

Challenge and Innovation: Methodological Advances in Social Research on HIV/AIDS

Edited by
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Chapter 8

Diaries and Sexual Behaviour: The Use of Sexual Diaries as Method and Substance in Researching Gay Men's Response to HIV/AIDS

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The Human Immunodeficiency Virus (HIV) is transmitted primarily in sexual activity; hence detailed information is needed about the sexual context in which that transmission occurs if accurate epidemiological estimates are to be made and the spread of the pandemic to be understood and contained. How such information may be obtained, and how its reliability and validity may be assessed form the basis of the research reported in this chapter. Very little can be taken for granted in such research and the methodological problems are considerable. From the outset we know that sexual behaviour such as vaginal and anal intercourse are particularly implicated in transmission, but the evidence is much less clear for oral sex and other sexual activities and it is therefore necessary to investigate the whole range of activities which could *possibly* lead to transmission.

The individual is at the centre of that investigation and is normally the source of such data, so it makes sense to collect data from his or her (ego's) perspective. But since any implicated sexual activity involves at least one other person, the real unit of investigation is the dyad (couple), and the behaviour and characteristics of the other person (alter) are also crucial.

Information of a particularly intrusive kind is needed for analysing HIV transmission. Since the mechanism involves the 'exchange of bodily fluids' — especially semen, blood and saliva — they too must be tracked and reported and details of whether and how ejaculation of semen occurs is an integral part of the analysis. Our research focus does not, however, cover all types of sexual behaviour, it is restricted to the sexual and social lifestyles of *men who have sex with men*¹ (and possibly with women).

If we were interested primarily in the actual mechanisms of sexual transmission of HIV, then direct observation might well be the appropriate method for obtaining information, as in Masters and Johnson's (1966) work. But such a method is likely to lead to highly biased estimates, since only a highly

atypical sub-population is likely to consent, and the presence of an observer would itself be highly reactive. Observation as a method is therefore far from unobtrusive and would involve major problems of consent and organization (and cost). It would also be illegal, at least in England and Wales (but not in Scotland).²

In order to obtain relevant information, we have to rely on subjects' own reports or accounts of sexual activity have to be obtained, and the interview setting provides the most usual context of data-collection. In Project SIGMA³ the yearly Core Question Schedule includes as a central element the Inventory of Sexual Behaviour (ISB) (Coxon *et al.*, 1992b), asking respondents a systematic set of questions about whether (and if so, how often) they had engaged in these detailed activities (for prevalence) and within a given period of time (for incidence). But how accurate are such subjects' estimates likely to be? From the outset of our enquiries the data gave good grounds for scepticism: the numbers given in answers were often suspiciously vague, rounded or approximate (Coxon, 1988b), suggesting problems of accurate recall. Moreover, when questions (identical or implied) were repeated later in the interview, the number given was rarely the same, suggesting problems of reliability. When cross-checks were made with estimates given by their partners the numbers were (to varying degrees) often at variance with the respondent's, suggesting problems of validity.

Much information obtained about sexual activity is also atomistic and out of context — we learn whether or how often something was done, but rarely the context in which it took place, the sequence in which it occurred, or the person with whom it occurred. Such factors make a big difference to the meaning of sexual behaviour, but they are also important, we believe, in attempting to understand sexual risk. That sexually risky behaviour takes place is important, but if people are to be encouraged to lessen or avoid risk then we need to know the significance of such behaviour to the person, and we also need to identify its context in order to find out whether risk-taking varies systematically by situation, rather than simply by individual. Again, the number of sexual partners a person has is an important variable epidemiologically, but it is even more important to know whether they are one-off or regular partners, whether sex with such partners involves penetrative or unprotected (risky) sex, whether alcohol or drugs such as nitrites have been used (possibly as disinhibitors) . . . and so on. In the normal way such questions are asked separately, and even if recall is excellent we can know nothing about how they co-occur with sexual behaviour and combine in a particular sexual situation to increase or decrease risk. Finally, the order in which sexual activity occurs (and the position in a sequence in which an act occurs) can have quite different effects. An example is the differing risks of hepatitis infection when oral sex follows anal intercourse as opposed to preceding it. Similarly, the probabilities of transmission are very different according to whether a person is anally receptive or insertive, and we knew little indeed about the prevalence and possible mixture of sexual role playing in male-with-male sex (Coxon and Coxon, 1993a).

The interaction of these issues is highly complex, and answers to them cannot be obtained by simple questionnaire methods. But they are pressing issues, whose answers could have radically different consequences for understanding and predicting the spread of the pandemic and for health education and interventions. It is not just that recalling complex behaviour is more difficult than recalling simple behaviour but that many people are unaware of how these factors combine in their own case, or simply cannot give a verbal account of it. A rather different method is therefore called for which can provide information in a manageable and a systematic way: we developed the diary method for this purpose.

Diary-keeping is a very natural way to elicit data of the sort we require. Almost everyone has kept a diary at some point and it is often the chosen way to confide and record one's thoughts and actions. It is, as Plummer (1983) rightly dubs it, a 'document of life'. Used as a social science method, it can be a valuable non-reactive-method (when previously written, uncommissioned diaries are used as a resource), or it can be a specially elicited record, typically focused on one domain such as purchases or alcohol consumption or, as here, on sexual activity. Like its natural variant, it suffers similar problems of motivation; many start diaries but fewer finish them.

How does the diary method compare with other methods? As in *Content Analysis*, diaries are usually written in natural language format, and are subject to the same forms of analysis including syntactic, semantic and thematic analysis. But in diaries, the focus and domain of interest is usually narrower than in most naturally-occurring prose. Like the similar methods of *Life-Case- or Event-history*, the diary method is time-structured and sequential, but it is usually more detailed and discursive in content and has a much smaller time-span than a history. There are even some similarities with the *questionnaire*. The questionnaire can differ in how structured it is and whether it is self-completed or administered in an interview situation, and so can the diary method. The main difference is that diary data are not elicited in a pre-ordained, conditional branching sequence of questions, as in the case of the questionnaire.

The Sexual Diary

The diary method has been developed within Project SIGMA (Coxon, 1988a; Davies and Coxon, 1990; Coxon *et al.*, 1992b; Coxon and Coxon, 1993b) as a parallel to the Project's more conventional methods, and has now become the preferred (indeed, the unique) method for obtaining certain sorts of information about the detail of gay men's sexual activity. It is important to enter a series of provisos at this point:

- (i) We are restricting attention here to sexual *behaviour*; other methods are used to establish the meaning and context of that behaviour and other

forms of data collection are useful in relation to other research questions.

- (ii) The need to concentrate on sexual behaviour capable of leading to HIV transmission means that considerable (perhaps undue) attention is paid to ejaculation and its *sequelae*. This aspect can, of course, be ignored and omitted.
- (iii) Although the sexual diary method has been developed in the context of studying homosexual behaviour there is nothing to restrict it to this orientation. Indeed, sexual activity between homosexual men and their female partners forms a natural part of this study.

Project SIGMA has developed a theory (or schema) for the representation and analysis of sexual activity (Coxon *et al.*, 1992b), which forms the basis for obtaining systematic information about the prevalence and incidence of sexual behaviour in both the Interview/Questionnaire context and that of the sexual diary (See Davies, Chapter 4, this volume). This makes aggregation and comparability of data from these different data sources a straightforward matter, and it also gives SIGMA's use of the diary method a very distinctive flavour. The theory itself arose both as a way of systematizing and inter-relating the components of sexual behaviour relevant to HIV transmission and as an attempt to connect the structure of sexual behaviour to Talcott Parsons' account of the Unit Act in the structure of social action, and to communication processes. At an early stage we had realized that the structure of sexual behaviour has a striking resemblance to linguistic structure, and that to interpret it in this way gives added insight to the analysis and meaning of sexual behaviour. In this interpretation, the self-contained unit of communication analogous to the sentence is the sexual session; the constituent words corresponded to the sexual acts, and the inflections of the word could encode the activity, the modality and the outcome. The information transmitted in a sexual session is basically a predication of the form:

WHO does WHAT, TO WHOM and with WHAT OUTCOME

which encodes the agent (who), the sexual behaviour (what), the other sexual recipient (to whom) and whether and how ejaculation occurred (what outcome).

This same structure can then be used to define question-formats for questionnaires (such as the ISB) and for diary instructions and makes it possible to compare data having many different formats.

Advantages and Disadvantages

Before proceeding with a specification of how the method of diaries is applied to sexual behaviour, it is worth pausing to summarize the advantages and

disadvantages of the sexual diary method. The sexual diary method is a more 'natural' method than most, both in the sense that it exists as a common social practice and that it is written in natural language. The diary makes it possible to obtain information in far greater detail than other methods, since it is designed to minimize recall and memory errors and cognitive strain. It is especially adapted to gathering reliable information on the time-sequence of events, so that change is easily charted. The information can be obtained in a contextually-specific manner, without relying on recall; thus variation due to such things as particular partners or particular settings can be directly studied. Quantitative information is derived directly from the data, without recourse to the errorful estimating procedures used by survey questioning or respondent recall. The sexual diary can be augmented to obtain other concurrent information such as alcohol and drug use in sex (see Weatherburn *et al.*, 1993), and the data obtained are, on present evidence, more reliable than those obtained from retrospective recall in surveys (see Janson, 1990). These advantages are impressive, but need to be balanced against the undoubted disadvantages, some of which can be ameliorated.

The main disadvantages of the sexual diary method have to do with bias in recruitment of respondents rather than with the method of data collection *per se*. But there is undoubted selection bias with respect to those who do and those who do not agree to be diary respondents or return information. In the case of hidden populations like gay men (SIGMA, 1990, Coxon and Joyce, 1993) selection bias in the recruitment of those prepared to keep a diary exists in addition to that in the initial sampling procedure of Project sample members. The sources of bias are very similar to those in other studies relying on volunteer subjects (Rosenthal and Rosnow, 1975:225) who tend to be educated, of higher social class, intelligent, approval-motivated and sociable; (the last characteristic takes the form of being more likely to be 'out' as gay men). Those volunteering tend to be more sexually active (in the sense of having more sexual sessions and more partners) than those who do not volunteer.⁴ For longitudinal studies there is undoubted 'step-wise attrition' — it is far easier to persuade men to keep a diary for consecutive months than regularly on a yearly basis. The type of data generated cannot readily be analysed by conventional packages, and rely on an intermediate stage of string-manipulation software (see section entitled 'Sexual diary data' below).

Implementation of the sexual diary

Keeping a sexual diary is not a novelty to many gay men (Joe Orton is a notorious instance; Lahr, 1986); some have been keeping one intermittently all their life. Sometimes this is instrumental (in case of infection with a sexually transmitted disease, so that partners can be informed), but more often it is intrinsically interesting, especially to those with a full and/or complex sex life, or

who wish to note their adventures for later enjoyment or as an aide-memoire to masturbation.

At each wave of the Project, the SIGMA respondent is taken through the last week of his⁵ sexual activity by the interviewer according to a specified format. Originally this was done to ensure that the respondent understood the instructions for keeping the diary. The interviewer often assisted in its recall and wrote the actual transcript. Subsequently, this procedure also provided useful information on autobiographical memory: how far back could he recall the detail of sexual activity?⁶ At the end of the interview, a month-long diary and set of instructions (see SIGMA, 1993) were given to the respondent for completion and return (an example of a completed week of such a diary is contained in Appendix One).

Respondents are told that accounts of sexual activity should be written down as soon as possible, and if possible on the same day they occurred; only to complete a diary if they are prepared to be completely honest, and not to invent or 'shade' what they do; that the basic unit of their account should be the 'session' ('one or more sexual acts by yourself or with the same person/s at one time'). The format of each session, derived from the 'structure of sexual action' (see Coxon, *et al.*, 1992b) is then explained. The components are:

- *Time, place and antecedents*: Day, hour; location (for example, in whose accommodation or external sites, such as parks, toilets, the activity took place), together with antecedents such as the use of alcohol, drugs and nitrates;
- *the participants*: (if any); description of the sexual partner/s⁷ involved in this session;
- *the sexual activity*: for each constituent sexual act in a session — the behaviour; the modality (who did it to whom) and the outcome (whether and how ejaculation occurred);
- *accompaniments*: especially use of condoms, lubricants, 'toys', etc.

The relevance of the participants and sexual activity components has already been explained above, but the inclusion of the others needs a brief explanation. *Time* is necessary for sequencing sessions during a day (what one does sexually in the morning often differs dramatically from what happens in the evening). *Place* or location allows us to separate out home-based from casual or out-of-doors activity. *Antecedents* are part of the scene-setting which makes it possible to inspect the effect of precursor activities (poppers or alcohol before, as opposed to within sexual activity); together they define the situation and hence reduce problems of indexicality. *Accompaniments*, by contrast are part of the scene and sexual activity which do not usually have a direct effect of the probability of transmission.⁸

The Sexual Act

The sexual act forms the basic building block — the word of the session's sentence — and the structure here is crucial for later analysis. In SIGMA's schema, all description is ego-centric, i.e., viewed from the respondent's (ego's) position in the proceedings, and the question of which sexual actor is doing a given act to the other is dealt with by the relational modality⁹ of the act. Thus, Active always means that ego does *x* to alter, and Passive always means that alter does behaviour *x* to ego. A simplified¹⁰ form of the specification of the sexual act is as follows:

<ACT>:: =	{(MODE)<BEHAVIOUR><EGO'S ORGASM ¹¹ ><ALTER'S ORGASM><MODIFIER>}
<MODE>:: =	{S A P M}
<BEHAVIOUR>:: =	{W S F Ri Fg Dk Fi...}
<EGO's = ALTER'S ORGASM>:: =	{N I X O H M C}
<MODIFIER>:: =	{null / <associated object list><modifier>}
<OBJECT>:: =	{P,L,D,T,...}

The symbol :: = may be read as 'can be replaced by' or 'consists of'; it links the basic term (*definiendum*) on its left hand side and its specification on the right. The symbol | may be read as 'or' or 'such that'. The most fundamental units (behaviours, modes, orgasm/ejaculation, conjugators and objects or 'accompaniments') are specified as a list of letters denoting the contents in the code. In brief:

a sexual act consists of:

a *behaviour* [masturbation,¹² fellatio . . .], where
 the *mode* is [self, active, passive, mutual . . .] and
ego's ejaculation and *alter's ejaculation* can occur in a specified manner
 [in him, on me, in a condom . . . to be explained later],

together with

modifier/s such as [poppers, lubricants . . .].

When the respondent is asked to specify these details (in natural language) for each act he will write, for example:

'I fucked him; I came in him; he didn't come.'

which is interpreted as:

behaviour anal intercourse; *modality* active;
ego's orgasm in alter; *alter's orgasm* no
 (*modifier/s* none).

The specification of the sexual act is open; the list of behaviours can be extended as new activities, such as inter-femoral intercourse, are encountered and such is the imaginativeness of human sexual behaviour that even modality is not closed.¹³

The Sexual Code

The structure of the sexual session can readily, simply and efficiently be represented in an encoded form as a string, which greatly simplifies storage and facilitates data analytic operations like comparing the structure of two sessions. The details of the coding system in this context would be rebarbative and need not detain us; suffice it to say that the coded form is isomorphic with the structure of the act, and has an easily remembered mnemonic form. Earlier and simpler versions of the code were used by respondents themselves as an encrypting device and some of these are still used to save unnecessary repetition.¹⁴

Sexual Diary Data

The problems of representation and analysis which arise in the case of sexual diaries are similar to those encountered in content analysis, where one is faced by a large amount of natural language material subdivided in various ways (sources, chapters, sentences and words) each with their own syntax and semantics. The same is true for sexual diary information, although coding is fortunately an easier prospect because the structure of sexual behaviour is (by design) much more tightly defined than ordinary language, and much complexity has been reduced by the preliminary coding.

To illustrate the high degree of structure and redundancy in a typical set of sexual diary data consider this coded version of a week of a respondent's sexual activity (each session is a sentence ended by a period):¹⁵

PF,NM/I.AS AS&PS PRI ARI ATF AF,HN/I PF/I HW,NI. (PS AS PS
 ACP PRI ARI AF,HN&HW)/p. PRI PF,NM/I PW. AW PW. AS. PF/I.
 HW PW,XN&HW,NX/I. PF/I. PS AF,HN/I,p,t. PW PRI PF,NM/I (PS
 ACP AF,HN/I)/p. PW AFG HW,NX AF/I.

Context and Acts: Data record and string

The original diary version of third sentence/session above was:

[... when we got home after the club I stripped him and, kneeling before me] he sucked me. After moving to the bed, I sucked him. Then I lay back and he started again sucking me. Lying face down I then took the belt to him and began using it on him and after a while he then moved round and began rimming me. I did exactly the same to him, preparing him. Then, with him lying on his back, I then fucked him using KY whilst he wanked himself. I came in him; he didn't come. We used poppers throughout.

Clearly, the purely sexual information has been abstracted and some incidentals (such as stripping and positional information) have been removed. Each session is a separate data base record¹⁶ as follows:

NO: cf****/1 | TYPE: vi | STATUS: Neg | DAY: tues | DATE: *****
 TIME: 0100 | PLACE: home, after the club
 PERSON: P2 Regular, 31, sex 4 yrs, Neg
 ACT: (PS AS PS ACP PRI ARI AF,HN&HW)/p
 POPPERS: tnt | CONDOMS: no | LUBS: ky
 OTHER: leather belt | DRUGS: alcohol beforehand.

Each field of the record is in upper case (FIELD:) and the entries are in lower case. Identifying information is denoted by asterisks. The contextual information makes it possible to select out subsets of data with particular characteristics of descriptive or explanatory relevance. Some of the more important ones evident from the above fields of the record include:

- *Home area and ID* (cf denotes Cardiff; **** is ID number and /1 refers to Wave 1).
- *Age-group and Relationship type* of Ego (type vi signifies 'Over 39 and in an open relationship').
- *Time*: day (to see whether sexual activity is different on Wednesdays as opposed to Saturdays); hour (to allow sequencing within a day but also to enable contrast between morning, afternoon, evening and early morning sex).
- *Place*: Most men are not co-habiting with a sexual partner, so location of sexual activity is interesting. This field also allows for outside sex, for example, parks or toilets to be selected.
- *Person*: each current sexual partner is allocated a sequential number and

described in terms of his (or her) characteristics (but not named) at the beginning of the diary form, and if other sexual contacts occur during the month they are added to the list, to form a *dramatis personae* of partners. The Project's ethical code promised that identifying information and names of partners (if known) would not appear on any records, thus precluding sexual network tracing — or almost so.¹⁷

- *Accompaniments*: Nitrites (poppers) are a commonly-used accompaniment to gay sex, and drugs sometimes are. The use of prophylactics (chiefly condoms but occasionally and more recently dental dams) are a major focus of safer sex.

The Sexual Diary Database

Project SIGMA has been collecting sexual diary data systematically since 1986. As well as the monthly diaries (and week-long retrospective interview diaries), there have been several one-off appeals for volunteers via the gay press, especially in the *Gay Times* in 1986 and 1987, and in *Boyz* in 1992. In toto, there are probably close to 1000 diaries, but the maintained data-base keeps a subset of these:

852	diaries in up to 5 Waves containing:
17,664	sessions involving:
39,011	acts for:
569	individuals from 10 SIGMA sites and 4 other sources

These data exist as data-base records and in more efficient internal format and are accessible¹⁸ with the specially-written package for the PC: SDA/pc (Sexual Diary Analysis) SIGMASOFT.TM

Reliability and Validity

The validity and reliability of the diary method has not been much studied, but there is a common assumption that it is less reliable and probably less valid than questionnaire methods. Although the validity of diaries as a method for collecting sexual behaviour has been questioned by McLaws *et al.* (1990). James *et al.* (1991) find a good fit between interviews and a self-administered questionnaire and Conrath *et al.* (1983) show the greater reliability of diary recording techniques (applied to sociometric data in this instance).

The reliability and validity of diary methods compared to interview methods

are currently under systematic investigation in Project SIGMA,¹⁹ and any results must therefore be tentative. In these investigations various methods are used. For a balanced subset of SIGMA panel members, comparison is made of the number of sexual acts per month given in the current interviews, and the estimates derived from their sexual diary (these refer to adjacent months, of course). A specially recruited national sample completed a month diary and returned it. After its return they were sent a form asking them to estimate the number of times they had done a set of sexual acts during that month (and given an incentive to do so).²⁰ Comparison was thus possible for the same month period between a diarist's counts derived from his sexual diary and the numbers estimated directly by him. Studies were made of the encoding process (both in the cognitive and the technical sense). In the former sense, the focus is upon how people differentially perceive and 'chunk' visual or verbal stimuli (of sexual behaviour); in the latter sense the focus is upon how Project coders turn subjects' accounts into their coded version.

Even at a preliminary stage the results of this research radically undermine the common assumption that data derived from questionnaire/interview data are more reliable and valid than diary data.

Reliability

Reliability refers to stability and internal coherence. Internal reliability in the psychometric sense of alternative forms or split-half reliability are not feasible proposals for diary entries; test-retest methods are virtually impossible to implement and can generate understandable and counter-productive hostility among diarists. Moreover, any attempt to implement independent or repeated entries fast run up against problems of memory recall for detailed data (Linton, 1986) and hence confound any reliability estimation. In SIGMA studies we have therefore concentrated on inter-coder reliability (how far do different coders encode natural language diary entries in the same way) and direct coding (from visual stimuli). Coders are presented first with a spoken or written account from a given diary, and asked to encode it (separately and without collaboration) according to the rules of representation.²¹ The coded versions are then compared; inter-coder agreement is assessed by comparing the codings (which are strings) and measuring how similar they are to each other by using a Levenshtein distance (Sankoff and Kruskal, 1983). Distance (dissimilarity) values are generally excellent, averaging better than 0.10.

The visual experiments consist of showing two three-minute sections from a gay porn video collection called *Gay Weekend II*, produced in the United States but brought into Britain from the Netherlands. Experiments have so far been restricted to project staff and coders. The main purpose is to see how, given a specific visual stimulus of homosexual behaviour (a sequence taken from the video), experienced coders 'chunk' this continuous and sometimes ambiguous

material in terms of the Project coding schema (which works in terms of a sequence of discrete events) and go on to ask how similar these accounts are. A major problem that emerges is how to reconcile codings which differ primarily in 'fine-ness' or detail, where, for instance, one coder will report that nipple fingering was followed by anal fingering, whilst another will interpose active masturbation between these two acts because the hand went over (and possibly lingered) over the penis. It is still too early fully to assess these visual experiments, but acts which resulted in ejaculation are always recorded, and in the correct sequence, which is reassuring.

Validity

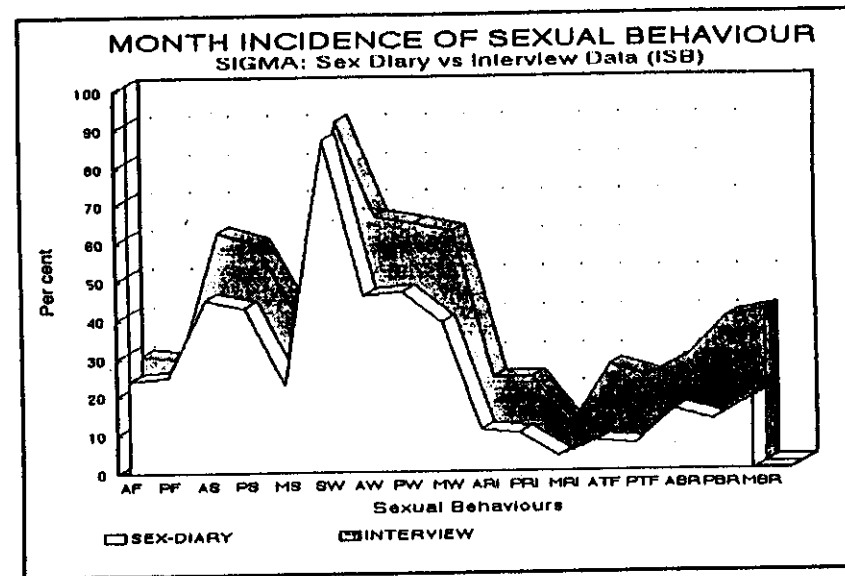
Short of observing sexual behaviour directly, it is not immediately obvious what forms validation can or should take. Since SIGMA diarists filled out their diaries in the months following their yearly interview it is possible to identify each diarist's interview data and compare the two sources. The most cited text treating validity (Campbell and Stanley, 1963) properly distinguishes internal and external validity (or, confounding and generalizability problems). Where there are two or more forms of instrument or method, each with its uniqueness component, they have also stressed the role of triangulation to deal with convergent validity.

Comparing interview and diary estimates of the same behaviour

Several forms of investigating validity are currently being used (see 'Reliability and Validity'). These concentrate primarily on the extent of agreement between accounts — derived from different methods (interview estimates vs. derived diary counts) and from different individuals involved in the same sexual session. Internal threats such as instrumentation and selection biases are particularly liable to occur in these contexts, and selection bias in particular undoubtedly occurs among volunteers who agree to do sexual diaries. However, since the SIGMA diarists are a subset of the main panel, demographic and other factors (such as higher rates of sexual activity) which differentiate the two groups can be used to estimate the degree and sources of selection bias.

The main focus in the SIGMA studies is on comparing the similarity between accounts and finding out if (and how) different estimates of the same sexual activity vary. At the aggregate level (i.e. incidence figures over all individuals) agreement is excellent and gives an important clue about the likely relationship between interview estimates diary counts (calculated from the daily-completed diaries; see Coxon and Coxon, 1993b). In particular, rank-order correlation between the aggregate diary counts and the aggregate interview estimates is modest ($\tau = 0.77$), but the linear correlation is considerably higher

($r = 0.93$). The regression of the diary counts on the interview estimates gives a regression coefficient close to unity ($b = 0.94$) and an intercept of 15.5. Taken together this suggests that, overall, respondents consistently over-estimate the frequency of their sexual activity in their retrospective recall in the interview situation by a constant addition (intercept). The aggregate data are presented in Figure 8.1.



Sexual Behaviour Codes:

MODALITY (1st letter): Active Passive Mutual/Simultaneous

BEHAVIOUR (Subsequent letter/s:)

Code	'Street Term'	Behaviour
F	Fuck	Anal Intercourse
S	Suck	Fellatio
W	Wank	Masturbation
R1	Rim	Oral-Anal
TF	Thigh Fuck	Inter-femoral
BR	Body Rub	Body Rub

Figure 8.1: Aggregate diary vs. interview estimates of sexual behaviour

Until recently, the main alternative explanation for any observed differences between interview and diary counts was that the two months were not the same; the interview questions referred to the month *past*, whilst the diary was not

started until after the interview, and the data hence referred to the *subsequent* month. In the most recent experiment, however, this has been overcome; on return of their diary, diarists were sent a new (and unannounced) sheet asking them to estimate the number of times in the last month (i.e. of the diary) they had done various acts, and how sure they were of each estimate. In this way the retrospection involved in answering the interview question is simulated, whilst a separate estimate is available by counting frequencies the diary.

Comparing partners' accounts

Another type of convergent validation consists of two participants' accounts of the same event — in this case, the accounts of the sexual partners. Although sexual partners of SIGMA diarists are not identified by name and only some of them are themselves SIGMA diarists, it is sometimes possible to identify partner pairs. Occasionally this occurs naturally where one of the partners mentions the other by name, and he is prepared to solicit his partner's co-operation. But normally this is not so, and the sexual partner can sometimes be inferred by matching attributes (since the attributes of sex partners are described in the diary account) or by matching the contents of the actual sex session itself. This method has been used with a degree of success to estimate 'number of partners of partners' for epidemiological modelling (see Coxon and Joyce, 1993). It is proposed to do a systematic search for such partners and compare the structure and 'fine-ness' of the two codings of the same events, and thus gain information not only on the general convergent validity, but also on the detail of what acts are most reliably reported.

An Example: Risk Behaviour in Anal Intercourse

We proceed now to an example of how the diary procedures are used in a specific research problem, namely that of anal intercourse and risk. The primary source of risk in sexual transmission of HIV among gay males is anal intercourse. Safer sex messages advise that risk should be minimized by the use of a condom, in conjunction with a water-based lubricant. If risk is to be monitored it is crucial to ensure that information about involvement in anal intercourse and the use of condoms is accurate, reliable and valid. The usual way of investigating this central issue is by the interview or questionnaire method, with the interviewer defining levels of sexual risk for the respondent and then asking whether or not he has engaged in any of the risky behaviours, and if so, how often.

There are good reasons for expecting that such data will underestimate the actual incidence of risk as respondents will tend to deny or underestimate such infractions of safer sex, and prevalence figures from interview or questionnaire data are best taken as lower estimates. Diary data offer definite advantages for

investigating such issues. First, the estimates are obtained by the researcher *post factum* from the diary accounts, and there is no need to involve the respondent in identifying risk occurrences at all, since these, too, are identified *post factum* by the researcher. Interviewer and social desirability effects can thus be avoided.

In monitoring the incidence of anal intercourse and use of the condom, most studies (including SIGMA) usually rely upon the respondent to report upon his condom use, and often content themselves with a graded scale of frequency of condom use.²² But, again, respondents' reports and estimates from interview contexts are liable to be defective and subject to systematic distortion.²³ Indeed, few can reliably give accurate estimates of their condom use, and yet fewer can remember which occasions involved their use.

Characteristics of anal intercourse

As a preparation for the risk analysis let us turn first to some general findings about anal intercourse derived from analysis of the diaries.

- If anal intercourse occurs, it is typically an end-marker to a sexual session. This is especially so when it culminates in ejaculation on the part of one or more of the partners. Once ejaculation has happened it is unlikely that any significant sexual activity follows, and if it does, it often simply establishes a reciprocation.
- Anal intercourse plays a crucial role in determining the power aspect of a session; Davies and Coxon (1990) show that a sexual session tends consistently to be either reciprocal (symmetric) or dominant (asymmetric).²⁴ In the reciprocal session the pattern of events follows an A,P alternation ('I do it to you, and you then do it to me', or vice versa), in the dominant session power positions are established: one partner becomes the active partner and remains so throughout the session. Fucking is often the lynch-pin of such sessions.
- The pattern of acts which immediately precede anal intercourse has a clear structure: In an earlier paper we have been able to show that the rule is, 'If I fuck a guy, sucking is most likely to precede it (rather than wanking) and I'm most likely to be sucked by him first' (Coxon and Coxon, 1993b). Correlatively, passive (receptive) anal intercourse is typically preceded by fellatio, and usually by *active* fellatio.

Ejaculation and Risk

Since many sexual acts carry the potential of orgasm, ejaculation is allowed for in the schema and in the coding. Initially, the only distinction noted was whether or not orgasm occurred, since the question of which partner did so was normally

clear from the context of the behaviour and its modality. Next, the outcome suffix was made two-place — the first for ego, the second for alter — making the detail of mutual orgasm easy to code and clearing up residual ambiguity. Finally, the two-place form was further differentiated to specify the actual destination of the ejaculate (semen), so that even potentially risky behaviours (such as alter masturbating himself and ejaculating on ego's body, which might have lesions . . .) could be explicitly identified. To do this we have developed the form shown in Figure 8.2.

CODE	EJACULATION DESTINATION
1. N	No ejaculation
2. X	Elsewhere (e.g. on floor, or unspecified)
3. O	On him (alter), i.e. skin or body surface
4. I	On me (ego)
5. C	into a Condom
6. H	In him (alter), either anally or orally
7. M	In me (ego), either anally or orally

Figure 8.2: Alternatives for destination of ejaculation.

The seven outcomes are arrayed as a weak order of risk of HIV transmission: no ejaculation (1) — ejaculate elsewhere (2) — ejaculate on a partner (3, 4) — ejaculate in a condom (5) — ejaculate in a partner (6, 7). This order differentiates the 'On rather than In' safer sex message and the full form also specifies which partner receives the semen. The fifth alternative (the condom) might at first sight seem anomalous, but belongs there as perhaps the most important 'destination', being the main form of prophylaxis. These ejaculation (outcome) codes will now be used to examine risk behaviour involving anal intercourse.

'Volume' Analysis of Risk and Anal Intercourse

The basic data used for the risk analysis are all the 2107 acts of anal intercourse in the data base and the unit of analysis will be the act rather than the individual (so-called volume or outlet analysis; Coxon and Coxon, 1993b).

Anal intercourse accounts for 5.6 per cent of all sexual acts of gay men in the database (13.4 per cent of all acts excluding masturbation), almost exactly evenly divided between the active/insertive and the passive/insertee modalities. (This percentage markedly differs from the usually reported incidence *per man* during a month; about a third of gay men engage in either active or passive anal intercourse a median number of two times a month according to SIGMA studies (SIGMA, 1990)).

To investigate levels of risk in anal intercourse we need first to examine the

frequency with which the various forms of ejaculation occur. The percentage distribution is given in Table 8.1. The information in this Table reveals several interesting points. One is that coming on a partner is actually a very uncommon activity; ejaculation elsewhere (basically, avoiding the partner's body) is a much more likely eventuality.

Code	Outcome	Per cent	Risk level
N	No ejaculation	30.5	0
X	Elsewhere	12.4	1
O	On him (alter)	1.9	2
I	On me (ego)	1.7	2
C	into a Condom	16.6	3
H	in Him	23.5	4
M	in Me	13.4	4
		100.0	
(N Acts = 2107)			

Table 8.1: Destination of ejaculate in anal intercourse.

Putting the information hierarchically — out of 100 acts of anal intercourse, 70 involve ejaculation of semen. Of these ejaculations: 17 are into a condom, 53 are unprotected, 12 go elsewhere, 4 go on the partner's body and 37 go into the partner's anus. The actual level of high-risk behaviour revealed is disturbingly high since over one-third of the acts of anal intercourse are in the highest risk category of all. High-risk sexual behaviour thus appears in this analysis to be much more prevalent than normally reported in studies of gay men, possibly because high-risk behaviour is concentrated in particular individuals. In the next section we shall therefore enquire whether there is significant variation among particular types of gay man.

Condom-use also presents a disturbing picture. It is well-known that condom use is far from universal among gay men who practice anal intercourse. But the figures in Table 8.1 derived here from their diary accounts shows that if ejaculation occurs in anal intercourse, a condom is used in *less than a quarter of the instances*. Moreover, protected ejaculation (into a condom) occurs only half as frequently as the most high-risk behaviour of unprotected ejaculation.

Have these fractions changed over the four annual waves represented here? Table 8.2 presents the relevant information. The percentage of protected acts of

Anal Intercourse Ejaculate:	WAVE 1	WAVE 2	WAVE 3	WAVE 4
Condom [C]	20	13	18	21
Unprotected [H,M]	33	33	36	37
Ratio: [C]/[H,M]	0.61	0.39	0.50	0.56

Table 8.2: Percentage of acts where anal intercourse involves a condom [C] or is unprotected [H and M] by wave.

anal intercourse (i.e., where a condom is used) actually drops by a third in the second wave (a phenomenon noticed elsewhere), and only climbs back up again over the next two; the fraction of unprotected acts of anal intercourse²⁵ actually increases over this period. The ratio of protected to unprotected acts was highest in the initial wave (1987), fell dramatically in the second wave and although increasing subsequently has not yet reached the initial level.

The Effect of Age and Relationship on the Volume of High-Risk Activity

Having found this variation, how is it to be explained? Power and sex-role almost certainly have a part to play (Coxon and Coxon, 1993a), and knowing that receptive anal intercourse is the more risky would normally lead us to differentiating active and passive modalities of anal intercourse in the analysis before going any further. But instead, in the space available, it may be more profitable to see how unprotected anal intercourse varies by the two factors that we have found to be repeatedly the most potent in explaining variation in gay men's sexual behaviour — age and relationship-type (Coxon, 1987). Because these factors are themselves associated, it will be best to take their combined effect on the unprotected anal intercourse.

The nine-fold SIGMA typology of three age-groups by three relationship types is now used to look at the percentage of acts of unprotected anal intercourse within the nine cells. This is presented graphically in Figure 8.2 with Table 8.3.

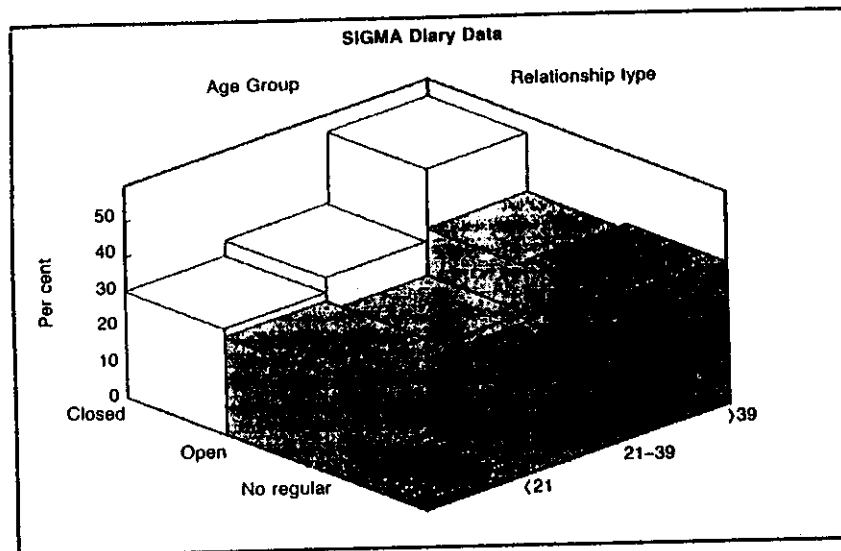


Figure 8.3: Unprotected anal intercourse by type.

Relationship	Age →	Less than 21	21-39	Over 39
Closed Relation		30.1	34.7	55.1
Open		27.8	24.5	38.2
No Regular		0.5	22.0	40.0

Table 8.3: Percentage of unprotected acts of anal intercourse, by age and relationship type.

There is clearly a very substantial amount of variation in these rates of unprotected anal intercourse. High-risk activity is positively related to age (the older groups have increasingly higher rates). Relationship also has a systematic effect: highest-risk anal intercourse is highest in closed relationships, slightly lower in open relationships, but considerably lower among those who have no regular relationship. This conforms well to findings from the panel-based data of the project (Weatherburn *et al.*, 1991; Hunt *et al.*, 1993), where issues of intimacy and trust rather than recidivism or relapse (Davies, 1992, 1993) are shown to explain such differences. Nonetheless, it is important to have some idea of whether age or relationship is the greater influence, and where the most important combinations occur. From the start of diary analysis (Coxon, 1987) we have used a resistant method of analysis to answer this question: means analysis with a median polish (Mosteller and Tukey, 1977: 165-202).

The analysis is a simple additive model: the table entries are the sum of the overall average (typical value TYP, here 27.8 per cent) plus the row (relationship) effect, plus the column (age-group) effect plus the combination/interaction/residual effect. In terms of main effects, age-group has a greater effect than relationship type, but this is primarily due to the older group (having an effect almost two-thirds the size of the overall effect). Being in closed relationships have the highest and positive effect. The most striking thing about the combination-effects is that the youngest age group who are not in a regular relationship have a remarkably lower rate — again, almost two-thirds the size of the overall effect. In brief, there are major variations in the rates of unprotected sex among these types of gay men; being older men (40 and over) and (to a lesser extent) in a closed relationship increases the rate of high-risk sex, and having no regular relationship and being young (under 21) serves to decrease the rate. Over and above this, young men with no regular relationship have a considerably lower rate than would be expected.

Relationship	Age →	Under 21	21-39	Over 39	Row Effects
Closed Relation		0	0	2.4	6.9
Open		7.9	0	-4.3	-3.3
No Regular		-16.9	0	0	-5.8
Column effects:		-4.6	0	18	TYP = 27.8
					Per cent

Table 8.4: Median polish of percentage of unprotected acts of anal intercourse, by age and relationship.

On this analysis of the sexual diary data, then, the youngest age group who are in no regular relationship have a very markedly lower rate of unprotected high-risk sex than any other. This is an encouraging (if not entirely unproblematic²⁶) finding, and accords with other trends documented by SIGMA (Davies *et al.*, 1992): young gay men conform far more to safer sex guidelines than any other group.

Conclusions

The diary method provides an excellent tool for the study of sexual behaviour, yielding fascinating detailed and often unique information. If combined with an explicit theory or schema of sexual behaviour, comparison with other methods is straightforward. However, it is undoubtedly a demanding method (on both respondents and analysts) even if analysis is aided by recently-available software. Validity studies suggest that while aggregate data correlate extremely well with those derived from other methods there is an undoubted selection bias in those who agree to keep such diaries.

The most striking substantive conclusion is that there is a remarkable amount of highest-risk activity (unprotected anal intercourse to ejaculation) among gay men — far more than would be suspected from individual-based analyses. This highest-risk activity is concentrated in older gay men and is markedly under-represented in young gay men who have no regular relationship. It would have been impossible or totally unfeasible to use questionnaire or interview methods to obtain this striking result.

Notes

- 1 This rather ugly clause is more accurate than homosexual or gay, which imply restriction to this orientation, or identification with it. In the rest of the chapter gay will be used to denote behaviourally homosexual males.
- 2 The presence of a third person (here the social scientist) would render homosexual activity illegal under the 1967 Sexual Offences Act as being no longer a private activity. Scottish law does not contain this restriction.
- 3 Project SIGMA (Socio-sexual Investigations of Gay Men and Aids). The research in this article was funded by the Medical Research Council and by the Department of Health (UK). Work on Sexual Diary software and on the validity and reliability of the sexual diary method reported here is funded under a series of grants from the Department of Health. The views expressed in this article are those of the author and not necessarily those of the Council or of the Department.
- 4 We have been able to show that it is selection bias toward those with busier sex lives rather than exaggeration of activity that is primarily producing bias.
- 5 The male pronoun is used descriptively throughout this chapter as we are referring exclusively to gay men.
- 6 As a rule of thumb, this is usually less than a three-day period for detailed accounts

- of sexually active men. Particular, rare or risky behaviour can often be recalled for a longer time, but even here the contextual information and surrounding sexual activity is poorly recalled (see Brewer, 1988; Neisser and Winograd, 1988).
- 7 The ethical undertaking given by the Project was that the name of someone identified in an interview would not be part of a Project record. This was undoubtedly important in maximizing response and trust initially, but prevented any record linkage and severely limited network analysis. The ethical issue is discussed in Coxon *et al.*, 1993c, and the practical network issues in Coxon and Joyce, 1993.
- 8 But also because they could have such an effect: condoms can act as a barrier (and are anyway encoded into the outcome information), lubricants can increase the probability if not water-based and may decrease it if containing Nonoxonyl-9; toys such as dildoes, if shared may potentially transmit the HI virus.
- 9 This distinction is in common use in the gay community. It is not to be confused with the insertee distinction often used in this context. Many (indeed most) sexual acts are not penetrative.
- 10 See Coxon *et al.*, 1992b for a fuller specification and treatment.
- 11 Orgasm and Ejaculation are used interchangeably, though it is recognized that they are not necessarily equivalent.
- 12 The entries in square brackets are instances taken from the appropriate list. The letters in the behaviour list are the first letter of the street term of the behaviour, e.g., Wanking, Sucking...
- 13 We had to include a new modality 'H' to deal with situations where alter did something sexual by himself, which could still have relevance to HIV transmission. An example is where he masturbates himself but ejaculates on his partner.
- 14 The most common activity is solitary masturbation to ejaculation/orgasm. This is now well-known in the gay community by its SIGMA code of 'SWO'.
- 15 Everything but the sexual session data has been removed — time, place, partner, etc.
- 16 Using either dBase or CARDBOX-Plus software. Selection using boolean operators is done within the database and then exported as ASCII or Basic (comma-delimited) format to specially designed or commercial software.
- 17 In order to derive information on partner mixing for the Imperial College group of epidemiological modellers (Anderson, 1986) an estimate of the number of partners of partners was needed. The network procedures used to do this on a Diary dataset are described in Coxon and Joyce, 1993.
- 18 The Programs and data are available at cost from the author.
- 19 This sub-project on reliability and validity is funded by the Department of Health.
- 20 The incentive consisted of donating £2 to the Terrence Higgins Trust on their behalf on return of a completed estimate sheet.
- 21 The same rules are presented in the instructions to diary keepers (SIGMA, 1993). Originally respondents were invited to encode some or all of their data but this is now discouraged except for very common events such as solo masturbation.
- 22 SIGMA uses the 7-point gradation: Always / Almost always / More than half the time / Half the time / Less than half the time / Very seldom / Never.
- 23 The direction of distortion can be upwards or downwards, though it is more likely to be downwards. Upward distortion is a kind of Don Juan effect: boasting about one's sexual prowess, and downward distortion usually arises because anal intercourse is known to be most risky and subject to disapproval by health education authorities.
- 24 It is important to stress that this is a contextual and *not* an individual property. Some individuals will always engage in one of the two types of session or always adopt an active or passive role, but these are in a minority. Most gay men shift modality in different settings or with different partners or even within the same session.

- 25 Throughout this and following sections of the chapter the phrase 'unprotected anal intercourse' means unprotected anal intercourse to *ejaculation*.
- 26 This group is relatively small in size (51/569); spread across 4 waves it is difficult to see a stable trend. Selection bias could account for some of the unexpected very low value, but not the relative amount.

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