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Adolescent health brief

Use of a Respondent-Generated Personal Code for Matching Anonymous Adolescent Surveys in Longitudinal Studies



Lisa Ripper, M.P.H., C.P.H. *, Samantha Ciaravino, M.P.H., Kelley Jones, Ph.D., M.P.H., Maria Catrina D. Jaime, M.P.H., and Elizabeth Miller, M.D., Ph.D.

Division of Adolescent and Young Adult Medicine, Children's Hospital of Pittsburgh, University of Pittsburgh Medical Center, Pittsburgh, Pennsylvania

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A B S T R A C T

Purpose: Research on sensitive and private topics relies heavily on self-reported responses. Social desirability bias may reduce the accuracy and reliability of self-reported responses. Anonymous surveys appear to improve the likelihood of honest responses. A challenge with prospective research is maintaining anonymity while linking individual surveys over time.

Methods: We have tested a secret code method in which participants create their own code based on eight questions that are not expected to change.

Results: In an ongoing middle school trial, 95.7% of follow-up surveys are matched to a baseline survey after changing up to two-code variables. The percentage matched improves by allowing up to four changes (99.7%).

Conclusions: The use of a secret code as an anonymous identifier for linking baseline and follow-up surveys is feasible for use with adolescents. While developed for violence prevention research, this method may be useful with other sensitive health behavior research.

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IMPLICATIONS AND CONTRIBUTION

The use of a participant-generated secret code to match anonymous surveys in longitudinal studies may reduce social desirability bias and underreporting of sensitive behaviors in research. The secret code assures participants that their responses cannot be connected to them, while allowing researchers to collect matched, accurate data across time points.

Studies on sensitive topics in adolescent health research such as interpersonal violence and sexual health cannot depend on behavioral observations or available institutional data (e.g., police or school discipline reports) because these behaviors

generally occur in private [1]. Thus, research in these fields depends heavily on self-reported responses from participants. Concern remains over the accuracy and reliability of self-reported responses due to social desirability bias, which may contribute to underreporting or misreporting responses to sensitive questions [1–3].

One successful approach to reducing such misreporting is increasing the anonymity of surveys [4]. College students using paper surveys reported less apprehension [5] and were more likely to disclose their behaviors [6] when they were not asked to put their names on surveys, indicating the anonymity of online surveys may be useful. Anonymous surveys are crucial when researching sensitive topics with adolescents due to concerns around mandated reporting and privacy. A challenge with

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* Address correspondence to: Lisa Ripper, M.P.H., C.P.H., Division of Adolescent Medicine, Children's Hospital of Pittsburgh, University of Pittsburgh Medical Center, Oakland Medical Building, Adolescent Medicine, 3414 Fifth Ave, Office # 208, Pittsburgh, PA 15213.

E-mail address: Lisa.ripper@chp.edu (L. Ripper).

Table 1
Secret code questions and response options

Question:	Response options:
1. What is the first letter of your mother's or female caregiver's first name? (Please write "N/A" if this does not apply to you). Please remember to use the first letter of her full name and not a nickname (e.g.: If your mother or female caregiver's first name is "Elizabeth," please write "E" for Elizabeth and not "L" for Liz).	A–Z, N/A
2. What is the first letter of your father's or male caregiver's first name? (Please write "N/A" if this does not apply to you). Please remember to use the first letter of his full name and not a nickname. (e.g.: If your father or male caregiver's first name is "Robert," please write "R" for Robert and not "B" for Bob).	A–Z, N/A
3. What is the first letter of your middle name? (Please write "N/A" if this does not apply to you)	A–Z, N/A
4. What is the first letter of the city where you were born?	A–Z, N/A
5. What is the first letter of the street you lived on when you first took this survey at the beginning of the sports season?	A–Z, N/A
6. How many siblings (brothers and sisters) do you have?	0–20
7. Are you a twin, triplet, or other multiple?	Yes No
If yes, were you born:	First Second Third Fourth Fifth None of the above
8. What is your birth month and year? (mmyy) Example: June 1995 would be 0695.	mmyy

prospective research is how to maintain anonymity while linking surveys from each individual over time. To conduct longitudinal intervention studies on adolescent relationship abuse using anonymous surveys, our research team developed and implemented a secret code method.

Methods

With each survey, participants are asked to create their own secret code based on eight questions that are not expected to change between baseline and follow-up surveys (Table 1). Research assistants remind participants to answer the secret code questions consistently and accurately and that by answering the questions, their survey remains private. This method ensures that surveys are truly anonymous, as responses are not linked to personal identifiers or contact information.

The secret code questions were refined from large-scale research studies (Coaching Boys into Men High School Trial NCT01367704 [7,8]; Coaching Boys into Men Middle School Trial NCT02331238; Engendering Healthy Masculinities NCT02427061). The UC Davis Institutional Review Board Administration and the University of Pittsburgh Human Research Protection Office approved all study procedures. During use of the secret code in the high school study, a question was changed from "first initial of your first name" to "first initial of your middle name" to ensure the surveys remained anonymous (especially in schools with fewer students). There were several secret code duplicates due to participants being multiples (confirmed through sports team rosters) in the middle school study. A new question was added asking the participant if they were a twin or other multiple, and if so, their birth order.

Survey data were collected online in a secure database (REDCap). The online survey was programmed to require responses to all secret code questions. Each question had a drop down menu (e.g., A–Z or N/A if not applicable) to reduce errors associated with free form entry. Data were imported into analysis software. Concatenating each participant's secret code variables created a unique ID number in each baseline and follow-up survey.

ID numbers were exported to a spreadsheet to conduct the matching. Researchers used a systematic process to compare

the ID numbers from baseline and follow-up surveys to identify discrepancies. Adding variables known from survey administration such as school and sports team improved matching. The first step in matching was to list the baseline and follow-up survey IDs in adjacent columns, which were then sorted. Identical IDs from baseline and follow-up were identified and finalized. All unmatched ID numbers were systematically identified and tracked for discrepancies by comparing each secret code variable. If a change to one variable would eliminate the discrepancy between an unmatched baseline ID and follow-up ID, that change was made to the follow-up ID and documented. This process was repeated for changes to two then three secret code variables. The percentage matched could be further improved by allowing four changes.

We performed a validity check of the middle school study matches using a random sample of 100 matches. Matched pairs were verified using the separate variables of grade and gender.

Results

In the high school trial of the "Coaching Boys into Men" violence prevention program (Table 2), with over 1,200 completed 1-year follow-up surveys (78.9% retention), 3% of surveys remained unmatched using this method. In the current middle school trial (with two time points), 50.0% of follow-up surveys were perfectly matched to a baseline survey. Changing one and two variables increased the total matched to 84.0% and 95.7% of follow-up surveys, respectively. At three changes, 98.1% of the follow-up surveys were matched to a baseline survey. The percentage matched can be further improved (99.7%) by allowing up to four changes. The questions that had the greatest number of mismatches were number of siblings (17.3%) and first letter of street name (12.8%).

For the validity check, only two pairs had discordant reporting of grade and gender within the pair (0/51 perfect matches, 1/29 one-change matches, 1/10 two-change matches, 0/4 three-change matches); two pairs were missing grade, and two were missing grade and gender.

Table 2

Demographic characteristics of the Coaching Boys into Men High School Trial NCT01367704 and Coaching Boys into Men Middle School Trial NCT02331238

Sample characteristics	Coaching boys into men high school trial NCT01367704	Coaching boys into men middle school trial NCT02331238
Total, N	2,006	831
Age:	14–18 years	11–15 years
Gender:	Male athletes	Male and female athletes
Race:	White: 34.2% Non-Hispanic black: 22.1% Hispanic: 19.6% Asian: 9.7% Native American/Pacific Islander: 4.7%	White: 51.0% Black or African American: 31.5% Hispanic/Latino: 1.9% Asian: 3.0% Native American: 1.4% Multiracial: 5.8% Other: 3.1% No answer: 2.2%

Discussion

The use of a secret code to create a unique anonymous identifier for linking baseline and follow-up surveys is feasible and reliable for use with adolescents, including middle school age participants. While this method was developed for violence prevention research, it may be a useful tool for other sensitive health behavior research. As demonstrated above, this method allows for a nearly 100% match for baseline and follow-up surveys without collecting identifying information from participants.

While the secret code has been used with studies involving adolescent male athletes, it is likely that the questions would be relevant to other youth. Future research beyond two time points is needed to determine accuracy across longer time periods. Some questions have the potential to change across time points due to unstable living environments or family dynamics. Additionally, while gender and grade concordance provides some assurance regarding validity of this approach, future studies should consider comparing this method to more traditional assigned study IDs to assess validity of the secret code as well as variation in response patterns between surveys with study IDs versus secret code.

Implementation of the secret code allows investigators to ensure anonymity and confidentiality of survey data (promoting unbiased reporting), while maintaining the ability to match participant data over time.

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