

Randomized Trial of Supplementary Interviewing Techniques to Enhance Recall of Sexual Partners in Contact Interviews*

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Background: People with multiple sex partners tend to forget a significant proportion when recalling them.

Methods: Randomized trial of supplementary interviewing techniques during routine partner notification contact interviews for chlamydia, gonorrhea, and syphilis in Colorado Springs, CO. Cases with multiple sex partners in the last 3 months ($n = 123$) participated. Interviewers prompted nonspecifically and read back the list of elicited partners after cases recalled partners on their own. We then randomly assigned cases to receive 1 of 3 sets of recall cues: (1) an experimental set of cues consisting of locations where people meet partners, role relationships, network ties, and first letters of names; (2) another experimental set including common first names; and (3) control cues referring to individual characteristics (e.g., physical appearance).

Results: Nonspecific prompting and reading back the list each increased the number of additional partners elicited and located by 3% to 5% on average. On average, the combined location/role/letter/network cues elicited more additional partners (0.57) than did the first-name (0.29) and individual characteristics (0.28) cues. The location and first-name cues were the most effective in eliciting located partners. The supplementary techniques increased the number of new cases found by 12% and, importantly, identified branches of the sexual network that would not otherwise have been discovered.

Conclusion: Elicitation of sex partners can be enhanced in contact interviews with simple interviewing techniques, resulting in improved network ascertainment and sexually transmitted disease case finding.

PARTNER NOTIFICATION,^{1–3} OR CONTACT tracing, is a fundamental tool for controlling the spread of sexually transmitted diseases (STDs)/human immunodeficiency virus (HIV) and gaining insight into the epidemiology of these infections.⁴ For partner notification to be effective and yield epidemiologically useful data, it is crucial that infected persons report their sex partners as completely as possible.^{5,6}

Among possible reasons why people may not report all sex partners in such contact interviews, forgetting figures prominently. Many at high risk for STD forget a substantial fraction of their recent sex partners when asked to recall them, as indicated by

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inconsistent reporting of particular partners in repeated interviews, self-reported forgetting, and partners not reported in interviews but recorded in diaries.^{7,8} Individuals who report many partners are the most likely to forget partners. In addition, recalled and forgotten partners are generally similar on key epidemiologic variables, such as frequency and recency of exposure.^{7,8}

In previous studies we assessed the impact of simple interviewing techniques—nonspecific prompting, reading back the list of already elicited partners, and various types of recall cues—on the elicitation of sex and injection partners in research settings involving anonymous participants and no tracing of elicited partners.^{7,8} These techniques are designed to be implemented after interviewees have recalled as many partners as they can by themselves. We developed the recall cues from our analyses of how people organize partners in memory as revealed by the relationships between successively recalled partners and the order in which partners are mentioned.⁹ Results from these studies showed that these supplementary methods elicited meaningful proportions of additional partners. Despite the simplicity of these techniques, traditionally trained public health interviewers rarely implement them, based on our anecdotal observations.

Here we describe the evaluation of these and other supplementary interviewing techniques as applied in routine contact interviews of STD cases. This evaluation permits an assessment of the supplementary techniques' practical impact on case finding and sexual network ascertainment. As part of this evaluation, we performed a randomized controlled trial to compare the effectiveness of the recall cues developed and tested in prior research with another experimental set of recall cues based on common first names and a control set of cues based on distinctive individual characteristics. We selected first names as another set of experimental recall cues because our earlier research⁹ showed that people also clustered sex partners by first name when recalling them. In addition, McCarty et al.¹⁰ effectively used common first names to elicit representative samples of respondents' acquaintances. We chose individuals' visual, olfactory, and auditory characteristics as control cues because our earlier research⁹ suggested that such characteristics do not play a role in how partners are organized in memory.

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Materials and Methods

We conducted the study in Colorado Springs, CO, during a 41-week period from August 2000 to June 2001. All study procedures were approved by the institutional review committee at Memorial Hospital, Colorado Springs. Individuals diagnosed with gonorrhea, chlamydia, or syphilis who reported multiple sex partners in the last 90 days in interviews with El Paso County Department of Health and Environment (EPCDHE) disease control staff were eligible to participate. (During the first 4 months of the trial we also administered the supplementary techniques to cases who initially reported only 1 partner in the last 90 days; the supplementary techniques elicited additional partners from only 1 (2%) of 55 such cases. Therefore, we excluded cases reporting only 1 partner in the last 90 days and did not administer the supplementary techniques to any subsequent case reporting only 1 partner.) Because this study was a modification of routine public health operations, interviewers followed normal procedures for approaching STD cases for contact interviews; cases were not explicitly recruited or asked to consent for participation in the study.

The typical interview period for all study interviews (except syphilis cases) consisted of the 90 days preceding diagnosis plus the time (if any) between diagnosis and treatment. When interviewers elicited study cases' partners, they first asked cases to recall their partners freely (without cues or prompts) or in reverse chronological order. After this, interviewers prompted nonspecifically and then read back the list of partners elicited. Nonspecific prompting involves the interviewer asking the interviewee "Who else have you had sex with in the [interview period]?" after the interviewee reports no other partners and prompting repeatedly as appropriate. When the interviewee insists there are no other partners he or she can recall, the interviewer can slowly read aloud the list of partners back to the interviewee and then prompt nonspecifically again at the end. Next, the interviewer introduced the recall cues by briefly explaining the problem of forgetting and noting that the cues may bring to mind other partners in the interview period (see Appendix posted at <http://www.interscientific.net/csevcues.pdf> for these instructions, the cues, and procedures used in developing the cues). The interviewer then presented 1 set of cues, asking the interviewee to think about people he or she knows who correspond to a cue and list any with whom he or she had sex during the interview period but had not yet mentioned.

During the trial, 1 of 3 sets of recall cues (location/alphabetical/role/network cues, first name cues, or individual characteristics cues) was randomly assigned to be administered to study cases interviewed in a given week. We performed the randomization of weeks within 15-week blocks to ensure that the 3 arms of the trial were evenly represented in each season. This constraint prevented longer-term changes in sexual activity or partnership patterns from influencing the results of the trial. Due to unintentional interviewer errors, 10 cases received recall cues that were different from those assigned for that week. Because these errors were haphazard, we analyzed the data based on which recall cues study cases actually received.

The location, alphabetic, role, and network cues used in our prior work⁸ were combined (the timeline cues were excluded because the relatively long time required to create the timeline made them inefficient). The 78 combined cues included 32 locations where persons at risk for STD/HIV meet their partners (e.g., restaurant), 26 letters, 18 role relationships between persons at risk for STD/HIV and their partners (e.g., ex-boyfriend/girlfriend), and 2 network cues (on average). Administration of the network cues involved reading back to the case the names or descriptions of partners already elicited in the interview but asking the case to think of other persons who know or interact with a particular cue

partner and to report those who are partners within the interview period but had not yet been mentioned. Common first names (e.g., Brenda, Keith) served as cues ($n = 79$) in the second experimental arm of the trial. The locations, roles, and first names used as cues were the most common listed in several EPCHDE STD Program databases. The 79 most common female names cover 53% of the female EPCDHE patient population in those databases, and the 79 most common male names cover 68% of listed males. We observed few race differences in which names were the most common. The control arm consisted of cues ($n = 79$) pertaining to individual characteristics: general appearance, aspects of particular parts of body/face, clothing/adornments, ways people sound, ways people smell, skin types, hair types, and racial/ethnic groups. In administering the first name and individual characteristics cues, interviewers asked study cases whether they had had sex with someone with a particular name or characteristic within the interview period whom they had not yet mentioned. We produced 3 randomizations of the cues for each set, and study cases received 1 of these randomized cue orders (see online Appendix for details on cue randomization).

Before the trial began, Brewer provided all EPCDHE interviewing staff 4 hours of training in the supplementary techniques. Halfway through the trial, Brewer provided a booster training and review session. Throughout the trial, Brewer gave feedback to individual interviewers based on audiotapes of study interviews ($n = 12$, or 10% of study interviews) conducted on randomly selected days during the trial.

Statistical Analysis

We used univariate summary statistics to describe study cases' characteristics. To test whether study cases were statistically representative of eligible cases interviewed by EPCDHE in the study period, we conducted χ^2 and t tests for categorical and interval scale variables, respectively.

For each of the different supplementary techniques, we computed the proportion of cases reporting additional partners in the interview period in response to the technique, the mean number of additional partners in the interview period elicited and located, and the mean proportional increase in additional partners elicited and located. We considered a partner to be located if the disposition for that partner was preventively treated; refused preventive treatment, not infected; infected, brought to treatment; previously treated for this infection; not infected; or located, refused examination. We computed χ^2 and t tests (as appropriate) for each of these measures, contrasting cases in each experimental arm with those in the control arm of the trial.

To assess the effect of the supplementary techniques on case finding, we noted the number of new cases (infected persons brought to treatment) who were elicited before the supplementary techniques and by the supplementary techniques. We then computed the number of subsequent new cases found as a result of interviewing these 2 sets of infected persons brought to treatment. We displayed selected network components (sets of persons connected by direct or indirect sexual links) that included chains of such newly detected infections. For these analyses, we used all contact tracing data from calendar years 2000 and 2001, including data based on interviews of cases not in the study.

To describe individual differences in study cases' responsiveness to the supplementary techniques, we calculated various measures and tests of association between case (e.g., demographics) and interview context variables (e.g., interview date, interview mode) and whether a case listed additional partners within the interview period in response to the supplementary techniques. We performed these analyses separately for cases assigned to different

TABLE 1. Summary of Recall Cue Effectiveness Measures by Study Arm: Partners Within Interview Period*

Measure	Location/alphabetic/ network/role cues (n = 35)	First-name cues (n = 41)	Individual characteristics cues (n = 47)
Mean no. elicited before cues†	2.23 (1.19)	1.85 (0.91)	2.45 (2.51)
Proportion of cases listing additional partners from cues	0.17	0.12	0.11
Mean no. elicited by cues	0.57 (1.48)	0.29 (1.27)	0.28 (1.21)
Mean proportional increase in no. elicited by cues	0.21 (0.59)	0.09 (0.34)	0.07 (0.25)
Mean no. elicited before cues who were located	1.40 (0.98)	1.02 (0.76)	1.02 (0.99)
Mean no. elicited by cues who were located	0.11 (0.32)‡	0.10 (0.37)	0.00 (0)‡‡

*Standard deviations appear in parentheses.

†Median = 2 for each arm.

‡Difference between arms $P < 0.05$.

arms of the trial, as well as for cases pooled across arms. Finally, we compared partners elicited before the supplementary techniques with those elicited by the techniques in terms of several partnership variables (e.g., recency and frequency of sexual contact). For each case who listed additional partners in response to the cues, we computed a ϕ or point biserial correlation (i.e., Pearson correlation between 2 dichotomous variables or between interval scale and dichotomous variables, respectively) between each partnership variable and whether a partner was recalled before the techniques or elicited by the techniques. To summarize these across cases, we calculated the unweighted mean correlation¹¹ for each partnership variable.

Results

Case Characteristics

One hundred twenty-three cases participated in the randomized trial, including 70 female (57%) and 53 male cases. These 123 include 113 persons with 1 case each and 5 persons with 2 cases each (4 of these 5 persons were assigned to a study arm in their second case that was different from the arm in their first case). Cases' mean age was 21.2 years (median = 20, s.d. = 4.5, range = 14–42). Forty-two percent were white, 36% black, 18% Hispanic, 4% Asian/Pacific Islander, and 1% American Indian. Based on sex of reported partners, 84% of study cases were heterosexual (45% female, 39% male), 13% were bisexual (10% female, 3% male) and 3% were homosexual (2% female, 1% male). Eight-three percent of cases had chlamydia only, 9% gonorrhea only, 1% syphilis, and 7% both chlamydia and gonorrhea. Forty-five percent of cases were symptomatic and sought care, 28% were asymptomatic and were diagnosed through screening, and another 28% were discovered as contacts to disease. Most (87%) study cases were diagnosed at the STD clinic, 5% at the community hospital, and the remainder by other providers. Most (82%) study cases were interviewed face to face, although 21 (18%) were interviewed by telephone (data on interview mode are missing for 9 cases). A total of 5 interviewers interviewed study cases, but 3 accounted for 98% of the cases interviewed in the trial.

Study cases represent 38% of eligible cases interviewed by EPCDHE staff during the study interval. Factors involved in not interviewing eligible cases with the supplementary techniques included staffing shortage, cases cutting interviews short, interviewers forgetting to administer the supplementary techniques, and interviewers choosing not to administer the techniques (e.g., in response to cases who were hostile to being interviewed). Some of these factors may have been increased by the departure of the

STD/HIV Programs director (JJP) early in the study period and the subsequent discontinuation of the position. Study cases did not differ meaningfully or significantly from eligible cases who did not participate in the study in terms of race, sex, disease, reason for presentation, or source of diagnosis. Study cases were slightly younger (mean age = 21.2 years) than eligible cases who did not participate in the study (mean age = 22.5 years; $P < 0.05$). Also, the 3 primary interviewers for the study varied moderately and significantly ($P < 0.001$) in the proportion of eligible cases to whom they administered the supplementary techniques.

Nonspecific Prompting and Reading Back the List

On average, study cases listed 2.1 partners in the interview period before nonspecific prompting (median = 2, s.d. = 1.7, range = 0–16). Seven percent of study cases listed additional partners in the interview period in response to nonspecific prompting and/or reading back the list. Nonspecific prompting elicited 0.07 additional partners (5% increase) on average and reading back the list elicited a further 0.06 partners (3% increase) on average.

Effectiveness of Recall Cues

The percentage of cases receiving the combined location/alphabetic/role/network cues who listed additional partners was modestly higher than the percentages for cases receiving the other types of cues (Table 1). Most cases in each arm listed no additional partners in response to the cues. On average, the combined location/alphabetic/role/network cues elicited an additional 0.56 partners, or a 21% increase, beyond those elicited before the recall cues (Table 1). This increase is 2 to 3 times as many additional partners in absolute and proportional terms as elicited by the first name and individual characteristics cues. Eighty-five percent of the partners elicited by the combined cues were elicited by the location cues. The supplementary techniques (nonspecific prompting, reading back the list, and recall cues) increased the number of partners elicited by 32% and 25%, on average, for cases who received the combined cues and first name cues, respectively. Overall, 17% of study cases listed additional partners within the interview period in response to 1 or more of the supplementary techniques.

The combined cues and first-name cues yielded about 0.10 to 0.11 additional located partners on average, but the individual characteristics cues did not elicit any located partners (Table 1). Partners elicited by the recall cues were somewhat less likely to be located than partners elicited before the recall cues. When aggregated across study cases, 52% (133/254) of partners elicited before nonspecific prompting were located, as were 38% (3/8) of those

elicited by nonspecific prompting and 57% (4/7) of those elicited by reading back the list. Twenty-four percent (4/17) of partners in the interview period elicited by location cues were located, and 33% (4/12) of those elicited by first-name cues were located. None of the partners elicited by alphabetic, role, network, or individual characteristics cues was located.

Supplementary Techniques' Impact on Case Finding and Network Ascertainment

Although technique-elicited partners were somewhat less likely to be located than partners elicited before the supplementary techniques, both types of partners were likely to be infected. Of the 14 technique-elicited partners who were located and tested, 7 (50%) were infected. In comparison, of the 131 partners elicited before the supplementary techniques who were located and tested, 75 (54%) were infected.

The supplementary techniques improved case finding and network ascertainment meaningfully, increasing the number of infected persons brought to treatment (i.e., not previously treated for this infection) by 9%: 44 infected partners brought to treatment were elicited before the techniques (39 within the interview period), and 4 such partners were elicited by the techniques (3 within the interview period). Three of these latter partners were elicited by first-name cues and 1 was elicited by nonspecific prompting. This increase in case finding is likely to be an underestimate of what is possible with the supplementary techniques, as 38% of the study cases received the comparatively ineffective individual characteristics cues.

Subsequent interviewing of the 4 new cases elicited by the supplementary techniques identified 2 additional infected persons brought to treatment who would not have been discovered as early or at all had the supplementary techniques not been administered. (Neither of these cases received the supplementary techniques when interviewed.) No other cases interviewed by the program, including those not in the study and those interviewed in the several months after the study period, reported these persons as partners.

Figures 1a and b depict the new branches of the sexual networks discovered as a result of administering the supplementary techniques. The figures focus on 2 components, each involving a study case who listed 1 additional partner in response to the supplementary techniques. Nodes labeled as "C" refer to cases (infected persons), and the subscripts indicate the temporal order of their diagnoses and interviews. Nodes labeled as "P" refer to partners who were not infected or not located. Arrows reflect which case named which partner, and double-headed arrows indicate 2 infected persons who named each other. The infected partners with an asterisk were elicited by one of the supplementary techniques. In Figure 1a, C₃, C₄, P₄, and P₅ would not have been identified without the supplementary techniques. C₁ was a study case, who listed C₃ in response to a first-name cue. C₃ then named C₄, P₄, and P₅. In Figure 1b, C₆, C₇, and P₉ would not have been detected without the supplementary techniques. C₅ was a study case who listed C₆ in response to a first-name cue. C₆ then named P₉ and C₇ (who, when interviewed, named C₆ back).

Subsequent interviewing of the 44 infected partners brought to treatment who were elicited from study cases before the supplementary techniques uncovered a total of 7 additional infected persons brought to treatment (only 1 of these persons was eventually reported as a partner of another case interviewed by the program). One further new case was identified from interviewing these 7 additional cases. The yield (in terms of new cases found) from interviewing new cases identified by the supplementary techniques (0.50 or 2/4) is higher than that for interviewing new cases

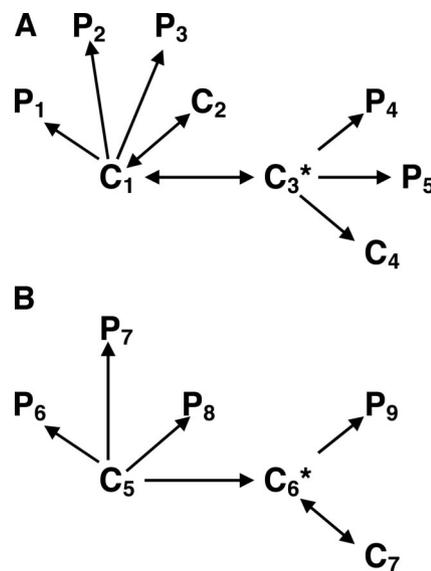


Fig. 1. a and b, Two selected components that illustrate the impact of the supplementary interviewing techniques on case finding. (C = case; P = partner not infected/located; asterisk = technique-elicited partner; arrows indicate who names whom; see text for full explanation).

elicited before the supplementary techniques (0.18 or 8/44). Thus, 6 new cases were discovered directly or indirectly from administering the supplementary techniques, which represents a 12% increase over the number of new cases (52) that were detected directly or indirectly from partners elicited before the supplementary techniques. These results suggest that infected partners elicited by the supplementary techniques are at least as likely to be mediating nodes in chains of transmission as infected partners elicited otherwise.

Comparison Between Partners Elicited Before and by the Supplementary Techniques

Twenty-one study cases listed additional partners within the interview period in response to the supplementary techniques. For each of these cases, we compared partners recalled before the supplementary techniques with those elicited by the supplementary techniques in terms partner age, whether partner and case were of the same race, frequency of sexual contact, and recency of sexual contact. We computed a point biserial or ϕ correlation coefficient for each of the 21 cases on a given variable and then summarized coefficients across these cases. The results indicate that technique-elicited partners do not differ substantially from freely recalled partners in terms of age (mean unweighted correlation = -0.22 , median = -0.45 [technique-elicited partners modestly younger]) or similarity to the study case's race (mean = 0.08 , median = 0.19 [technique-elicited partners slightly more likely to be of a race different from the study case]). However, technique-elicited partners tended to have had moderately less frequent (mean $r = -0.31$, median = -0.50) and less recent (mean $r = 0.71$, median = 0.72) sexual interactions with study cases than partners elicited before the supplementary techniques. Nonetheless, all partners in these analyses fell within the interview period.

Effectiveness of Particular Cues

The particular location and first-name cues which elicited additional partners tended to be those referring to the relatively more

common locations and first names in the databases from which these cues were derived. In addition, the partners elicited by the first-name cues often did not have same first name as the first-name cue. Partners elicited by these cues sometimes had names or parts of names that sounded similar or had very different names (perhaps triggered by other associations with the first-name cue).

Case and Contextual Correlates of the Supplementary Techniques' Effectiveness

Numerous factors (case age, sex, race, sexual orientation, disease, number of partners elicited before supplementary techniques, date of interview, interviewer, source of case report, reason for presentation, and interview mode [face to face vs. telephone]) bore negligible relationships with whether a study case reported additional partners within the interview period in response to any supplementary technique (detailed results available on request).

Discussion

Simple interviewing techniques can enhance the elicitation of sex partners in contact interviews. Nonspecific prompting and reading back the list of elicited partners generated mild increases in the number of partners elicited and located. In the randomized trial, the combined cues, particularly the location cues, elicited more partners than the other types of cues, but both the location and first-name cues produced meaningful increases in the number of partners located. Located partners elicited before the techniques and those elicited by the techniques were about equally likely to be infected. The supplementary techniques also identified new branches of the sexual network of infected persons, improving case finding appreciably and presumably preventing further disease spread.

Partners in the interview period elicited before and by the techniques were similar in demographic terms, although technique-elicited partnerships tended to involve fewer and temporally more distant sexual encounters than partnerships elicited before the techniques. None of the demographic, behavioral, and contextual variables we examined meaningfully predicted cases' responsiveness to the supplementary techniques. The strongest predictor in our earlier research⁸—number of partners recalled before the supplementary techniques are administered—may not have been as salient in our study because we included only those cases who reported multiple partners.

The proportional increases of partners elicited by nonspecific prompting, reading back the list, and the location cues in this study are comparable with those we observed in earlier research^{7,8} with anonymous participants, longer interview periods, and no tracing of partners. This similarity of results reinforces the idea that forgetting may be the predominant cause of underreporting of partners in contact interviews, regardless of context. Moreover, the proportional increases in partners elicited by the supplementary techniques are as large or larger than those observed for reinterviewing in research and partner-notification settings.^{7,12,13} This is especially important because reinterviewing is often impractical, time consuming, or impossible. Administration of the supplementary techniques typically required 5 to 10 minutes of interviewing time, which is consistent with our prior work,⁸ although precise data on the time involved in the current study are not available.

The superiority of the location and first-name cues over the individual-characteristics cues also affirms the value of using memory organizational structures identified by patterns in recall to develop effective recall cues.^{9,14,15} As in our initial evaluation of

supplementary interviewing techniques,⁸ one key for enhancing recall of partners is providing interviewees appropriate mental contexts in which to search.¹⁶ Location cues seem to address this need. The network cues performed poorly in this study, which may be explained by their similarity to reading back the list, as well as the low density of social ties in individuals' personal sexual networks.⁹ Further anecdotal evidence for the effectiveness of the recall cues comes from study cases' reactions to the cues. Cases were frequently surprised at recalling additional partners in response to the cues and often approached the cues as a game, spontaneously noting how successful and fun the cues were.

More research is required to determine the generalizability of these results to other locales, populations, interviewers, and interviewing modes. Further work is also needed to ascertain the most effective and time-efficient combination of location and first-name cues. The only requirements for implementing the supplementary techniques in routine contact interviewing are motivated staff, modest training of interviewers, and development of locally tailored cues based on analysis of STD program databases.⁹

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