego to report on specific characteristics of their nominated alters. These can range from simple demographics (age, race, etc.) to sexual activities (i.e., did Person 1 have sex with Person 2?). The quality of reporting on these factors ranges, and is particularly reliant on the type of information collected. For instance, "asymmetric information," or alter characteristics that are rarely known by the ego, such as HIV status, are likely to be less accurate than age or race (Shelley et al., 1995).

Within egocentric networks, there are both direct and indirect ties between individuals. Ties from an ego to an alter are consider direct ties, whereas ties between alters are considered indirect ties. Figs. 1 and 2 outline common scenarios that occur when egocentric data are obtained from individuals with overlapping networks. More specifically, Fig. 1a represents the classic egocentric scenario where a respondent (R_1; i.e., an individual who completed an egocentric interview) reports on a nominated person (N_1) that was not interviewed, and therefore the accuracy of this tie cannot be verified. Fig. 1b presents a less common scenario, where a respondent

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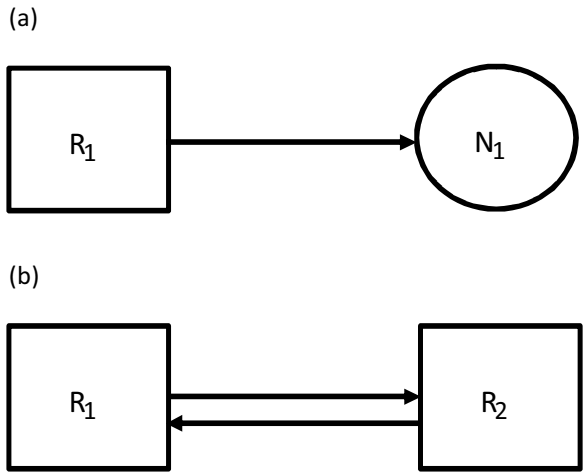

Fig. 1. Examples of direct tie reporting.
Note. Rs represent respondents who completed an egocentric interview. Ns represent nominated alters who did not completed an egocentric interview. Solid lines represent directly reported ties.

reports another respondent (R_2) within their network. In this case, we can investigate the accuracy of R_1's report by examining if R_2 also reports the tie. Fig. 2a again presents a classic egocentric scenario where a tie between two nominated persons (N_1 and N_2) is reported by a respondent (R_1) but cannot be verified. However, in the case (Fig. 2b) where a respondent (R_1) reports a tie between a nominated person (N_1) and another respondent (R_2), the accuracy of this perceived tie can be validated again R_2's own report. Finally, a unique scenario is shown in Fig. 2c where a respondent (R_1) reports a tie between two individuals and both individuals are respondents (R_2 and R_3). In this scenario, we have two sources to examine the validity of a perceived tie in both R_2's and R_3's report. In any of the scenarios discussed there are also two possible sources of error that could explain an uncorroborated tie across respondent reports: false positives and false negatives. A false positive would occur when one of the respondents reports a tie that does not exist while a false negative would occur when a respondent fails to report a tie that actually exists. Unfortunately, in overlapping egocentric datasets, both errors could appear as a tie reported by one respondent and not corroborated by another.

Most research into error in network measurement has focused on comparing the accuracy of self-report data to behavioral (Killworth and Bernard, 1976) or other forms (Kumbasar et al., 1994) (e.g., consensus from multiple observations) of independent measurement. Less attention has been paid to the difference between direct and indirect tie reporting. Yet, in most analyses of network data, the distinction between self-reported (direct) and indirect information is ignored; by default, this treats both cases as equally valid. A reported sex tie between a respondent and a nominated person is considered to be as valid as a reported sex tie between two nominees, despite the increased likelihood of inaccuracy in reporting in the former case. Therefore, investigation into the correspondence between direct and indirect information, specifically the existence of ties, becomes vital in understanding the entire network of interest.

Prior research into the validity of indirect information has had mixed results. A social network study of 39 HIV-positive individuals in Uganda found high accuracy for gender, age, and pregnancy status – all factors that can be determined without being close to an alter (Green et al., 2014). However, less observable characteristics, such as receipt of advice between alters, were more inaccurate. Researchers also found that there were no key personal predictors of reporting accuracy – accuracy was driven more

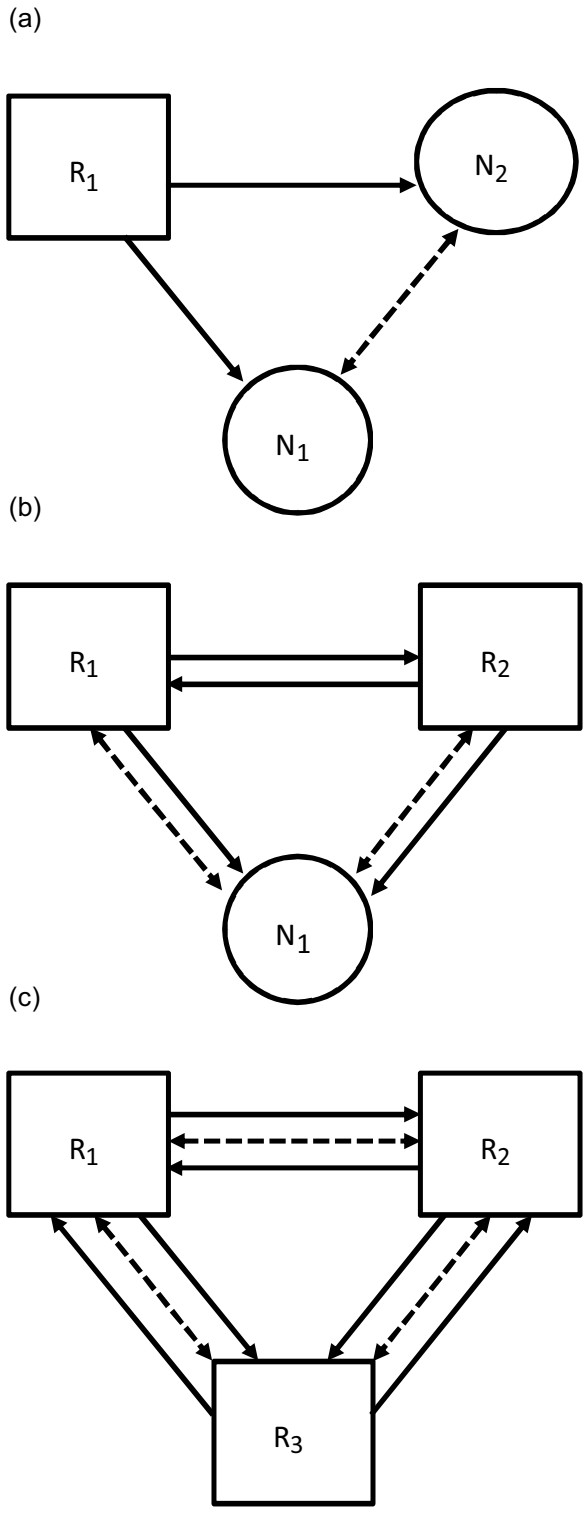

Fig. 2. Examples of indirect tie reporting.
Note. Rs represent respondents who completed an egocentric interview. Ns represent nominated alters who did not completed an egocentric interview. Solid lines represent directly reported ties while dotted lines represent an indirectly reported tie (i.e., between two nominated individuals that were not respondents).

by the respondent-nominee relationship. One of the few studies to compare the accuracy of direct versus indirect ties found that directly-reported ties were more likely to be corroborated than reports between two alters, as would be expected (Adams and Moody, 2007). Similarly, related research examining the accuracy