Inconsistent reports of sexual intercourse among South African high school students

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Abstract

Purpose: This study aims to describe patterns of inconsistent reports of sexual intercourse among a sample of South African adolescents.

Methods: Consistency of reported lifetime sexual intercourse was assessed using five semiannual waves of data. Odds ratios related inconsistent reporting to demographic variables and potential indicators of general and risk-behavior-specific reliability problems.

Results: Of the sexually active participants in the sample, nearly 40% reported being virgins after sexual activity had been reported at an earlier assessment. Inconsistent reporting could not be predicted by gender or race or by general indicators of poor reliability (inconsistent reporting of gender and birth year). However individuals with inconsistent reports of sexual intercourse were more likely to be inconsistent reporters of substance use.

Conclusions: These results suggest that researchers need to undertake efforts to deal specifically with inconsistent risk behavior data. These may include modification of data collection procedures and use of statistical methodologies that can account for response inconsistencies.

Keywords: Adolescence; Sexual behavior; Methods; Reliability of results

Human immunodeficiency virus (HIV) and acquired immune deficiency syndrome (AIDS) represent pressing public health concerns for youth in South Africa. Nationwide between 8% and 10% of 15-24 year-olds are infected with HIV [1,2]. Delaying the initiation of sexual intercourse, through policy and programmatic intervention, may help to reduce prevalence rates. However effective intervention requires valid data on adolescent sexual behavior. These data implicate target behaviors, assist in the identification of high-risk populations, and suggest appropriate goals for behavior change [3].

Given the private nature of sexual behavior, scientists must rely heavily on self-reports; unfortunately, however, there are few objective criteria against which to judge their validity. The

tools that are available, ranging from urine tests for sperm presence to monitoring of local condom sales, tend to be imprecise or impractical. Therefore scientists have turned to repeated-measures research designs as one alternative method for assessing the validity of self-reported sexual behavior [4].

Inconsistency in the U.S. context

Several studies have examined the short-term stability of reported sexual intercourse. In one such study, within a single assessment, between 4% and 8% of youth provided inconsistent responses as to whether they had ever engaged in sexual intercourse [5]. In another study, when two assessments were up to 3 weeks apart, the K-value for responses on lifetime sexual intercourse was 90.5 [6]. Therefore although short-term consistency is high, it is not perfect.

It is also possible to examine inconsistency longitudinally. If a person has his or her sexual debut in adolescence, there will be a valid inconsistency over time (e.g., virgin at Time 1, sexually active at Time 2). However once an adolescent has had sex, we would logically expect him or her to continue reporting lifetime sexual intercourse at subsequent time points. In this case, one indicator of invalid reporting would be when an adolescent reports having engaged in sexual intercourse at one time point and then reports being a virgin at a later time point. On average, over periods of a year or more, research shows that 4-12% of adolescent participants rescind their initial reports of having engaged in sexual intercourse [5,7-9].

Causes of inconsistent reporting of sexual behavior

There are several potential explanations for inconsistent reporting of sexual behavior. First participants may not have accurate or complete memories of their sexual health and behavior histories [3,4]. This argument is especially plausible for reports of repeated or complicated behavior; it is less applicable to reports of whether a presumably simple and salient one-time event such as first intercourse has ever occurred.

Alternatively inconsistencies in reporting sexual activity may arise because certain participants lack either the motivation or the ability to understand survey questions and to respond accurately [3,4]. Evidence for this explanation, in relation to adolescent reports of lifetime sexual activity, is mixed. In one study, youth with low vocabulary comprehension were more likely to be inconsistent reporters of sexual intercourse [7], whereas in another, inconsistency was unrelated to reading ability [8].

Another potential source of longitudinal inconsistency is participants responding to questions in ways that they feel are desirable or acceptable, given the norms and values within their social context. This may be one reason why inconsistent reporting is more common among individuals with certain demographic attributes. For example younger adolescents, for whom sexual intercourse is less normative, are less consistent reporters than older adolescents [7,8]. Some youth may use false reports of sexual intercourse as a way to bolster their status with peers, whereas others may understate their experience as a way to avoid stigma and embarrassment. As adolescents get older, sexual experience may have less relevance for positive or negative social status, leading to more honest reporting of sexual behavior. At least one study supports this notion, with self-reported sexual honesty being higher for older participants [10].

Similarly norms and values have been advanced as an explanation for gender and racial/ethnic differences in consistency of reported sexual intercourse [4]. There is some evidence for the

inflation of reported sexual experience being especially high among boys [7,10]; girls who are dishonest in their sexual reporting tend to underreport their sexual experience [10]. In the U.S., Alexander et al found that white adolescents were more inconsistent reporters of sex than their black counterparts [8]; however others have found that this is only true for girls [5].

Inconsistent responses in the South African context

A few studies have measured the short-term consistency of reported sexual intercourse among South African adolescents. The high school participants in a study by Flisher et al [11] had more than 95% agreement in their responses to a lifetime sexual intercourse item in assessments that occurred up to 2 weeks apart. In their sample of 11-19-year- olds, Jaspan et al [12] found slightly lower agreement (86%) over a 2-week period; however this may be due in part to the fact that different modes of data collection (paper-and- pencil, then Palm Pilot) were used for each of the two assessments. To our knowledge there have been no previous studies about the long-term consistency of self- reported sexual behavior among South African adolescents. We are also unaware of studies that have attempted to predict inconsistency in this population using demo-graphics or other variables.

Current study

The current study examines longitudinal reports of lifetime sexual intercourse in a sample of South African high school students. Specifically we examine the degree to which reports are consistent over time and whether inconsistency can be predicted by demographics, indicators of general reliability problems, or inconsistency in reporting of other types of risk behavior.

In addition to studying a unique population, this study is novel in the types of predictors that it examines; we are unaware of any other studies that have related inconsistent reporting of sex to inconsistent reporting of other information, including demographics and substance use. We believe that exploring these associations will help to elucidate plausible mechanisms for inconsistency, which in turn may allow us to reduce inconsistency in future studies.

Methods
Sample

Participants were high school students from Mitchell's Plain, a low-income township near Cape Town, South Africa. Students (N = 2,414) were participating in a research trial of a classroom-based leisure, life skill, and sexuality education program [13]. The sample for the present study was restricted to participants who reported lifetime sexual intercourse in at least one of the first four survey assessments (n = 713), given that these were the only participants for whom an inconsistent sexual response was possible. This subsample was mostly male (69%) and "colored" (mix of African, Asian, and European ancestry) and had a mean age at baseline of 14 years (SD = .90; range = 13-17). Demographic information for the subsample is given in Table 1.

Procedure

This study was approved by the Institutional Review Boards of both the Pennsylvania State University and Stel- lenbosch University. Passive parental consent and adolescent assent procedures were used. Researchers outlined the research process, including issues of privacy and confidentiality, at the start of each survey administration. Participants were identified using unique identification numbers rather than names. Each participant was seated at an individual desk with sufficient space to ensure privacy, and trained fieldworkers monitored the

administration to ensure that participants did not communicate with each other. Fieldworkers were trained in the referral process for sexual or substance use problems, and at each administration participants were provided a list of community organizations that could assist with these types of issues

Beginning in 2004, participants completed identical semiannual surveys on personal digital assistants (PDAs). Five waves of data were used in the current study: those from the beginning and end of eighth and ninth grades and the beginning of tenth grade. Items assessed both behavior and attitudes in a number of areas, including substance use, sex, leisure, and life skills. The survey was self-administered in each participant's home language, either English (62% of all baseline surveys) or Afrikaans (38%). Assessments were completed in classrooms (and other school spaces, as needed) during school hours. At the start of each session, fieldworkers instructed participants in the use of PDAs; they were also available to assist with any difficulties that arose during the assessment. Initially the surveys took between 45 minutes and 1 hour to complete, however this did decrease over time (20-30 minutes by Assessment 5) as students became more familiar with the use of PDAs and as their reading/comprehension skills improved. As is customary in South African research, students were not compensated for their participation. However the school received annual monetary compensation for their participation in the research project

Table 1
Descriptive statistics and corresponding response inconsistency for sample (N = 713)

Predictor	N (%)	% Reporting sex inconsistently
Male gender	492 (69)	40
Female gender	198 (28)	37
Age at baseline (years)		
13	100 (14)	44
14	310(43)	40
15	170 (24)	39
16	45 (6)	31
17	15(2)	20
Race		
Colored	479 (67)	43
Black	93 (13)	32
White	34(5)	47
Indian	4(1)	75
Failed a grade in school	429 (60)	41
Inconsistent reporter of gender	21 (3)	48
Inconsistent reporter of birth year	67 (9)	48
Inconsistent reporter of lifetime alcohol use	172 (24)	57
Inconsistent reporter of lifetime		

cigarette use	156 (22)	52
Inconsistent reporter of lifetime marijuana use	139 (19)	58
Inconsistent reporter of lifetime inhalant use	125 (18)	52

Note: Percentages within gender, age, and race do not add to 100 because of inconsistent and/or missing data on these variables. Colored = mixed African, Asian, and European ancestry.

There were few missing data (<1% of items missing) within the surveys that were actually administered [14]. However school absence and drop-out is relatively high among the target population. Therefore 10-15% of the sample was lost to attrition between each semiannual assessment, with 1364 students from the full sample participating in Assessment 5. (Note: Of the 713 participants in the sexually active subsample, 252 completed all five assessments. Poisson regressions predicting a count of missing assessments showed that boys, older participants, participants of black and white ethnicities, participants who had ever failed a grade, participants who were sexually active at baseline, participants who had not used alcohol by Assessment 4, and participants who had used inhalants by Assessment 4 completed significantly fewer assessments $[p < .05]$).

Measures
Retracted report of sexual behavior. At each assessment, participants were asked: "Have you ever had sex? This means intimate contact with someone during which the penis enters the vagina (female private parts)." Participants could respond either yes or no. Based on these data, each participant was coded as providing either a consistent or inconsistent response set. If, after first reporting sexual intercourse, a participant denied lifetime sexual intercourse at any assessment that followed, that individual was coded as providing an inconsistent response set. Otherwise a participant was coded as providing consistent reports. Participants who had missing data for the sexual intercourse variable but who were consistent in all available sex responses were coded as consistent reporters.

Demographics. Participants reported on their gender, birth year (from which age at baseline was computed), and race (response options of colored, white, black, Indian, other) at each assessment. A participant's demographic predictors were included only if they were consistent over time (e.g., reporting "girl" for gender at every nonmissing assessment). Otherwise the participant was excluded from the bivariate analysis relating inconsistency to that demographic predictor.

Indicators of general validity problems. At each wave, participants indicated whether they had ever failed a grade in school. We collapsed these items into a single dichotomous indicator of whether a participant ever reported failing a grade. We used this indicator as a proxy for lower ability and/or motivation, which might reduce the validity of survey responses. Participants reported their gender and birth year at each assessment. For each of these variables, we created an indicator of whether participants were consistent or inconsistent reporters of this information across available assessments. Including these indicators as

predictors of inconsistently reported sex may help to determine whether participants exhibit general patterns of inconsistent responses or whether there is something unique about sexually related responses.

Indicators of risk behavior validity problems. At each wave, participants responded to close-ended items about the frequency of their lifetime alcohol, cigarette, marijuana, and inhalant use. These responses were collapsed into dichoto- mous (yes/no) indicators of lifetime use of each substance at each wave. Following the same logic described previously for sexual behavior, we then determined whether reports of each type of substance use was consistent or inconsistent based on the subsequent assessments. This allowed us to examine whether inconsistency of reported sexual intercourse was part of broader problems in the reporting of risk behavior, or whether it was a phenomenon specific to sexual behavior.

Results

Of the students who reported sexual intercourse at some point in the assessment process, nearly 40% (n = 283) eventually went on to report that they had never had sexual intercourse. Table 1 shows rates of inconsistency for the demographic subgroups of interest, as well as for individuals with inconsistent reports of other types of information. Intervention participants were no more or less likely to be inconsistent reporters than were members of the control group (not tabled; p = -.04, p = .801).

Examined over the full duration of the study, earlier reports of sex were most likely to be retracted than later reports; 46% of youth who reported sexual intercourse at Wave 1 later rescinded, as compared with 17% of youth who reported being sexually active at Wave 4 (Table 2). We also examined adjacent pairs of assessments. Between 14% and 18% of reports of sexual intercourse were followed by a report of no sexual intercourse in the subsequent assessment.

Table 2
Reports of sexual intercourse by assessment

Assessment	N	% of reporting sexual intercourse	N% of Reports retracted in subsequent assessment [a]	% of Reports retracted by Assessment 5
1 - Beginning of 8th grade	647[b]	40	14	46
2 - End of 8th grade	582	52	17	38
3 - Beginning of 9th grade	538	56	15	28
4 - End of 9th grade	462	70	18	17
5 - Beginning of 10th grade	345	58[c]	—	—

[a] Among participants with non-missing data at subsequent wave.

[b] The sample size at Assessment 1 is less than the full sample size (713) because of both school absences at Assessment 1 and new participants joining the study in subsequent assessments (e.g., students transferring into a participating school).

[c] The apparent drop in prevalence of sexual intercourse between Assessments 4 and 5 is due to inconsistent responses between those two assessments: 325 youth report that they are sexually active at Assessment 4; of these youth, 55 report that they are *not* sexually active at Assessment 5. If these inconsistent youth had instead reported that they *were* sexually active at Assessment 5, 256 youth (74% of participants with Assessment 5 data) would have reported being sexually active.

Table 3

Unconditional odds ratios for predictors of inconsistent reports of sexual activity

Predictors	OR[a]	95% CI
Demographics		
Male gender	1.1	.8–1.6
Age	.8	.7–1.0
Race[b]	—	—
Indicators of general reliability problems		
Failed a grade in school	1.1	.8–1.5
Inconsistent report of gender	1.4	.6–3.3
Inconsistent report of birth year	1.4	.9–2.4
Indicators of risk behavior reliability problems		
Inconsistent report of lifetime alcohol use	**2.5**	**1.8–3.6**
Inconsistent report of lifetime cigarette use	**1.9**	**1.3–2.7**
Inconsistent report of lifetime marijuana use	**2.6**	**1.8–3.8**
Inconsistent report of lifetime inhalant use	**1.8**	**1.2–2.7**

CI = confidence interval; OR = odds ratio.

[a] Boldface values are significant at $p < .05$.

[b] Type III analysis of effects: $\chi^2(3) = 5.45$, not significant.

somewhat more likely to be inconsistent, although this finding did not achieve statistical significance. Inconsistency of sex responses was also unrelated to the three indices of general reliability problems (academic failure, inconsistent reporting of both gender and birth year). However those with inconsistent reports of any of the four substances assessed in this study (alcohol, cigarettes, marijuana, inhalants) were two to three times more likely to be inconsistent reporters of sexual intercourse.

Discussion

The results of this study show that the majority of adolescent participants were able to provide consistent reports of their sexual activity over the course of 2 years. However there was still a sizable proportion of youth who provided contradictory reports. To best address sexually related public health concerns for youth in South Africa, it is crucial that explanations of this inconsistency are sought, so that the reliability of data intended to inform prevention efforts is improved.

Almost 40% of the sexually active participants in our sample were inconsistent in their reporting of lifetime sexual intercourse. Although this proportion may seem large in light of U.S. findings [5,7-9], it is important to note that these previous studies all had fewer assessments (and hence fewer opportunities for inconsistent responding) than the current study. If we instead examine inconsistent reporting between any two adjacent assessments in the present study, inconsistency drops to 14 -18%, which is comparable to that in previous studies. In addition our assessments occurred up to 6 months apart, and a number of previous studies with higher consistency have had more closely spaced assessments [5,6,11]. Therefore we believe that our inconsistency rate of 40% is not necessarily an indicator of comparatively low data quality or uniqueness of this sample but, rather, it suggests that inconsistent reporting is a problem that compounds with additional widely spaced longitudinal assessments. This underscores the importance of addressing response inconsistency in long-term studies of sexual behavior.

Previous literature has put forth a number of potential explanations for inconsistent reporting of sexual behavior (i.e., memory, ability, motivation, norms/values). However it is important to acknowledge that there may be social and historical explanations for inconsistent reporting that are unique to South African youth. In particular forced sexual intercourse may impact reports of sexual activity. Nonconsensual sexual intercourse is much more common in South Africa than in the United States [15]. For adolescents who have engaged only in nonconsensual sex, the answers to general questions about sexual history may not be straightforward, and their interpretation of these questions and associated response options may change over time.

During our own data collection, the question most frequently asked by participants was how to respond to the lifetime sexual intercourse item when their only experience was forced intercourse. (In this situation, survey administrators instructed these participants to enter "no" for the item.) However because the survey did not directly ask about forced sexual experiences, there may be invalid data for students who needed but did not seek clarification, and we cannot investigate the degree to which forced sexual experiences were related to response inconsistency. Survey instruments used in future studies of this population should be revised in a way that makes all questions relevant and clear for those who have had nonconsensual sexual experiences.

Our results differ from previous studies of U.S. adolescents in that inconsistency had no significant association with gender or race. Cross-sectionally, there was a trend toward younger participants being more likely to be inconsistent; however this finding did not achieve statistical significance. The rates of inconsistency between adjacent assessments were fairly stable over time, meaning that consistency had little longitudinal association with age. In total these results suggest that even though there may be subgroup differences in sexual values and norms, these differences do not affect patterns of inconsistent responses in a research context. Therefore any

efforts to address inconsistent reporting in this population will need to target members of all demographic subgroups.

We failed to find an association between inconsistent reporting of sex and both school failure and inconsistent reporting of demographic information. If these indicators are indeed good proxies for low motivation or ability, it suggests that inconsistent reporting of sexual activity cannot be attributed to factors like low literacy or a disinterest in providing valid responses. Therefore it is unlikely that consistency can be improved by general efforts to simplify assessment procedures, such as reading survey questions aloud or simplifying their wording.

As shown in Table 1, 17-24% of the sample inconsistently reported their use of each of four substances. This is compatible with results of other studies examining longitudinal reports of substance use [16]. In our data, inconsistent reports of substance use also exhibit patterns over time that are similar to those shown for sex in Table 2, with inconsistency compounding over time but remaining fairly stable between pairs of adjacent assessments (results not shown).
The significant associations between inconsistent reports of sexual intercourse and inconsistent reports of substance use suggest that the reporting of both types of risk behavior may be influenced by similar factors. In this particular context, for example, there may be similar norms and expectations for multiple types of risk behavior. Sex and drugs may carry similar risks of embarrassment or stigma. It is also possible that both types of behavior have similar value for attaining status with peers. Given that the two types of inconsistency are related, it suggests that the same strategies may be effective in reducing both.

Strategies for reducing inconsistency
In risk behavior research, efforts to protect the confidentiality of responses need to be visible to adolescents, and these need to be efforts that adolescents perceive as being effective. Also researchers should strive to foster motivations that will offset a desire to provide socially desirable responses. This might include appealing to adolescents' sense of civic responsibility by sharing how results would be used to improve the lives of both participants and other youth, and then stressing that accurate results would be more helpful than inaccurate results.

The increasing popularity of electronic modes of assessment, coupled with improving infrastructure for technologies such as wireless Internet, may make it possible to reduce inconsistencies by incorporating adolescents' previous responses into subsequent assessments. For example an adolescent might report being sexually active at the first assessment. This response could be electronically stored and then retrieved (either directly from a hard drive or remotely via the Internet) at the beginning of the next assessment. If and when an inconsistent response is given, the adolescent could be presented with one or more questions to follow up on the inconsistency. According to the adolescent, which of the two responses is correct? Was the inconsistency caused by dishonesty, error, or a change in how the adolescent interpreted the question? This would allow the researcher to have more valid data and would provide greater insight into adolescents as participants in risk behavior research.

Even if it is impossible to completely eliminate inconsistent responses, there is at least one analytic strategy in which inconsistent responses can be retained for analyses meant to describe only logical patterns of development. In latent transition analysis, the probability of illogical transitions (i.e., sexual activity to virginity) can be constrained to zero. Any individuals actually

exhibiting this type of transition are included in analysis but contribute to reduced model fit [17]. Unfortunately, for longitudinal analyses using techniques other than latent transition analysis, it is unclear how best to handle inconsistent data.

In the past researchers have often dealt with inconsistent responses by recoding them according to logical rules. For example a researcher might recode all subsequent responses to be consistent with an earlier report of sexual intercourse, operating under the assumption that the first report is more proximal to the event of interest and thus is more likely to be accurately recalled. However, the use of such rules is rarely reported, and their implications for statistical inference have not been explored. Therefore the issue of inconsistent reporting is one that methodologists should strive to address, and then provide recommendations for data analysts.

Limitations and future directions
It is important to acknowledge that by operationalizing consistency in the way that we have, we are limited to stating that an invalid response is present. We do not know whether it is the initial report of sexual activity or the subsequent report of virginity (or both) that is false. In addition this indicator only captures only one type of false reporting: moving from a report of sexual activity to one of virginity. We are unable to determine which participants have responses that are false yet logically possible. For example a participant may report being a virgin at one time point and then be dishonest about being sexually active at a later time point. Similarly a participant who consistently reports being sexually active may have misreported at initial assessments, and a participant who consistently reports being a virgin may be misreporting at later assessments. Unfortunately this type of error is undetectable in our data.

In the present study the majority of participants had missing data for at least one assessment. As long as they did not provide any inconsistent responses, we considered participants with missing data to be consistent responders. This use of only available data is contrasted with a strategy in which missing data are incorporated into analysis by way of a procedure such as multiple imputation or the EM algorithm [18]. Our chosen strategy does have its limitations; depending on the degree to which inconsistency and its correlates are related to attrition, our results may not be fully representative of the general population. However we believe that it is only those youth who actually provide inconsistent data who cause analytic problems for researchers; it is these data on which missing data procedures and inference are based. Explanations of inconsistencies among these participants can potentially be used to reduce reported inconsistencies in future research. We would argue, however, that predicting potential inconsistencies in data that are never collected is of little practical utility.

In addition we acknowledge that the results presented here are only representative of youth who are enrolled in and attend secondary school. In South Africa, education is only compulsory through grade 9 or age 15 [19]. National educational statistics [20] show that, beginning in grade 9, South African schools tend to be under enrolled, meaning that there are fewer enrolled students than one would expect given the number of youth of the corresponding age within the population. By the 12th grade, school enrollment is 53% of the appropriately aged population. It is possible that the youth who either do not enroll in or do not attend school differ in the degree to which they are consistent reporters of risk behavior. Therefore our results may not generalize to research participants in non-school settings.

It is unclear the degree to which our results our unique to our PDA assessment format. There is some evidence that reported prevalence of sexual behaviors differs between electronic assessments and either interviews or paper-and-pencil self-reports, and that participants find electronic assessments to be both more confidential and conducive to honest responding [21-23]. With non-electronic assessment modalities, it is therefore possible that rates of inconsistent responding and the associations between inconsistent responses and other constructs differ from what we have reported here.

Despite these limitations our study provides evidence that inconsistent reporting of sexual behavior is a legitimate problem in research with South African youth. It is an issue that cuts across demographic groups present in this study, suggesting some degree of universality within our target population. However there is evidence for a relationship between inconsistent reporting of both sex and substance use. This implies that researchers need to address motivations for invalid responses in the risk behavior domain specifically. In addition methodologists need to work to provide solutions for dealing with any inconsistencies that remain after the modification of research protocols.

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