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**SOCIAL DESIRABILITY IN REPORTING PAYING FOR SEX
AND RISKY BEHAVIOURS:
COMPARING TWO TECHNIQUES FOR HANDLING MISSING DATA**

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ABSTRACT

Sexual behaviour and personal expenses are among the most sensitive topics in surveys. Thus, sample members asked about paying for sex might misreport or refuse to answer such questions. However, surveys about sexual behaviour have been increasingly common in the last decades for the study of Sexually Transmissible Infections and for policy evaluation.

The level of social desirability associated with paying for sex may be influenced by prostitution policies through attitudes. In this work, I discuss the legislation models regulating sex work in the United Kingdom, showing a shift of policy focus from sex workers to clients and a consequent stigmatization of men who pay for sex.

The shift of UK policies towards the reduction of the demand for sexual services had the explicit aim to “challenge attitudes” towards paying for sex. I review the evidence from the literature on the effect of prostitution policies on attitudes toward sex work and I discuss how attitudes may influence reporting paying for sex.

The sensitive nature of questions on paying for sex may influence not only the measurement but also the sampling strategy adopted by social researchers to investigate the phenomenon. I discuss different sampling techniques adopted in the literature on sex workers’ clients in relation to the substantive findings derived from these studies.

Sociological, economic and epidemiological literature have studied sex workers’ clients linking the concept of risky behaviours with paying for sex: however, both concepts are subject to social desirability. I hypothesize that these two sets of behaviours are characterized by high item missing data, and that missing data is not missing completely at

random (MCAR). Also, I hypothesize that the statistically significant correlation of paying for sex and risky behaviours may not hold under different missing data handling techniques.

In order to test these hypotheses, I use data from the National Survey for Sexual Attitudes and Lifestyles (Natsal-2). This is a nationally representative sample of over 12,000 adults (aged 16-44) living in Britain in 2000.

I confirm that paying for sex and risky behaviours have higher missing data than other non sensitive socio-demographic items (excluding partners' characteristics). Also, item missing data are not MCAR, neither in terms of socio-demographic characteristics nor in terms of paradata on respondents' embarrassment and commitment to the survey.

Moreover, the propensity to produce valid answers does not vary widely across the behaviours considered. I reject the hypothesis that multiply imputed values have higher prevalence of paying for sex and risky behaviours; finally, the correlation of paying for sex and risky behaviours is not significantly different under the two missing data handling techniques considered (*listwise* deletion and Multiple Imputation by Chained Equations).

The finding that paradata are associated with item non response in paying for sex and risky behaviours is particularly promising. As these factors can be informative of the non response process, the inclusion of such items in data collection on sensitive topics is considered advisable, when possible under budget constraints.

The evidence that, in this analysis, the estimate of the correlation of paying for sex and risky behaviours does not change under different missing data handling techniques is encouraging, as it does not undermine other evidence from the literature. To assess the external validity of this finding, further research may evaluate whether estimates of the correlation of paying for sex and risky behaviour differ by missing data handling technique in different contexts, and/or under different subsample specifications.

Overall, I believe this work makes an important contribution not only to the measurement and analysis of paying for sex, but also to the analysis of the correlation of different sensitive behaviours.

INTRODUCTION

This project studies social desirability and item non response in paying for sex and risky behaviours. It discusses the role of prostitution policies and attitudes towards sex work in shaping the degree of social (un)desirability in reporting paying for sex and the level of sensitivity of the survey question eliciting information on the sex purchase. Also, it compares two techniques for handling missing data to estimate the correlation of paying for sex and risky behaviours: *listwise* deletion and multiple imputation.

This work considers the prostitution policy framework and the societal attitudes toward sex work in the study of item non response. Prostitution policies and attitudes toward sex work are expected to influence the social desirability of paying for sex and thus item non response in paying for sex.

More broadly, surveys often ask sensitive questions on topics that are subjects of repressive legislation (e.g. drug use, drink driving, and tax evasion). The level of criminalization of these activities may vary substantially across countries – e.g. European countries are characterized by different legislations on marijuana consumption. Also, attitudes on these topics may vary substantially across cultures. In comparative research, as well as in cross cultural surveys, different policies and attitudes may influence the reporting of sensitive topics.

Thus, policies and attitudes may be taken into consideration when studying sensitive behaviours. For example, they may be considered in the survey design phases, as they may contribute – together with other background information and empirical evidence – to survey design choices such as question wording, data collection mode, sampling strategy.

Also, policies and attitudes may be considered in the data analysis process. Prostitution policies and attitudes toward paying for sex may increase the social undesirability of reporting paying for sex, and thus lead to non response in survey questions on the sex purchase. Thus, the data analyst may take into account the role of prostitution policies and attitudes toward sex work in interpreting results and assessing their external validity.

This reasoning can be extended to behaviours that are not necessarily illegal, but whose reporting is nevertheless influenced by policies. For example, the level of sensitivity of reporting a LGBT sexual identity may be different in countries that have legalized gay marriages (e.g. England and Wales), compared to countries that do not recognize any kind of gay civil unions (e.g. Italy) and countries where homosexuality is illegal (e.g. Morocco¹).

Policies may influence reporting *per se* – e.g. respondents may not report an illegal behaviour for fear of legal consequences – as well as through attitudes – e.g. policies may increase stigmatization, discrimination and create negative attitudes (and *vice versa*, negative attitudes may influence policies).

Also, societal attitudes may have a different impact on the individual attitude of reporting a sensitive behaviour than the attitudes of peers, or, in general, people who are close to the respondent. Survey agencies may consider societal attitudes and attitudes of the subpopulation under study in taking survey design choices.

Also, data analysts may consider these factors in analysing non response in sensitive questions. For these reasons, I incorporated the description of prostitution policies and attitudes toward sex work in the analysis of item missing data.

The project compares different techniques for handling missing data. This is relevant both to validate empirical results from the literature, as well as to guide researchers in the choice of techniques to handle item missing data in similar contexts.

Given the challenges associated with eliciting answers to sensitive questions and the extremely intimate nature of questions on paying for sex, an objection may be made as to whether collecting data on such topics is strictly necessary.

¹ Source: United Nations Human Rights Office, <https://www.unfe.org/en/actions/criminalization-map> last accessed 10 September 2015

The literature on prostitution and sexuality highlighted several reasons why data collection on paying for sex is particularly relevant. Firstly, both the European Commission (2002) and academic researchers (e.g. Cauduro *et al.*, 2011) stressed the importance of research on sex workers' clients to reduce trafficking for sexual exploitation.

Also, the epidemiological literature (e.g. Jones *et al.*, 2014) argued that research on sex workers' clients is needed in the analysis of the transmission dynamics of Sexually Transmissible Infections (STIs). In order to conduct these studies it may be necessary to collect quantitative data on sex workers' clients: these data may be subject to item non response, and this research addresses this issue.

More specifically, collecting data on sex workers' clients and guaranteeing high data quality is important to inform prostitution policies. Concerning the repression of human trafficking, the United Kingdom, as well as several European Countries, is shifting the focus of policies from sex workers to clients, criminalizing the demand for sexual services (Sanders *et al.*, 2009). However, little is known about the characteristics of the sex market and the typologies of prostitutes' clients, target of the repressive legislation.

The idea that the reduction of demand for paid sexual services may reduce human trafficking is controversial. At the academic level, there is not agreement about the possibility of decreasing trafficking in human beings through the reduction of the demand of sexual services. While some sex workers are coerced into prostitution others may choose actively to enter the paid sex market (Kingston and Sanders 2010). However, the choice of entering the sex market may be motivated from constraints to access other employment opportunities.

In synthesis, the demand for sexual services can be addressed both by sex workers that are victims of trafficking and/or exploitation and sex workers that are not victims of trafficking/exploitation (Anderson and O'Connell Davidson, 2002; Kingston and Sanders, 2010). It is not clear if the demand for paid sexual services drives the trafficking for sexual exploitation. On the contrary, the sector might be supply driven, as cheap performances may generate a higher demand for sexual services (Anderson and O'Connell Davidson, 2002).

However, in the UK as in other European Countries, the current policy focuses upon clients through criminalizing the demand (Sanders *et al.*, 2008). The Swedish normative of criminalization of prostitution clients' has been adopted by Iceland and Norway (Picchi,

2011). Moreover, the 2002 European Union Declaration on Preventing and Combating Trafficking in Human Beings states that the reduction of demand for sexual services constitutes an essential goal in the fight against human trafficking (Council of the European Union, 2002).

Among the policies adopted to reach this goal, the Council of the European Union cites the awareness raising campaigns addressed to clients of sexual services in order to reduce the demand of trafficking of human beings (Council of the European Union, 2002). To this end, there is stress on the importance of research on prostitution demand (Council of the European Union, 2002). Indeed, “a crucial component in the comprehensive counter-trafficking response will be further research and analysis of the ‘demand’ side of the trafficking process and an examination of methods by which the demand of clients can be effectively reduced” (Council of the European Union, 2002: 9). Also, Di Nicola *et al.* (2005) stress the need to adopt manoeuvres aimed at knowing the role of prostitution demand in the sex trade. High data quality, the adoption of adequate techniques to handle missing data, and the identification of item missing data mechanisms and patterns are requisites for sound quantitative empirical research.

Besides human trafficking, paying for sex has been studied in the epidemiological literature in relation to the spread of STIs. Fenton *et al.* (2001) argue that, in general, the study of sexual behaviour is relevant for the study of transmission dynamics of sexually transmitted infections (STIs).

Clients’ role in the transmission of infections is controversial, and it is country and time specific. Although at least one research finds evidence that male clients of female sex workers report high rates of condom use with prostitutes and low levels of STIs compared to the general population (Miller *et al.*, 2004) several studies have shown that customers are a “bridging population” both to female sex workers, as well as to other sexual partners (Ghani and Sevgi, 2005; Lownders *et al.*, 2000; Lownders *et al.*, 2002; Decker, 2008; Xu *et al.*, 2008, Nguyen *et al.*, 2008; Lau and Thomas, 2001, Shah *et al.*, 2007; Ward *et al.*, 2005). Many of these latter studies conclude that there is a need for prevention intervention targeted toward clients (Lownders *et al.*, 2000; Lownders *et al.*, 2002; Decker, 2008; Nguyen *et al.*, 2008; Ward *et al.*, 2005; and Shah *et al.*, 2007) and that further research is needed to track sex workers’ clients to inform these programmes (Decker, 2008).

Indeed, in a recent research of men who pay for sex in the United Kingdom, Jones and his colleagues (2014) define sex workers' clients as an important core group in STIs transmission. The authors conclude that "men who pay for sex remain at greater risk of Sexually Transmissible Infection acquisition and onward transmission" than men who do not pay for sex (Jones 2014:1). The authors show that men who pay for sex are more likely to report for STIs diagnoses – and the results hold after controlling for number of sexual partners.

The authors conclude that this evidence supports the idea that men who pay for sex are a bridge population for assortative sexual mixing² and for the spread of sexually transmissible infections (STIs). These men, compared with men who do not pay for sex, also report higher prevention behaviours, such as clinic attendance (Jones *et al.*, 2014). Indeed, the higher clinic attendance can be used as an opportunity to target intervention toward these men (Jones *et al.*, 2014). If more data on sex workers' clients were available, targeting clients might be more precise.

Some related literature stresses the importance of increasing knowledge on men who pay for sex noticing that much pressure on female prostitutes to provide unprotected sexual services comes from clients (McKeganey and Barnard, 1992) and customer resistance is the major obstacle met by sex workers in adopting safer sexual behaviours against STIs (Pyett and Warr, 1997). Similarly, evidence from developing countries – specifically Kolkata (India) and Mexico – show that sex workers using condoms face income losses and this is interpreted as clients' preference for condom-free sex (Rao *et al.*, 2003; Gertler *et al.*, 2007). These studies stress the importance of information and awareness campaigns aimed at clients, to increase their willingness to use condoms.

Jones and his colleagues (2014), studying the contemporary UK context, finds higher condom use for clients compared with non-clients, but with the data available they are not able to disentangle safe sex with sex workers from safe sex with "unpaid" partners. They also show a higher prevalence of sex purchased by UK residents travelling in low income countries, compared to the frequency of overall tourism in these countries. For example, the

² Assortative sexual mixing refers to the choice of a sexual partner from a different social network (Kissinger and Shedlin, 2012). This behaviour tends to spread epidemics from network to network (Kissinger and Shedlin, 2012).

authors noticed that the 25% of the sex purchase out of the UK occurs in Asia, while Asia is the destination of only the 5% of British travellers. The authors conclude that these findings have implications in “targeting sexual health interventions and health promotion messages to those travelling to these sex tourism areas especially given the higher STI/HIV prevalence in these regions” (Jones *et al.*, 2014).

The researchers claim that there is a need for more detailed data on sex purchases. Indeed, due to the characteristics of the dataset, they could disentangle only macro-regions where the sex purchase took place, and they state the need to gain more detailed information on the specific location of sex tourism. This would enable comparison with health statistics from the country, recipient of the sex tourism.

Moreover, the authors claimed the need for more information on whether sex purchase occurred only abroad, only in the UK or both in the UK and abroad. Indeed, the availability of such data may enable social researchers and policy makers to disentangle these different groups of men who pay for sex. This would allow exploring if these are heterogeneous groups and if so, in which socio-demographic and sexual behaviour aspects these three groups of men differ from each other (Jones *et al.*, 2014), allowing better targeting for health promotion reasons. In synthesis, Jones *et al.* (2014) stress the need for data collection on sex workers’ clients in the UK for epidemiological reasons: most information may be elicited only through survey questions addressed directly to clients, and these questions are likely to be highly sensitive given the topic. Thus, since the data collection and statistical analysis on paying for sex is needed, research on item missing data and on the comparison of different item missing data techniques on paying for sex is particularly relevant.

Moreover, the population of sex workers’ clients may be considered hidden, elusive and rare, due to the stigmatization and social undesirability of paying for sex. Understanding the role of policies and attitudes in determining item missing data and the item missing data mechanisms may guide decisions in the sampling strategy to adopt to reach this and other hidden, elusive and rare populations.

Also, the theoretical framework adopted here is common to analysis of the correlation of behaviours that are elicited asking sensitive questions. Research in sociology, psychology, epidemiology, and economics often study the correlation of sexual behaviours with risky behaviours, e.g. teenage pregnancies and bridge drinking. Due to the sensitive nature of these

variables, these studies may face item missing data in both the dependent and independent variable. The analysis proposed in this work, where item missing data is expected to be present in both the dependent variable (paying for sex) and the independent variable (risky behaviours), may be adopted in other studies of this kind.

STRUCTURE

After defining the main concepts (CHAPTER 1), I discuss the legislation models of prostitution with a particular focus on the evolution of the legislation in the United Kingdom (CHAPTER 2); secondly, I discuss the evolution of the attitudes toward sex work, in light of stigmatization (CHAPTER 3).

Moreover, I argue that clients' stigmatization and social undesirability of paying for sex influence all aspects of surveying sex workers' clients. Thus, I discuss other aspects of surveying sex workers' clients, such as sampling strategies adopted in the literature on paying for sex (CHAPTER 4).

I argue that paying for sex and engaging in risky behaviours are sensitive topics in surveys, and respondents may misreport or underreport these socially undesirable behaviours. I discuss mode effects in surveying sexual behaviour and alternative data collection strategies for sensitive topics – e.g. indirect questioning techniques (CHAPTER 5).

In the empirical section, I test the hypothesis that paying for sex and risky behaviours have higher missing data than other non-sensitive items (*HYPOTHESIS 1*); the presence of missing data does reduce the sample size for the analysis, and it may also lead to biased estimates, if respondents with different characteristics have different propensity to give a valid, non missing, answer. Thus, I test the hypothesis that missing data are conditionally associated with respondents characteristics and characteristics of the interview settings (*HYPOTHESIS 2.1 and 2.2*). Also, I test whether the propensity to produce valid answers varies across items with different levels of sensitivity (*HYPOTHESIS 3*). Furthermore, I test whether the prevalence of paying for sex and risky behaviours among sample members with item non response is different compared to the prevalence among sample members providing a valid answer (*HYPOTHESIS 4*). Finally, I test whether due to the missing data, the conditional correlation of paying for sex and risky behaviours is biased (*HYPOTHESIS 5*).

Methods used to test the proposed research hypothesis are described in CHAPTER 6 and 7. Specifically, Multiple Imputation by Chained Equation is adopted to impute item non-response for both risky behaviours and paying for sex. In CHAPTER 9 the proposed research hypothesis are tested using data from the National Survey of Sexual Attitudes and Lifestyle (Nasal-2) – these are described in CHAPTER 8.

I believe this makes an important contribution not only to the measurement and analysis of paying for sex, but also to the analysis of the correlation of different behaviours measured with sensitive questions. More broadly, it provides an example of dealing with item missing data while estimating the association between two categorical variables (see the conclusions, described in CHAPTER 10).

CHAPTER 1 – DEFINITION OF CONCEPTS

1.1. SEX WORK AND PAYING FOR SEX

In this chapter I describe the main concepts that I adopt in the thesis, while other technical terms will be defined as they appear in the text. Firstly, the term “sex work” means the offer of a sexual service for profit (i.e. providing a monetary exchange) (Davis, 1997)³ ⁴. Therefore, the peculiarities of sex work are the commercial nature of the performance and the non-discriminatory nature of transactions (Davis, 1997). As a result, the definition of sex work does not include a wide range of sexual behaviours that – although perpetrated for self-

³ The original definition by Davis uses the term “prostitution” rather than sex work. However, in this thesis I opt for the terms “sex work” and “sex worker”, rather than the nouns “prostitution” and “prostitute”. Di Tommaso (2012) notices that there is a clear distinction, among researchers studying sex work, in the terminology adopted. In fact, some researchers use the term “sex work” attributing to this term the connotation of a profession. While the term prostitution is preferred by scholars that consider sex work as a commodification/exploitation of the body and endorse abolitionist positions. According to Pateman (1988) the feminist movement disputes the reduction of sex work to an economic contract, as such consideration would erase the existing power relationships between genders.

Even though, in this thesis I consistently use the term “sex work” and “sex worker”, this choice should not be read as an ideological stance. The choice of the term “sex work” instead of “prostitution” derives from the definition of “work” as an “activity involving mental or physical effort done in order to achieve a result” (Oxford dictionary). Embracing this definition means recognizing that the sale of sex (which involves physical effort) in an exchange for money (the result), constitutes work. While, studying the level of exploitation in sex work is beyond the scope of this research.

⁴ Serughetti (2012) proposes a definition of sex work as the “art or practice to engage in sexual intercourse for money” (Serughetti, 2012:36). The author stresses two points: firstly this definition includes a reference only to one agent of the sex-money exchange: the sex worker. Secondly, the English language contains only a few nouns to describe the client. Not only the client is not mentioned in the definition, but also, though there are many words to define the prostitute (escort, call girl, whore, slut, streetwalker, tramp, *etc.*) only a limited number of nouns are in use to define the client (john, punter and client). According to the author, this linguistic imbalance signals an asymmetry in the discourse on sex work (Serughetti, 2012).

interest – do not imply a monetary exchange (e.g. marry for money, sustain a mistress, have a sexual relationship in exchange of food or presents) (Davis, 1997).^{5 6 7}

Several types of sex work are identified according to the person who provides the performance and in relation to the place where the sexual encounter takes place. Depending on the person supplying the performance, the terms male and female sex work indicate, respectively, the supply of commercial sex by a male or a female sex worker. While, transsexual sex work indicates the practice of sex work by a transsexual person.

Different sex markets can be distinguished according to the place where sex is sold, the *medium* used to find and contact the sex worker and the circumstances of purchase. In relation to the place where sex work is sold, “street sex work” means that the sex worker solicits the customer outdoors – mostly in streets but also in other public places such as parks, beaches, *etc.* Conversely, indoor sex work indicates all cases in which the sex worker does not solicit the client outdoors, but in apartments, motels, strip clubs, massage parlours *etc.* In relation to the medium used to contact the sex worker, “on-line sex work” refers to forms of sex work that are advertised using the Internet and that then take place off line. Another type of market for paid sex is “sex tourism”. This is defined as “a type of holiday finalized to practice sexual activity” (Alexander and Thompsons, 2008:147).

The sex market is an economic market; thus, agents can be labelled as demand (the clients) and supply (the sex workers). The term “sex worker” identifies the person, either male or female, who offers sexual services in exchange for money. While, the terms “sex workers’ client” refers to a social actor paying money in order to obtain a sexual performance. This agent constitutes the demand for sexual services.

⁵ Whereas this definition includes the forced participation in paid sexual performance – e.g. sex work of victims of trafficking in sexual exploitation (Davis, 1997).

⁶ In some cases, the literature adopts different definitions of “sex work”. For example, Morse *et al.* (1992) include in the definition of “sex work” also the exchange of sex for goods. In fact, in their study on male sex workers, the authors clarify that a male street prostitute is “a person who walks the streets of an urban area and engages in a variety of sexual acts in exchange for money, drugs, and/or other items of monetary value” (Morse *et al.* 1992:349). Coherently, they defined a customer as “any male who pays (in money or trade) to engage in a sex act with a male prostitute”.

⁷ Cipolla and Ruspini (2012) noticed that the term sex work has a variety of social and epistemological meanings that are not always coherent. Indeed, the authors argue that the term sex work means selling spheres that should not be subject to a monetary exchange.

The focus of this thesis is on male sex workers' clients of both heterosexual and homosexual prostitution⁸. The anecdotal suspicion that the sex market is mainly constituted of males paying female sex workers⁹ ¹⁰, together with the idea that males and transsexual sex workers offer mainly homosexual services (Danna, 2014) is reinforced by empirical evidence; only a minor percentage of women in a representative sample of the UK population reported paying for sex in the 5 years prior to the interview – 0.1% *versus* 3.6% for males (Mercer *et al.*, 2013). And, males buy sex chiefly from female sex workers (Jones *et al.*, 2014). This difference is deep-rooted in wider gender differences. Danna (2014) highlights, the importance of understanding the male and female sexual roles to comprehend the male demand for sexual services, and the need to focus on gender economic imbalances to shed light on the offer of sexual services.

Clearly, sex workers' clients may have sexual relations both with paid and unpaid partners. The epidemiological literature on “paying for sex” uses the terminology “unpaid”

⁸ The negative term “non clients” will occasionally be adopted in the discussion.

⁹ Dworkin (1993: 2), defines sex work as the “use of a woman’s body for sex by a man, he pays money, he does what he wants”. Clearly, in this definition, the purchase of sex by female client from male prostitutes is not considered.

¹⁰ Also, the literature on sex workers' clients has focused mainly on male clients of female prostitution (Sanders *et al.* 2009). However, some degree of participation of women as customers in the sex industry is revealed by some studies centred on females as frequenters of strip clubs (Smith, 2002), customers of sex shops (Malina and Schmidt, 1997, Storr, 2003), users of pornographic material (Comella, 2008) and sex tourists (O’Connell Davidson, 1998; Sanchez Taylor, 2001; Jeffreys, 2003).

Regarding the latter phenomenon, even though academic research has typically studied male sex tourists, recently the literature has shed light on female clients of sex tourism. (O’Connell Davidson, 1998; Sanchez Taylor, 2001; Jeffreys, 2003).

Though the existence of a rare phenomenon of western lesbians engaging in sex tourism (O’Connell Davidson, 1998) the focus of the literature is mainly on heterosexual female sex tourism.

This activity is often described as “romance tourism”. The exchange of sex for money is contextualized in a framework of emotional involvement, courtship and long term relationships. The relationship is characterized by a racialized power of the white privileged woman toward the black disadvantaged men, and the use of the term “romance tourism” is rooted in the double standard under which being a woman the buyer of sex, the phenomenon appears to be more acceptable (Sanchez and Taylor, 2001).

Sanders *et al.* (2009) argued that even though female and male consumption of sexual services differs in many aspects, the commercial sexual relationship is subject to the same race and gender-based dynamics. Female clients of sex tourism rationalized the behaviour as “romantic tourism” (rather than sex work) and sex is typically purchased in exchange for goods (presents, dinners, *etc.*), thus this phenomenon is not fully comprehended in surveys measuring paying for sex as a monetary exchange.

and “paid” partners, to distinguish between clients’ partners who receive a monetary exchange for the sexual performance, and partners who don’t (e.g. the wife, the girlfriend).

1.2. RISKY BEHAVIOURS

The economic and epidemiological literature on sex workers’ clients has linked the concept of risky behaviours with paying for sex. Risky behaviours are a typology of behaviours that may damage the individual undertaking them. De Guzman and Pohlmeier (2014) divide risky behaviours for youths into four classes: (i) self-injurious behaviours (driving-related risks), violence (fighting and aggression), and suicide; (ii) substance abuse (drinking, smoking, drug use and prescription drugs taken improperly/ without a doctor’s prescription); (iii) risky sexual behaviours (e.g. unsafe sex both in terms of STI and birth control); (iv) behaviours related to obesity and an unhealthy diet.

The same set of behaviours can be classed as risky for adults, even though the consequences of the behaviour on the individual may differ according to age and life stage.

Moreover, the degree to which an activity becomes a risky behaviour depends on the frequency of the behaviour or the level of engagement (Chowdry, Kelly and Rasul, 2013).

The work by Della Giusta *et al.* (2009b, 2014) studies the correlation of risky behaviours with paying for sex, to shed light on how social stigma is embedded in the sex “worker – client” relationship.

I use the work of Della Giusta *et al.* (2014) as a starting point for my analysis. The risky behaviours considered by Della Giusta *et al.* (2014) are: smoking, drinking, injected drug use, unsafe sex, and overseas partner acquisition. I concentrate my analysis on the most sensitive ones, in this group of behaviours, i.e.: injected drug use, unsafe sex and overseas partner acquisition.

The injection of drugs without prescription is a risky behaviour for two reasons. Firstly, this behaviour in the presence of needle sharing may lead to the contagion of a Sexually Transmissible Disease (STD); secondly, injected drug use without prescription is a form of substance abuse.

Unsafe sex is defined as having sex without protection for Sexually Transmissible Infections, and the behaviour is considered risky because it may lead to contacting the

disease. The degree of risk in unsafe sex depends on individual behaviour – e.g. frequency of unsafe sex, number of sexual partners – and on the sexual partners’ characteristics – i.e. contracting Sexually Transmissible Infections (STIs).

Overseas partner acquisition is defined as having had a sexual partner while abroad (i.e. outside the UK) in the 5 years prior to the interview. More specifically, the reference population for Natsal-2 are adults living in Britain; among those, the subsample of adults that travelled outside the UK “either for holiday or for work” during the 5 years prior to the interview, is asked about their sexual activity while outside the UK.

The respondent is labelled as having had an overseas partner if he/she have had sex with any people for the first time while in any county outside the UK. This behaviour is classed as risky in the epidemiological literature on sexuality studies not because it leads directly to contracting Sexually Transmissible Infections (STIs), but because it is a proxy of a more sexually risky lifestyle.

Even though the sexual practice is safe, acquiring a new sexual partner while abroad is considered as an indicator of a wider high risk sexual lifestyle that leads to higher risk of sexually transmissible infections (Mercer *et al.*, 2007). For this reason this group is targeted for monitoring the spread of Sexually Transmissible Infections (STIs) (Mercer *et al.*, 2008).

Finally, paying for sex is a risky behaviour in terms of Sexually Transmissible Infection, as clients “remain at greater risk of STI acquisition and onward transmission than men who do not” (Jones *et al.* 2014:1).

1.3. STIGMA

Reporting paying for sex and risky behaviours is influenced by social undesirability bias. More broadly, both paying for sex and engaging in risky behaviours may create stigma. Stigma¹¹ is “a social or individual attribute that is devalued and discredited in a particular social context” (Kusow, 2007:4478)¹². Bruce and Yearly (2006) define stigma as any physical

¹¹ The original meaning of stigma had a positive connotations. In fact, the term stigmata (from which stigma originates) are the marks Jesus Christ acquired on his hands and feet while being crucified. Throughout the Christian era, the reported appearance of stigmata has been seen as a sign of a divine blessing (Bruce and Yearley, 2006).

¹² As the attribute itself does not inherently embed a quality, a stereotype is associated with the attribute through a “language of relationship” (Goffman, 1963). More specifically, As Kusow (2007:4478) reports: “The term

or social attribute which devalues a persons' social identity. Link and Phelan (2001) identify four components of stigma: (i) the distinguishing of individuals by human differences, (ii) the labelling of people with undesirable attributes by members of the dominant cultural group, (iii) the distinction of negatively labelled groups from the non-stigmatized group, (iv) the loss of social status experienced by labelled individuals as a consequence of stigmatization.

Stigmatized attributes can be classed in two different categories: i. attributes that are visible (either immediately or potentially) in social encounters, and ii. attributes that are not clearly or outwardly visible.

The case of sex workers' clients is a stigmatization associated with a behaviour: paying for sex. This behaviour is generally invisible as sex workers clients' may hide it (for example not mentioning it to others), but it may become visible in two types of circumstances: when clients admit to paying for sex, or when they are discovered by someone (e.g. they are seen by someone while approaching a street prostitute, or in the case of online prostitution, when someone accesses the internet chronology or appointment messages). Hiding is one of the strategies adopted by social actors to avoid stigma (Goffman, 1963). Indeed, as described by Goffman (1963) all social actors have stigmatized attributes and adopt strategies to avoid stigmatization. Every individual has traits (or combination of traits) that are not socially normal, thus everyone may be subject to stigmatization (Goffman, 1963). If traits are hidden, the social actor may adopt a number of strategies to protect the information on the stigmatized attribute from being passed to others (Goffman, 1963). Indeed, social actors are not passive in the face of stigma, but instead individuals actively manage the presentation of the self in an effort to "avoid, deflect or transcend stigma" (Fine and Sandstrom, 2006:611).

Thus, the idea of hiding the stigmatized trait is at the core of the sampling and data collection strategies for surveying elusive populations. In fact, as it will be shown in CHAPTER 4, surveys targeting an elusive population elicit a stigmatized trait – the stigmatized attribute is either the focus of the survey or it is part of a screening phase.

stigma refers to a social or individual attribute that is devalued and discredited in a particular social context. As Goffman (1963) noted, however, this definition requires an important qualification, one that defines stigma in terms of "a language of relationship" that can link attributes to particular stereotypes, rather than a priori objectified attributes. The language of relationship between attributes and stereotype is extremely important because an attribute in and on itself, does not carry an inherent quality that makes it credible or dis-credible outside the nature of the stereotype that corresponds to it".

Stigmatized individuals may adopt a number of “information management techniques” to deal with their stigmatized attribute. Firstly, in an attempt called “covering” individuals may conceal signs commonly considered as stigma symbols. Secondly, stigmatized individuals may dissociate and distance themselves from roles, associations and institutions that are stigmatized. Thirdly, individuals may “compartmentalize” their lives in two social worlds, in a small and intimate world the individual reveals his stigmatized attitude, while in the larger group the stigmatized attribute is concealed. Fourthly, stigmatized individuals may embrace the stigmatized attribute confirming the stigmatized attribute (Snow and Anderson, 1987). Surveying individuals with a stigmatized trait is affected by information management techniques adopted to deal with the stigmatized attribute, in particular if the technique adopted is “covering”, “distancing” or “compartmentalizing”.

Importantly, attributes that are stigmatized in some social contexts, might not be stigmatized in others (Kusow, 2007). Indeed, the distinction between stigmatized and not stigmatized attributes is not fixed over time and/or across cultures, and it is a function of social standards (Kusow, 2006; Fine and Sandstrom, 2006) Regarding the concept of stigma in the United States in early 2000, Kusow (2007) argues that as a result of the changes in the political and social climate (including multiculturalism) the division of society into stigmatized and “not-stigmatized” individuals is under revision. This is a key concept in understanding how stigmatization on paying for sex varies with changes in the regulation of sex work and with the change of attitudes towards prostitution (see CHAPTER 2 and 3). Moreover, the notion that policies influence stigmatization is embedded in the idea that whether a group is considered stigmatized depends on the power possessed within the society of the community (Fine and Sandstrom, 2006), with groups having relatively less power being more likely to be stigmatized by dominant groups, and with the stigmatizing definitions imposed upon them more likely to stick (Fine and Sandstrom, 2006).

Della Giusta and her colleagues (2006, 2009a, 2009b, and 2014), argue that social stigma is embedded in the nature of the transaction of sex workers and clients¹³. The authors define stigma as a “loss of reputation that affects social standing” for clients. Using as a

¹³ Stigma is attached to sex workers, and is one of the barriers to quitting the sex market and entering other professions or to entering the marriage market. However, Della Giusta *et al.* (2006, 2009a, 2009b, 2014) argue that social stigma characterizes not only the sex worker but also the client.

starting point the economic and sociological literature (Granovetter, 1985; Bordieu 1986; Coleman, 1988; Manski, 2000), the authors identify two different mechanisms through which reputation is relevant to economic agents. Firstly, economic agents are social beings who derive utility from the positive evaluation of others in their social group (or groups) (Casson, 1991); secondly, economic agents are aware of costs that social sanctions impose on their material progress (Akerlof, 1980; Arnott and Stiglitz, 1991). Thus, reputation has an intrinsic value – i.e. it is desired per se as a provider of utility – and an instrumental value –i.e. it can be used to access other earning opportunities (Dalla Giuta *et al.*, 2014). In this conceptual framework, stigma is defined as a loss of reputation from participating in the sex market, which for clients means buying sexual services. Also engaging in risky behaviours (such as injected drug use, unsafe sex, overseas partners acquisition, smoking and alcohol consumption) can be stigmatized and lead to loss in reputation. Thus, the authors test the correlation of paying for sex with risky behaviours, arguing that clients are less likely to be risk adverse.

Given the stigmatization of paying for sex and of risky behaviours, I argue that reporting these concepts may be influenced by social desirability bias. More specifically, while answering a survey question on risky behaviours or paying for sex, the respondent may decide to either misreport or not answer the survey question to avoid revealing a stigmatized attribute. The decision to skip the survey question leads to self selection bias, while the decision to misreport leads to a measurement error bias.

1.4. SELF SELECTION AND MEASUREMENT ERROR

The correlation of paying for sex and risky behaviours may be influenced by self selection bias and measurement error. These two sources of bias are particularly relevant in this context as they may be due, among other things, by the social desirability of the answers in questions on paying for sex and risky behaviours. This social desirability, may, ultimately, depend on stigma. As self selection bias and measurement error are two key concepts in this work, I here provide a definition.

In survey methodology, self selection bias is defined as a form of bias that arises when: 1. sample members are allowed to decide for themselves whether to participate or not in a survey 2. not all sample members participate in a survey, 3. the propensity to participate

is correlated with the variable of interest for the researcher (Olsen, 2008). Participation can be interpreted also as answering the survey question, thus self selection results not only from unit non response but also from item non response.

In the case under study, a self selection problem arises as sample members decide whether or not to answer the survey question, but the analysis is performed only on respondents (those that responded to the survey question, regardless of whether they reported or not reported the truth). Thus the analysis is performed on a self selection of participants. In the case under analysis, this selection is mainly composed of: those who didn't engage in the sensitive behaviour, those who are willing to report engaging in the sensitive behaviour and those who engaged in the sensitive behaviour and misreport it; the selection is correlated with the "willingness to report a socially (un)desirable behaviour"¹⁴.

Measurement error is defined in survey methodology as the "departure from the value of measurement as applied to a sample unit and the value provided" (Groves *et al.*, 2004: 40). More broadly, measurement means the assignment of a symbol (e.g. a number) to an object according to a rule (Miller, 2008) and "error" in measurement means "any deviation of the assigned symbol from the "true" value that should be designated to the object" (Miller, 2008: 458). One source of measurement error is misreporting. Misreporting means "the deliberate or non-deliberate reporting of inaccurate or untruthful answers to survey questions" (Dew, 2008: 467). Deliberate misreporting is particularly severe in sensitive topics (as in this case paying for sex and risky behaviours) as the respondent may not reveal the sensitive behaviour to adhere to social norms¹⁵. However, misreporting may happen also unintentionally. In fact, respondents may misreport both sensitive and non sensitive answers due to failure in cognitive processes, for example in: comprehension of the survey question/response category, retrieval of memory, error in judgment about the response accuracy/appropriateness (Dew, 2008).

In the case under study, among those that answered the sensitive questions, some might misreport the behaviour. In particular, due to social desirability, some respondents might intentionally report that they didn't pay for sex although they did. Moreover, some

¹⁴ This selection arises both for unit non response and item non response, however this work focuses on item non response. A more detailed description of different types of non response is given in CHAPTER 5.

¹⁵ These concepts will be elaborated in more detail with the definition of social desirability bias in CHAPTER 5.

respondents may unintentionally misreport (both not paying for sex even though they did, or paying for sex when they did not). Similarly, misreporting may apply to risky behaviours due to socially desirable bias. While, I do not correct for measurement error, I attempt to reduce self-selection error by imputing values for missing data, and replicate previous results from the literature on the larger sample.

CHAPTER 2 – THE REGULATION OF SEX WORK

Different views or interpretations of sex work have guided the legislation that regulates sex work in Europe. These regulations that have changed throughout the centuries and across countries, influence attitudes to prostitution. As it will be argued in CHAPTER 3, attitudes influence the propensity to report payment for sex, as lower social acceptance increases under-reporting. Thus, understanding the legislative framework that regulates prostitution is a prerequisite for understanding the reporting of sex purchase: this chapter addresses precisely this issue.

Within the European Union, national policies on prostitution vary widely and a common norm does not exist (Di Nicola, 2006; Picchi, 2011; Crowhurst *et al.*, 2012). A general consensus of policies within the European Community is needed (Picchi, 2011)¹⁶. In fact, while in some European countries prostitution is legal and regulated – i.e. The Netherlands, Germany, Austria, Switzerland, Greece, Hungary and Latvia – in others, prostitution is illegal e.g. Sweden, Finland, Ireland and many areas of Eastern Europe, or again legal but not regulated, as in the majority of Central European states (Picchi, 2011). Thus, it is clear that “different European countries have arrived at different conclusions” regarding the regulation of sex work (Kourmanen, 2011:248).

¹⁶ Not only at the legislative level, but also on the repression of human trafficking a common effort has been solicited. In fact, the International Organization for Migration (2000) underlined the necessity for the creation, at the European level, of a centralized database enabling the cross-national exchange of information. Indeed, different regulations do not only influence the demand of sexual services, but also give opportunities to the criminal behaviour connected with human trafficking to flourish (Di Nicola, 2006).

The status of prostitution in the United Kingdom is contradictory. In fact, street “sex work” is illegal but indoor prostitution is legal in limited circumstances (Danna, 2004). Moreover, to protect the sex worker from exploitation, selling and purchasing sex is legal, but some activities that encourage prostitution (i.e. aiding, induction, recruitment, exploitation *etc.*) are prohibited (Picchi, 2011).

2.1 FROM DIFFERENT VIEWS ON PROSTITUTION TO DIFFERENT LEGAL MODELS

Different legislative models originate from different attitudes to prostitution. In this chapter we will first define these different view-points and then move on to a description of the different models. As to the theoretical aspect, Danna (2004) puts forward four different interpretations of prostitution: social plague, 2. Harmful activity for prostitutes, 3. Resource and 4. Work (see TABLE 2.1). These are divided into two categories: a. the positive or negative attitude to the phenomenon, and b. the repercussions on the individual and on society.

The view of prostitution as a “social plague” originates in a distant past (Danna, 2014). This category, as theorized by Danna (2001a, 2014), means that sex work is considered a social plague because it encourages extramarital sex, the spread of sexually transmissible infections (STIs), harm to minors exposed to the sex market, harm for the community, and degradation of the public spaces where the sex exchange takes place. The roots of considering sex work as a “social plague” are to be found in the Christian tradition that considers sex works as damaging society, undermining the sacred institute of marriage (Danna, 2001). In this view, since males would recur to prostitution anyway, the sex market is an inevitable social plague, that should be circumscribed (Danna, 2001). In contrast with the extremists train, Agostino and Tommaso recognise brothel’s social utility, as a safeguard for non-prostituted women (Danna, 2001) as extramarital sex was confined to ad-hoc places. A even more extreme interpretation holds for XVI century France were prostitutes are said to have the social and moral responsibility to defend public order (Rossiaud, 1984).

Sex workers “fight” against extramarital sex, firstly because they are obliged to report those who do not respect the marital bond and secondly because even if they fail to report the infidelity, the purchase of sex constitutes a minor harm compared with more scandalous

behavior (Rossiaud, 1984). Finally, sex workers “should take care of foreigners by toning down their aggressiveness and keeping them away from more serious crimes” (Rossiaud 1984: 59 – personal translation). In contrast with the original interpretation, the XX century view of prostitution as a “social plague” does not stem from religious belief or the attempt to protect the institution of marriage; the stress is on public morality and social order. Arguments underlining sex workers’ harm to society are the spread of Sexually Transmissible Diseases, harm to the community due to disturbance of the public peace and corruption of the young who are exposed to the sex market (Danna, 2001b). Thus, the view of sex as a “social plague” incorporates not only age-old arguments but also more recent ones which consider the selling of sex as harmful to women in general when the female body becomes the object of an economic transaction (Danna, 2014). Policies associated with this view are *prohibitionism* and *regulationism* as will be shown in the next paragraph.

The second view identified by Danna (2001a) sees sex work as “individual damage”. Firstly, the damage can be due to a loss of personal dignity and moral degradation. Secondly it can stem from the loss of physical and mental health. In fact, sex workers suffer from mental health issues caused by the attempt to separate physical sensations and emotional involvement. According to this view the above issues are seen as encouragement to resort to drugs, alcohol and psychiatric drugs. Thirdly, damage to the individual can be caused by physical harm. Finally, sex work is seen as damage to the individual in cases of human trafficking. While in the “social plague” view both society and clients were harmed by the sex worker, in the “individual damage” approach the sex worker is harmed, and (s)he is considered a victim.

Moreover, the third view identified by Danna (2001, 2014) sees sex work as a “resource”, which can be a legitimate personal choice (Danna, 2014). Sex work is seen as “sexual autodetermination” (Danna, 2001:21). This interpretation is coherent with the end of sex worker stigmatization. In this context, Goldman (1910) considered the social and economic inferiority of women compared to men as the cause of prostitution. Sex work is seen as a way of gaining independence and a higher social status (Corso and Landi, 1991). While in the vision of sex work as a “social plague” the sex worker was stigmatized; according to this view there is no stigmatization of sex workers, but victimization (as in the view of sex work as individual damage). In fact, the decision to offer sex is not entirely free,

because it stems from a lack of alternatives. This is why, in the view of sex work as a “resource”, prostitution is not considered a “job”, but remains an informal activity.

Finally, another way of interpreting sex work is to consider it a “job”. From this point of view, all obstacles to the acknowledgement of prostitution as work should be removed. As a matter of fact, the market – that should be regulated in the same way as other legal markets – should respect standards of safety, safeguarding both the seller and the buyer of sexual services. Even though the legitimacy to sell sex is asserted, the contraposition of prostitution as a free choice and prostitution as coercion, is considered irrelevant when prostitution is seen as a “job” (Danna, 2001b). Since every kind of work implies necessity, the category of free choice can be applied to sex work as to any other kind of “job”; indeed many other professions are not taken up as a free choice (Danna, 2001). Danna (2001) argues that “since not every poor chose prostitution (nor every sex worker comes from a disadvantaged background)” there is no point in questioning whether the motivation to sell sex is understandable or legitimate (Danna, 2001:26)¹⁷. According to this view prostitution should be considered an economic activity, and both sex workers and customers should be protected as in any other service market.

¹⁷ Without going in depth in this topic, I will just propose here that this argument seems fallacious: firstly, society should provide equality of opportunities, avoiding that its citizens engage in employment opportunities by “necessary”, secondly, this argument doesn’t take into account the complexity of the search and matching of demand and supply of every labour market.

TABLE 2.1: Interpretation of prostitution

	At the individual level	At the social level
		Social plague
Negative consideration	<p>Harmful activity for prostitutes</p> <p>Prostitution is seen as harmful for the prostitute. Sex work is seen as leading to moral degradation, loss of dignity, physical and psychological harm.</p>	<p>Prostitution is seen as a social plague, because:</p> <ul style="list-style-type: none"> - sex out of the wedlock is not accepted, - prostitution may increase the spread of sexual transmissible diseases - sex work may disturb the public peace, - the commercialization of bodies is not acceptable. - <i>etc.</i>
	Resource	
Positive consideration	<p>Every person should have the right to have legitimate recourse to prostitution. Sex work is considered as a mean to achieve economic security, independence and emancipation. The choice is supposed to be driven by individual mistakes (debts or loss of opportunities for other employment) or through social inequality. The use of paid sex should not be regulated or taxed: only sex workers can profit from prostitution. Anyone else including the state – cannot make a monetary profit from sex work.</p>	Work
		<p>All obstacles to the full recognition of prostitution as an economic activity should be considered problematic. Both the sex worker and the customer should be protected as in any other working activity.</p>

Source: Danna (2001) and Matthews (2008).

Moreover, a whole series of policies derive from these different ways of considering prostitution: prohibitionist, regulationism, abolitionism, client criminalization, neo-regulationism and decriminalization (Danna, 2014, Matthews, 2008) (See TABLE 2.3)

TABLE 2.2: Approaches toward prostitution

		Moral condemn of prostitution			
		Yes			No
		Moral condemn of prostitutes			
		Yes	No		
Legal possibility of prostituting	Yes	Regulationism	Abolitionism	Neo-regulationism and decriminalization	
	No	Prohibitionism	Neo Prohibitionism Clients' criminalization	<i>Logically impossible</i>	

Source: Danna (2011) and Di Nicola (2006)

2.2 THE CLASSIFICATION OF PROSTITUTION POLICIES

The three principal legislation models of prostitution has been *protectionism*, *regulationism*, and *abolitionism* (Danna, 2001b). Subsequently the three classical models are reflected in new legislation models: *neo-regulationism*, *neo-prohibitionism* (*alias* criminalization of the client) and *decriminalization* (Danna, 2006b, Verdolini 2011). Indeed, these models were dissociating themselves both from the classical regulationism models – that were considered discriminatory towards sex workers – as well as abolitionist models (Danna, 2006a).

2.2.1 PROHIBITIONISM

The prohibitionist model is founded on the Christian aim to limit extramarital sex which undermines the institution of marriage (Danna, 2001a). Thus sex workers were condemned for “tempting” the male partner (Danna, 2001a). In this model both indoor and outdoor prostitution are forbidden and sex workers are subjected to repressive regulation (Di Nicola, 2006). Nowadays the model is mainly adopted in the United States, where in most states both sex workers and clients can be prosecuted (Matthews, 2008)^{18 19}.

¹⁸ Matthews (2008) includes also Sweden in the list of abolitionist states, though recognizing the differences of the Swedish case compared to other abolitionist countries. Here we opted to follow the approach adopted by Danna (2001a) and we will treat separately the Swedish case of the criminalization of the client.

¹⁹ The state of Nevada constitutes an exception as here it is lawful to run licensed brothels, but prostitution remains illegal outside the establishments (Matthews,2008).

2.2.2 REGULATIONISM

Regulationism was introduced in the mid XIX century, and the main theorists of this approach are Acton (1857) in Britain and Parent-Duchet (1836) in France. More specifically, the approach arose to counterbalance the prohibitionist norms, which had been ineffective in eradicating the sex purchase, and the spread of sexually transmissible infections (STI). The *regulationism* framework has the aim of controlling the exercise, abuses and disorders associated with prostitution (Matthews, 2008) Thus sex work is not considered illegal.

Regulationism is based on the claim that “prostitution can be regulated and administered in such a way that it is possible to reduce its negative associations (Matthews, 2008:97). As Matthews argued (2008: 98) “while not endorsing or promoting prostitution it [regulationism] formally remains agnostic if not ambivalent about its desirability and acceptability”. Within this framework, even if prostitution is not illegal (Matthews, 2008), in reality norms were aimed at eradicating street prostitution, circumventing indoor prostitution in brothels confining it to certain areas, in order to manage the undesirable consequences of sex work (Danna, 2001a). This regulation aims at controlling and regulating sex work, an attempting to reduce harm where harm is intended as the spread of sexually transmissible infections (STIs) to male clients and “non sex worker” women (Danna, 2006b). In this legislative model, sex workers were deprived of civil rights (e.g. the right of movement, or the right of refusing health care) and brothels were strictly controlled (Danna, 2001a).

2.2.3 ABOLITIONISM

The abolition model is a legislative model of prostitution that has liberalized sex work but condemned the exploitation of prostitution (e.g. human trafficking and the management of prostitution) (Danna, 2001b). This model originated from the abolitionist movement that was developed in the XIX century in Britain and led by Nosophine Butler.

This model has its origin in the convergence of different ideologies (Danna, 2001b). On the one hand, the liberal components of the debate defined prostitution as a private act – a contract for the sale of a service – that should not be condemned (Danna, 2001b). On the other hand, first-wave feminists opposed the depriving of prostitutes of civil rights (Danna, 2001b). And, finally, protestant evangelists were against the government controlling and earning from prostitution through taxes, as this was compared to exploitation (Danna, 2001b).

The abolitionist model assented that sex work should not be prohibited by law (Danna, 2001b), thus sex workers should not be criminalized: sex workers' role shifts from being considered that of a criminal to that of a victim. As a consequence, third party activities which contribute to the organization of sex work were criminalized as forms of exploitation (Danna, 2001b). For example, renting locations where sex work took place was considered a form of exploitation of prostitution even when the rent was in line with market prices (Danna, 2006). Moreover, the partners and/or adult offspring living with a sex worker, without being able to justify the living standard with adequate income, have been criminalized in some countries (Danna, 2006). Thus, even though neither outdoor nor indoor sex work are prohibited (Di Nicola, 2006), in fact, in most abolitionists countries, the only possibility for exercising indoor sex work legally, is to own the location of the workplace and not advertise services. Finally, it should be noticed that the abolitionist model, even though it liberalizes the sale of sexual performance, morally condemns prostitution.

2.2.4 NEO REGULATIONISM

In the Neo-regulationism model²⁰ sex work is a legal activity regulated by the state. While in the regulationism the regulation of prostitution was aimed to limit and control a social plague, the neoregulationism version aims establishing non discriminatory norms to sex work, which is recognized as a legal activity (Vieille, 1998). Legalization takes a pragmatic approach and organizes sex workers in order to obtain the greater benefit of both clients, sex workers and society in general (Matthews, 2008). Indoor prostitution is usually permitted²¹, and, in some cases, street prostitution is zoned in some specific areas, i.e. "toleration zones" (Danna 2006b, Matthews, 2008). The model offers the promise of safeguarding sex workers' rights and providing a more secure working environment for sex workers (Matthews, 2008), which are in some cases required to do medical controls. This regulation moves in the direction, craved by some movements for sex workers' rights, of the recognition of prostitution as a "normal job" (Danna, 2006b)²².

²⁰ Matthews (2008) define this model as "legalisation", while, for the sake of coherence, here we will opt for the terminology adopted by Danna (2001, 2006b).

²¹ Matthews (2008) clarify that is usually takes the form of state approved brothels.

²² Di Tommaso (2012) proposes a different distinction, comparing the interpretations of sex work as a as a "work" and prostitution as "exploitation" – in abolitionist perspective. The author use the conceptualization by Radin (1996), that theorize prostitution as, on one side, a *commodification* – using body as a commodity – on the

This movement is aimed at extending the validity in the sex trade of the normal penal laws for business – e.g. laws against fraud, child abuse, rape and discrimination (Danna, 2006b). This model has been adopted by the Netherlands and by some states in Australia.

2.2.5 DECRIMINALIZATION

The *decriminalization* model implies that sex work cannot be prosecuted legally, nor is it to be condemned from a moral point of view (Verdolini, 2012). However – in contrast with the neoregulationism model – sex work is not considered a “normal job”, but a “last resort”, the ultimate resource that women can use to escape from poverty or gain social mobility (Verdolini, 2012; Danna, 2006b). Decriminalization has been endorsed by two main groups: some parts of the feminist movement and liberals/libertarians (Matthews, 2008). The feminist movement in 1970s-1980s argued that laws aimed at female sex workers were discriminatory, unjust and often counterproductive (Matthews, 2008). One reason for viewing legislation as discriminatory is that, prior to 1970s 1980s the legislation penalized mainly sex workers (which were and are typically female) while ignoring the client (Matthews, 2008); thus, the XIX century legislation criminalizing ‘soliciting for the purpose of prostitution’ has been constructed as a gender offence” (Matthews, 2008:101)²³. Liberals and libertarians argued that sex work is not the business of the law, and that free market principles should be allowed to operate in the sex industry (Matthews, 2008). Liberals theorize that the state should not interfere in the sex exchange, as this pertains to the private sphere, which should be separated from the public sphere (Danna, 2006b). The state should not impose regulations to limit or stigmatize this activity, nor impose taxes – since sex work is the last resort for women, taxes would result in an exploitation of sex workers (Teodori, 1986). Thus, as a consequence of abolitionist heritage, sex work is not considered a “job” (Danna, 2006b).

As in neoregulationism, some forms of decriminalization imply eradicating any explicit reference to sex work in legislation; thus, any crime connected to prostitution might

other side the body is seen as a “non-commodity”. For Di Tommaso (2012) while some policies aimed at addressing prostitution are aimed at eradicating the commodification of bodies, as prohibitionists regulation, may worsen sex workers’ conditions and risks.

²³ Matthews (2008) notices that this criminalization was interpreting sex work as supply driven. Whereas, the chronologically subsequent Scandinavian model of criminalizing the clients interpret the market as demand led. While policy makers and academics endorse one or the other thesis, there is no empirical evidence on which of the two applies to any sex market.

be punished with normal penal legislation (Danna, 2006b). The rationale is that no negative connotation is attributed to prostitution itself (Danna, 2006b). Thus, rather than having a specific regulation for prostitution, general laws against rape, coercion, *etc.* are applied to sex work (Danna, 2006).

2.2.6 NEO PROHIBITIONISM ALIAS CLIENTS' CRIMINALIZATION

Sweden was the first country in the world to introduce a law prohibiting, not the sale but the purchase of sex (Serughetti, 2013). Indeed, the sex Purchase Act – i.e. the Swedish law that prohibits the purchase of sex – came into force on 1st January 1999 (Kousmanen, 2011). According to this law the sale of sex remains legal, and only the purchase (or attempt to purchase) is prohibited, with conviction up to 6 months (Matthews, 2008). The law was introduced with the interpretation that sex work is harmful to sex workers as well as society at large by being a form of male violence against women. This act “claimed that if one wants to achieve a gender-equal society, then prostitution must cease to exist (...) also because all women in society are harmed as long as men think they can “buy women’s bodies” (Dodillet and Ostergren, 2011: 2-3)²⁴.

According to this view, men paying for sex are seen as agents of the oppression of women, and this is seen as compatible with the goals of gender equality (Serughetti, 2013)²⁵. The rationale of the norm that punishes the purchase of sex, is to be found in the interpretation of sex work as an expression of gender inequality. The sex worker – who is often a woman – was seen as the “weak” party (Kourmanen, 2011). As Ekberg (2004:1190) argues, comparing the Swedish model with other legal approaches to prostitution: “It is understood that the legalization of prostitution will inevitably normalize an extreme form of sexual discrimination and violence and strengthen male domination of all female human beings. Legalization of prostitution activities means that the state imposes regulations with which they can control one class of women as prostituted”.

In the debate preceding the implementation of the Swedish prostitution policy, pro-reform analysts argued that “the most important consequence of the changes was the norm

²⁴ For completeness, it should be noticed that the two authors (in this as well as in other sources) criticize the Swedish legislation on sex work.

²⁵ As Serughetti (2013) interestingly argues, the desire of eradicating exploitation linked with sex work has overshadow the nuances of the sex market, which, she argues, is composed of free choice and exploitation.

building character of the legislation in the effects it could have on public opinion and attitudes towards prostitution” (Dodillet, 2009 in Kuosmanen, 2010: 3).

Indeed, as it will be analyzed more in depth in CHAPTER 3 this legislation has been said to have changed attitudes towards prostitution in Sweden. Indeed, Braham (2010) and Jakobsson and Kotsadam (2011) have shown how prostitution policies have influenced attitudes toward sex work. It is exactly this change in attitude that might have decreased the reporting of paid sex, since this has become less socially desirable²⁶. The evaluation of prostitution policies is beyond the scope of this thesis²⁷, however, I am pointing out that a change in attitudes might have reduced paid sex and may, at the same time have reduced self-reported paid sex in official statistics: disentangling these two effects remains a challenge, which, to the best of my knowledge has not been emphasized sufficiently so far.

The introduction of this legislation constituted a turn in western public discourse on sex work (Serughetti, 2013). Subsequently, legislation aimed at the criminalization of the client has emerged in other countries with the purpose of reducing human trafficking for sexual exploitation.

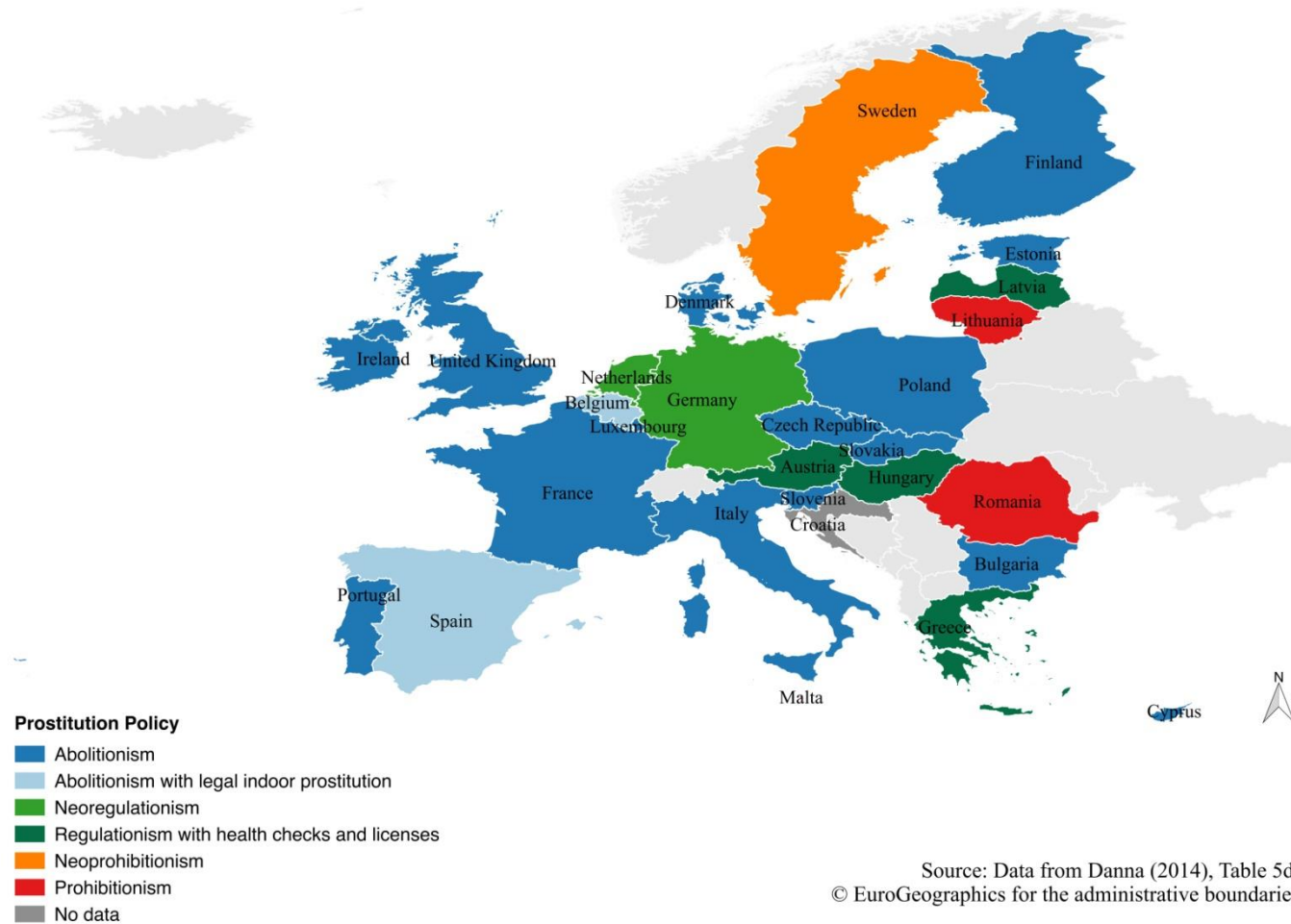
²⁶ Furthermore, during the debate preceding the introduction of the norm, some authors argued that rather than reducing sex work, this legislation would drive sex work underground (Dodillet, 2009).

²⁷ Many studies propose hints on which legislative approach is more effective to either reduce the harm or eradicate prostitution, but most of them are not empirical or rely on fragmented data. An empirical model with data from Italy is proposed by Immordino and Russo (2012). The authors propose an economic theoretical model under three different alternative policies: prohibitionist, regulationism, and “laissez-faire”. They conclude that in a prohibitionist regime, where buying sex is illegal and selling sex is legal, may reduce the quantity of paid sex exchanged in the economy compared with a regime where selling is illegal, while buying is legal, but this latter will be more effective in reducing the harm faced by the sex worker. A regulated system “that prevents some infected individuals from joining the legal market reduces the risk and is therefore associated with a sharp increase in quantity” (Immordino and Russo, 2012). Thus, a prohibitionism is preferable if the public policy goal is to minimize quantity, while regulationism is more effective to minimize harm (Immordino and Russo, 2012).

2.3 THE SITUATION BY COUNTRY

As Matthews (2008) points out, firstly, while different countries can be labeled as adhering to specific models (e.g. regulationism, abolitionism) in actual fact, every country operates with a mix of different models. Secondly, prostitution is normally regulated in different locations at the federal, provincial and municipal level and these local differences might allow for the coexistence of different models within the same country (Matthews, 2008).

FIGURE 2.1: The regulation of prostitution in Europe



Source: Data from Danna (2014), TABLE 5d.

2.4 PROSTITUTION POLICIES IN BRITAIN FROM 1950S ONWARDS

The 1950s were a crucial decade for the regulation of sexuality and commercial sexual interactions in Britain (Brooks-Gordon and Gelthrope, 2003): indeed, it is in these years that a common legislation emerged to control and constrain prostitution (Phoenix and Oerton, 2005): the family was reinstated as the privileged seat of sexual normality (Weeks, 2007) and street prostitution was seen as leading to family breakdown (Hubbard, 2006).

In the mid 50s, the Report of the Department Committee on Homosexual Offences and Prostitution – also known as the Wolfenden report (Wolfenden, 1957) – stressed the issue of the visibility of prostitution. In fact, the report argues that sex workers, putting themselves on exhibition by their continual presence, “more habitually and openly” than clients, were affronting “the sense of decency of the ordinary citizen” (Wolfenden, 1957:14). The resulting Street Offenders Act (1959) made it illegal for sex workers to loiter or solicit prostitution in public places, including the street (Home Office, 1959; S.1.1.). Some authors (Self, 2003; Linnane, 2003) argued that the Street Offences Act, increasing fines and imprisonment, changed the sex market from street sex to indoor sex work.

An interesting aspect of the Wolfenden report is the assertion that the state should not regulate private behaviour, as only the public realm can be subject to private control (Weeks, 2007) and men who pay for sex are absent from the legislation of the Sexual Offences Act 1956 (Sanders, 2005).

From 1972 clients were prevented from kerb-crawling²⁸ by local authorities under the s222 of the Local Government Act 1972 (Kingston, 2014), but the law rarely enforced (Brooks-Gordon and Gelthorpe, 2003). It was only in the themed 1980s with The Sexual Offences Act 1985 that kerb-crawling became an offence. Some authors (Farley, 2001; Kingston, 2014) argue that, as a consequence of this regulation, indoor venues came to flourish.

A revision of the whole set of prostitution policies in Britain was undertaken in the late 1990s with the rise of the New Labour government (Kingston, 2014). The review of

²⁸ A kerb-crawler is defined, in the subsequent Sexual Offences Act 1985 as “someone who solicits a women for the purposes of prostitution from or near a motor vehicle, persistently (...) or in such a manner likely to cause annoyance to the woman solicited, or nuisance to other person in the neighbourhood (s.1), or, in a street or public place persistently solicits a woman for the purpose of prostitution (s.2).” (Home Office, 1985).

prostitution policies started with the document *Setting the Boundaries* (Home Office, 2000) published in 2000, and subsequently with the consultation paper *Paying the Price* (Home Office, 2004) which, finally, led to the proposal: *A Coordinated Prostitution Strategy* (Home Office, 2006).

The consultation paper *Paying the Price* caused a shift in the official discourse on paying for sex (Kingston, 2014): sex workers rather than being perceived as a problem are considered victims, while men who pay for sex, and, more specifically, men who pay for sex in the street were now seen as the problem (Kingston, 2014). Clients of street sex workers are here defined as men who “harass women” and “fuel exploitation and problematic drug use” (Home Office, 2004: I-97). Kingston (2010) argues that these comments appear biased and lacking in any sound evidence.

One of the aims of the *Coordinated Prostitution Strategy* was tackling demand for sexual services by eradicating street prostitution and deterring clients (Home Office, 2006). The Home Office calls for a strategy to reduce demand, “taking every opportunity to reduce the opportunity for a sex market to flourish” (Home Office, 2006:13).

Finally, a further review on *Tackling Demand For Prostitution* started in early 2008, by the Home Office. The review includes two visits, one to Sweden (as an example of the model of clients’ criminalization) and one to the Netherlands (as an example of a regulated regime). The recommendations of the report included: firstly, a liability offence for paying for sex with someone who is controlled for another person’s gain; secondly, an awareness raising campaign among sex workers’ clients on sex trafficking; thirdly, the amendment of the requirement of persistence for the offence of kerb-crawling – thus allowing prosecution for first time offenders; fourthly, the implementation of a second anti-kerb-crawling campaign; enforcement of police powers and encouragement of multi-agency partnerships. These recommendations informed the subsequent Policing and Crime Act 2009; buying sex from someone who has been subjected to force, deception or threats through s53a became an offence (Home Office, 2009), but paying for sex was not fully criminalized, as in the Swedish model. Another change of the norm that concerns customers is that kerb-crawlers do not need to be persistent to be arrested.

To sum up, in Britain in the XXI century the focus of policies has shifted from the sex worker to the client. Policies that criminalize clients increase stigma faced by clients (Di

Tommaso, 2012); according to Di Tommaso (2012) this increased stigma should decrease the clients' propensity to pay for sex. And thus, the amount of sex exchanged in the economy – as well as its price – should decrease (Di Tommaso, 2012)²⁹. However, an increase of clients' stigmatization decreases social acceptance of paid sex and increases social undesirability, posing stronger challenges in collected self reported data on paying for sex.

2.5 CONCLUSION

Policies may influence the reporting behaviour of paying for sex. In fact, if policies move toward the criminalization of clients, it is also less socially desirable for a client to declare the purchase of sex, as this becomes an illegal activity. As a matter of fact, it is hard to disentangle whether policies have reduced sex purchase – and consequently increasing misreporting and/or under-reporting.

The use of administrative data to solve this challenge, brings up other issues such as comparing *pre* and *post* reform figures, which might not be appropriate, since changes in policy might alter the nature of the data. For example, in prohibitionist policies, as well as in policies aimed at the criminalization of clients, an example of administrative data can be collected from the records of registered sex workers, fiscal records, or data from sex workers' unions. The different nature of the data undermines the possibility of sound comparison in order to establish correlations or causation.

²⁹ In addition to this, Della Giusta *et al.* (2009) include the concept of “stigma” in their economic analysis of the sex market.

CHAPTER 3 – ATTITUDES TOWARD SEX WORK, CLIENTS’ STIGMATIZATION AND REPORTING PAYING FOR SEX

As seen in CHAPTER 2, sex work regulation differs across nations. In this chapter I focus on how attitudes³⁰ toward sex work also differ in different countries and on the relationships between attitudes and policies. More specifically, attitudes toward prostitution are likely to both influence policies (Immordino and Russo, 2015a; Jakobsson and Kotsadam, 2009, 2011; Levin and Peled, 2011; Cao and Maurige, 2013) and be influenced by policies (Immordino and Russo, 2015a; Jakobsson and Kotsadam, 2009, 2011). Also, attitudes toward prostitution may influence the elusiveness of sex workers’ clients. In fact, attitudes may influence not only the demand and supply of paid sex (Jakobsson and Kotsadam, 2009, 2011) but also the reporting of participation in the sex market: i.e. paying for sex or being a sex worker.

3.1 STIGMA, ATTITUDES TOWARD SEX WORK AND THE PARTICIPATION IN THE SEX MARKET

The two actors of the sex market, clients and sex workers, are stigmatized³¹ (Della Giusta *et al.*, 2008, 2009b, Immordino and Russo, 2015a, 2015b). The level of social stigma depends on the social context (Della Giusta, Di Tommaso and Strøm, 2009a; Immordino and

³⁰ In this context attitudes are defined as settled ways of thinking or feeling about something (Oxford dictionary).

³¹ As specified in the introduction stigma is defined as “a social or individual attribute that is devalued and discredited in a particular social context” (Kusow, 2007:4478).

Russo 2015a, 2015b) and it is influenced by policies regulating prostitution (Immordino and Russo 2015a, 2015b). Prostitution policies influence stigma, with the highest stigma in countries where clients are criminalized. The mechanism through which policies influence stigma is attitudes.

Attitudes have been defined here as settled ways of thinking or feeling about something and stigma is defined as “a social or individual attribute that is devalued and discredited in a particular social context” (Kusow, 2007:4478). The extent to which an attribute is stigmatized in a social context depends on how that attribute is thought of and/or felt in that context; thus, the level of stigmatization depends on the attitudes towards the attribute.

Jakobsson and Kotsadam (2009, 2011) describe the relationship between attitudes and stigma in the market of paid sex as a causal relationship where attitudes influence stigmatization; negative attitudes increase stigma and decrease both demand and supply of paid sex (Jakobsson and Kotsadam, 2009, 2011).

Given the existing relationship between these two concepts, the literature has used survey data on attitudes toward prostitution (e.g. data from the word values survey) as a proxy for stigma in studying sex work (for example, see Immordino and Russo, 2015a).

Both demand and supply for paid sex are influenced by stigma (Della Giusta, Di Tommaso and Strøm, 2009). As prostitution policies and attitudes toward sex work differ across nations, the degree of stigmatization of sex work leads to different market equilibrium in different countries (Della Giusta, Di Tommaso and Strøm, 2009). Della Giusta *et al.* (2009) model stigma as a reputational loss and argue that both sex workers and clients may take into account the potential reputational loss from participating in the sex market, when deciding whether to buy/sell sex. Their model is described in detail in the next section.

3.2 EVIDENCE FROM DELLA GIUSTA AND HER COLLEAGUES (2014) ON STIGMA FROM PAYING FOR SEX

Stigma, has been incorporated in the economic analysis of the sex market by Moffatt and Peters (2004), as a barrier faced by sex workers in entering other professions. However, to the best of my knowledge, Della Giusta, Di Tommaso and Strøm (2006, 2009b) are the first

to derive an economic model that includes stigma as not only affecting sex workers, but which is also embedded in the sex worker–client relationship.

As anticipated in the introductory definition of concepts, stigma is modelled as the loss of reputation from participating in the sex market (Della Giusta *et al.*, 2006, 2009b). As people care about their social standing, they take into consideration how their actions influence it (Della Giusta *et al.*, 2006, 2009b); this idea is also suggested by the economic sociology literature on social capital (Granovetter 1985; Bordieu 1986; Coleman 1988; Putnam 1993; Manski 2000). Reputation matters to economic agents, as: 1. social beings derive utility from a positive evaluation that others (in their social group) attribute to them (Casson 1991); 2. social beings are aware that social sanctions may impose costs on their material progress (Akerlof 1980; Arnott and Stiglitz 1991). As a matter of fact, reputation has an intrinsic value (i.e. it is desired *per se*, and provides utility) and an instrumental value – i.e. it can be used to access other earning opportunities (Della Giusta *et al.*, 2006: 2009b).

This reasoning does not apply to the decision to pay for sex only but also to the decision to reporting (or not) paying for sex; and, in general, socially undesirable behaviours. Caring about their social standing, sex workers' clients may avoid revealing their sex purchase in a survey, if they believe this may affect their reputation. The loss of reputation may be caused by the disclosure to third parties and/or to the interviewer.

The model by Della Giusta *et al.* (2014) is based on two theoretical assumptions: 1. that demand and supply functions do not depend on gender; 2. stigma plays a pivotal role in determining quantities demanded and supplied in the market (Della Giusta *et al.*, 2009b).

With the first assumption, Della Giusta *et al.* (2009b) stress the point that sex workers and clients can be either men or women³²(Dalla Giusta *et al.*, 2009b). This assumption allows the authors to model the gender power relationship that they consider intrinsic in the sex exchange, following the O'Connell Davidson (1998) consideration that sex work “allows certain powers of command over one person's body to be exercised by another” (O'Connell Davidson 1998:9). More specifically, gender, social class and race combined together produce the social positioning of the sex worker in relation to the social positioning of the client; the

³² Though, as the authors acknowledge – the literature suggests sex workers' clients are far more frequently male than female.

difference in social standing is determining for stigmatisation (Kempadoo and Doezema 1998).

With the second assumption the authors incorporate reputation effects, as determinants of both clients and sex workers' behaviours. The stigma, defined as loss of reputation, is associated with both buying and selling sex: as exchanging sex for money is subject to moral judgement. Reputation is unaffected when the actors (sex workers and clients) do not engage in the sex market; while once sex workers and clients enter in the sex market they are subject to reputational loss, i.e. stigma. Reputation is modelled both as an exogenous factor – in the first formulation of the model – as well as an endogenous factor. When the authors model reputation endogenously they assume the higher quantity of sex purchased in the market, the lower the stigma.

In the model by Della Giusta *et al.* (2006; 2009b), a loss of reputation (stigma) affects sex workers' social standing (influencing wages, working conditions, and other employment opportunities) as well as clients' social standing. The latter is influenced if the purchase of sexual services is known and sanctioned by the community. For the sake of simplicity the authors assume in the model that the sex purchase is always observed in the community (i.e. probability of being caught equals 1).

Della Giusta and her colleagues (2009b) do not discuss the reporting behaviour of paying for (or selling) sex in surveys, as this is out of the focus of their work. However, they acknowledge that the loss of reputation depends on whether the participation in the sex market is observed in the community. In reporting paying for sex in a survey the respondent may fear that the information may be shared with the interviewer, the survey agency, the researcher or third parties. Even in the case where the actual probability of disclosure is nil, respondents may fear disclosure and, in some cases, the consequent loss of reputation. The perceived probability of loss of reputation depends also on the likelihood that he/she attributes to the information spillage.

Della Giusta *et al.* (2009b) define reputation capacity as the capacity for clients' reputation losses when no prostitution is bought. The higher the individual social standing, the lower the reputation capacity. For example, individuals with high social status (e.g. politicians, judges) are vulnerable reputation wise, thus “even a small amount of sex purchased can ruin their reputation potential” – i.e. they have a lower reputation capacity

(Della Giusta *et al.*, 2009:505). On the contrary, individuals with low social status may have a higher reputation capacity – i.e. higher capacity for reputation losses. The same reasoning applies also to other personal characteristics, besides social status: for example, married clients may have a lower reputation capacity – “more to lose” – than single clients (Della Giusta *et al.*, 2009:505).

This reasoning may be extended to the reporting of paying for sex in surveys. If the perceived probability of disclosure to third parties is equal across people with different social standing, *ceteris paribus*, we would expect higher missing data on the question in paying for sex for individuals with higher social standing, compared with individuals with lower social standing, after controlling for item missing data in other variables.

Della Giusta *et al.* (2009b) define the clients’ realization of the potential reputation as the difference between the reputation capacity (i.e. capacity for clients’ reputation losses when no prostitution is bought) and the amount of prostitution bought. Maximising their utility, clients will participate in the sex market if their willingness to pay for the first unit of sex is higher than the sum of: *a.* the price of paid sex, *b.* the marginal costs of a worsened reputation for the first unit of sex purchased and *c.* a threshold level. The treasure is included in the model to allow a greater loss in reputation if paying for sex for the first time, compared with the subsequent times. The authors model this treasure as a function of individual and neighbourhood characteristics (Della Giusta *et al.*, 2006, 2009b).

Della Giusta *et al.* (2006; 2009b) derive that “at utility maximum, the marginal willingness to pay for prostitution (in terms of consumption of ordinary goods) should be equal to the price of prostitution plus the marginal cost of a worsened reputation (in terms of the consumption of ordinary goods)” (Della Giusta *et al.*, 2009b:506). Moreover, the authors show that the higher the reputation capacity (i.e. more capacity to lose reputation), the lower the marginal cost from the effects of paying for sex on reputation; thus, the agent is more likely to buy sex. Also, the lower the threshold, the lower the price and the higher the agent’s income the more likely that he/she enters the market.

The supply side of the model is not discussed here, as it is considered out of scope in this context. However, it is relevant to discuss one aspect of the equilibrium reached by the model, as it concerns clients’ stigmatization: “more prostitution is sold at a higher price when

the reputation capacity of clients increases and/or when clients are able to cover to a great extent their consumption of prostitution” (Della Giusta *et al.*, 2009b:510)³³.

In a further modelling exercise, the Della Giusta *et al.* (2009b) relax the assumption that reputation is exogenously determined, and they consider it endogenous. The authors put forward Akerlof’s (1980) theory of social custom, saying that multiple *equilibria* exist as, for every social code, some people believe in the code and others not. The authors argue that as sex work is stigmatized to different degrees in different societies, a change in attitudes towards paid sex may produce different market *equilibria*. As in Akerlof (1980) the level of stigmatization depends on the individual’s adherence to the social code and to the share of individuals in the population endorsing the code, Della Giusta *et al.* (2009b) assume that the larger the sex market the lower the reputation loss of clients and sex workers. Thus, clients’ reputation depends on the number of clients, and sex workers’ reputation depends on the number of sex workers. The direct conclusion is that the higher quantity of sex purchased/sold the lower the stigmatisation – i.e. the higher reputation capacities (Della Giusta *et al.*, 2009b).

If sex workers and clients entered the market, the amount of sex sold/purchased at equilibrium increases with clients’ income, and decreases sex workers income opportunities out of prostitution. Also, price increases with the increase in sex workers’ income opportunities out of prostitution. The authors conclude that in countries with an uneven income distribution, with rich clients and poor sex workers, more sex is expected to be sold at lower prices compared to countries with more evenly distributed incomes and job opportunities; in this latter case less sex is sold and prices are higher. A second conclusion, is related to trafficking/smuggling: the model suggests the existence of “commercial interests tied to importing possible prostitutes to rich countries” (Della Giusta *et al.*, 2009: 513). As a policy recommendation, an improvement in quality and availability of “ordinary” jobs decreases the amount of sex sold (Della Giusta *et al.*, 2009b).

The four market equilibria identified by the authors are:

1. reputation is exogenous; the amount of sex exchanged does not influence reputation;

³³ On the supply side, they show the more prostitution is sold and at a lower price, when the loss of reputations is lower, and the higher the income from other occupations, the lower the amount of prostitution sold and the higher the price.

2. the clients' reputation capacity increases with the amount of sex sold/purchased, while sex workers' reputation is unaffected by the amount of sex exchanged;

3. the sex workers' reputation capacity increases with the amount of sex sold; while clients' reputation is unaffected by the amount of sex exchanged;

4. both clients' and sex workers' reputation capacity increases with the amount of sex sold.

The first case is used as a benchmark. In the second case, more sex is sold, and the price is higher than the benchmark. In the third case, less sex is sold, and the price is higher than the benchmark. In the fourth case, more sex is sold, and the price is higher than the benchmark (Della Giusta *et al.*, 2009b). The reasons for the two latter conclusion (case 3 and 4) is the higher opportunity cost of leisure. In these cases, "the shadow price of leisure gets higher at equilibrium and the prostitutes demand a higher price to be willing to sell prostitution services" (Della Giusta *et al.*, 2009b:514).

The authors conclude that the sex market is fundamentally characterised by stigma. The model predicts an over-representation of women on the supply side and of clients on the demand side. This follows from the inclusion of income in the utility function of clients and sex workers. The higher the sex workers' income in other non prostituted jobs, the lower the supply of sex work and the higher the price. The gender wage gap at the global level determines the gender difference in demand and supply, with demand dominated by men and supply by women. The inverse may be the case for "Western women" demanding bought sex in developing countries.

In subsequent works, the theoretical assumptions of the model are confirmed empirically on a sample – collected by Martin Monto (2006) – of arrested male clients of female street sex workers in four U.S. cities, namely: San Francisco, Portland, Las Vegas and Santa Chiara³⁴ (Della Giusta *et al.*, 2009). The market resulted characterized by stigmatization of both clients and sex workers – this "is reflected in the attitudes of clients in the sample

³⁴ There are two main sources of error: 1. The sample is composed only of arrested clients, which may not be representative of the entire population of men who pay for sex; 2. only arrested clients who attend the rehabilitation programme are eligible for the survey.

towards sex work, towards sex workers and towards being caught” (Della Giusta *et al.*, 2009:2274).

In a subsequent study, Della Giusta *et al.* (2014) argue that stigma influences the demand for sexual services, as professional status is negatively and significantly associated with paying for sex. Also, risky behaviours are positively associated with being a sex workers’ clients, and this finding is interpreted as a desire for the “thrill of engaging in risky behaviour” (Della Giusta *et al.*, 2014: 20). We also find no significant effects of variables which measure the relative degree of conservatism in morals.

3.3 EVIDENCE ON ATTITUDES TOWARD SEX WORK

3.3.1 ATTITUDES TOWARD SEX WORK, ATTITUDES TOWARD GENDER EQUALITY AND PERSONALITY TRAITS

Early studies have analysed attitudes toward sex work in relation to attitudes toward gender equality and with personality traits. In an early work that uses data from a sample of undergraduate psychology students in the US, Basow and Campanile (1990) show that individuals with more pro-feminist attitudes had negative attitudes towards sex work, as they are: 1. more likely to consider sex work as reflecting the exploitation and subordination of women, 2. less likely to take into account economic necessity as a driving factor for the choice to sell sex, 3. less likely to accept decriminalization and legalization of sex work (Basow and Campanile, 1990). Also, the authors find gender differences: women were less likely than men to endorse decriminalization and legalization of sex work and more likely to consider sex work as a reflection of exploitation and subordination (Basow and Campanile, 1990).

Studying personality traits, Abrams and Della Fave (1976) analyse the relation between authoritarian personalities and attitudes toward prostitution, on a sample of university students. The authors identify four elements of the authoritarian personality that leads to negative attitudes toward sex work – more specifically, to opposition to the legalization of sex work. These are: 1. conventionality, as attachment to the *status quo*, and resistance to change; 2. the tendency to react punitively to individuals that resist conventions; 3. cynicism and suspicion of human nature; 4. preoccupation with sexual activities, as a projection of the authoritarian's repressed sexual desires (Adorno *et al.*, 1950; Abrams and Della Fave, 1976). The authors showed that respondents having most authoritarian personalities and most religious respondents were less likely to be in favour of the legalization of sex work.

In a similar perspective, May (1999) tested the correlation of supportive attitudes towards the legalization of sex work with tolerance for non conformity in the United States. Tolerance for nonconformity is defined as the freedom to express ideas and engage in behaviours in conflict with dominant judgement regarding what is cognitively correct or morally right (Acock, Wright, and McKensie, 1981). May (1999) finds that, when the study

was conducted (in 1995), only 18% of respondents favoured the legalization of sex work. Some socio-demographic factors resulted as being associated with positive attitudes toward the legalization of sex work. In particular, males, older respondents, Catholics, residents from the western states (in the United States), whites, unmarried respondents and individuals with higher levels of education are more likely to favour the legalization of sex work. Moreover, tolerance for nonconformity, measured as tolerance of another “deviant” behaviour (i.e. gambling) is associated with having more favourable attitudes toward sex work legalisation.

Consistently with Adams and Della Fave’s (1976) and May’s (1999) work, Cao and Maurige (2013) find that tolerance is positively associated with favourable attitudes towards prostitution and authoritarianism is negatively associated. Using data from three waves (1981/82, 1990, 2000) of the Word Values Survey, the authors show also that tolerance toward sex work has increased over the period 1981-2000. By year 2000 the majority of respondents agreed that prostitution was justifiable under certain circumstances, but 46.9% stated adamantly that sex work is never justifiable. Moreover, Cao and Maurigine (2013) found evidence that while in 1981 and 1990 social class was significantly associated with tolerance toward prostitution – with lower classes being significantly less tolerant toward sex work than middle and upper classes – in 2000 the difference is eroded and it is no longer statistically significant. They also found that older, educated and employed respondents are significantly more likely to have favourable attitudes towards prostitution, while religiosity is negatively associated with favourable attitudes towards sex work.

3.3.2 ENDORSEMENT OF RAPE MYTHS AND PROSTITUTION MYTHS

Other studies on attitudes toward sex work have analysed the endorsement of “prostitution myths”, and the correlation of the endorsement of “prostitution myths” and “rape myths”.

Prostitution myths are socially accepted beliefs and attitudes about sex work and sex workers. Rape myths are one of the components of socially accepted attitudes that normalize rape (Lonsway and Fitzgerald, 1994). They consist of cultural belief thought to “support and perpetuate male sexual violence against woman” (Payne, Lonsway, and Fitzgerald, 1999:27).

Regarding the endorsement of prostitution myths among sex workers' clients, Sawyer *et al.* (2001) find that older and less educated costumers are less likely to support prostitution myths; also, they are more likely to support decriminalization of sex work.

Cotton, Farley, and Baron (2002) study the correlation between the endorsement of "prostitution myths" and "rape myths". Prostitution myths are measured with a scale introduced by the authors³⁵, while rape attitudes are measured with the Illinois Rape Myth Acceptance scale³⁶. Data are collected on a purposive sample of students. The authors find a positive correlation of prostitution myth acceptance with rape myth acceptance. They also identify gender differences, as rape myths acceptance was higher among college men compared with college women. They interpret this difference as men may be more prone to believe that sex work is necessary to meet males' sexual needs, while women may consider sex work as exploitative and may empathize with sex workers. Due to the characteristics of the sample, it is not clear to which extent the results of this study – as well as the work of Basow and Campanile (1990) – can be applied to the general population.

The relationship between endorsement of rape myths and prostitution has also been analysed, with different methodologies, by Monto and Hotaling (1998) and Miller and Schwartz (1995). Analysing a sample of men arrested for paying for sex – Monto and Hotaling (1998) found that overall rape myth acceptance is limited among sex workers'

³⁵ In order to measure "prostitution myths" the authors used the following six items: "There is nothing wrong with prostitution"; "Prostitutes are victims of pimps"; "Most prostitutes make a lot of money"; "Women are prostitutes because they want to be; it's their choice"; "Prostitutes enjoy their work"; and "Prostitutes genuinely like men." Agreement of every item, with the exception of the item "Prostitutes are victims of pimps", is labelled by the authors as an endorsement of prostitution myths. While, for the statement "Prostitutes are victims of pimps" disagreement is categorized as an endorsement of prostitution myths. Prostitution myths are measured in a 4 point scale, ranging from strongly disagree to strongly agree.

It should be noticed that the concept of "myth" is relative and may change over time and depends on the context. The work of Cotton *et al.* (2002) was conducted over ten years ago and in the United States, where sex work is – and was at the time of the study – illegal in most states. In some contexts the academic debate on sex work has embraced some of the statements that the authors label as myths. Even if the empirical evidence from the sex work is limited and insufficient to derive solid conclusions on the structure of the market, the statement "Prostitutes are victims of pimps" is controversial, as some commentators would argue that not all prostitutes are victims of pimps. The same argument may apply to other statements such as: "There is nothing wrong with prostitution" and "Women are prostitutes because they want to be; it's their choice".

³⁶ This is a 45 items scale, aimed at measuring 7 concepts in rape myths, these can be summarized in the following statements: 1. "She asked for it"; 2. "It wasn't really rape"; 3. "He didn't mean to"; 4. "She wanted it"; 5. "She lied"; 6. "Rape is a trivial event"; and 7. "Rape is a deviant event".

clients. Miller and Schwartz (1995) analysed the sex workers' evaluation of the acceptance of rape myths among sex workers clients and police. Sex workers reported that this category of males showed endorsement for concepts summarized by these statements: 1. it is not possible to rape a sex worker, as her profession is a declaration of consent to sex; 2. harassment is not harmful to sex workers; 3. sex workers deserve to be raped.

3.3.3 ATTITUDES TOWARD SEX WORK IN BRITAIN AND ENDORSEMENT OF CLIENTS' CRIMINALIZATION

Regarding attitudes toward sex work in Britain, Ipsos Mori conducted two omnibus surveys, commissioned by the Government Equalities Office, in July and August 2008 (Ipsos Mori, 2008a, 2008b). The sample size was 1,012 for the July survey and 1,010 for the survey conducted in August. The July survey was conducted on adults aged over 16 years old, while the August survey was conducted on adults aged over 18 years old. Results are shown in table 3.1 and 3.2.

The first survey (Ipsos Mori, 2008a) found that when sample members are asked whether paying for sex should be made illegal, the relative majority (47%) of respondents disagreed (i.e. paying for sex should be legal), 36% agreed (paying for sex should be illegal), 14% neither agreed nor disagreed, and 3% don't know.

However, when the question was formulated differently, and the idea that prohibiting paying for sex may reduce women and child trafficking, results changed: the majority of respondents (58%) declared they would support a law that makes paying for sex illegal – with 31% opposing the law, 9% neither supported nor oppose it and 3% didn't know (see TABLE 3.1 below).

In the subsequent August survey, the question was asked again in a neutral way (i.e. "Do you think the purchase of sex by men should be legal or illegal?"³⁷): as in the first formulation of the June survey, the relative majority (50%) of respondents thought the purchase of sex should be legal, 43% illegal, 4% don't know and 3% refused. In the August

³⁷ Discussing attitudes toward paying for sex and selling sex, it should be noticed that the debate is usually gendered, with the client being perceived as a male and the sex worker as a female (Kingston, 2014). Media, political debates, policy documents and research literature perpetuate this gender difference, which overall may be an accurate description of the sex market, as the empirical evidence has shown (e.g. Jones, 2014) that the demand is composed mainly of males and the supply mainly of females (Kingston, 2014).

survey, respondent's were also asked whether selling sex should be illegal (i.e. "Do you think the selling of sex by women should be legal or illegal?"): again, the majority of respondents (51%) stated that selling sex should be legal, 42% declared it should be illegal, 5% don't know and 3% refused to answer.

In the June survey almost half of the respondents (49%) considered most sex workers as victims of exploitation (while 34% disagreed and 14% neither agreed nor disagreed, and 3% didn't know). At the same time, however, almost 60% considered sex work as a "perfectly reasonable choice that women should be free to make" (with 27% disagreeing, 12% neither agreeing nor disagreeing, and 2% didn't know).

Regarding stigma the majority of respondents (60%) stated they would feel ashamed if a family member was working as a prostitute (*versus* 37% who would not feel ashamed and 2% that don't know) and 74% stated that they would consider it unacceptable for a family member to be a sex worker (19% acceptable, 6% don't know). The stigma associated with paying for sex seems higher than the stigma associated with offering sex in exchange for money: 87% of respondents consider it unacceptable if a spouse or partner has recently paid a prostitute for sex. However, it should be noticed that this question does not disentangle paying for sex from infidelity, which is likely be considered by at least some respondents as unacceptable in itself.

With respect to stigmatization, in the August Ipsos Mori survey (2008b), as in the July survey (Ipsos Mori, 2008a), both paying and buying sex was generally considered unacceptable. The majority of respondents (52%) declared it was unacceptable to pay for sex with a woman, while 39% considered it acceptable, 5% neither unacceptable nor acceptable and 2% didn't know. Approximately the same percentages hold for offering sex in exchange of money: 53% considered it unacceptable, 38% acceptable, 5% neither unacceptable nor acceptable and 2% didn't know. The level of social undesirability increases if the person buying or selling sex is a relative (i.e. brother, son or father for paying for sex; sister, daughter or mother, for selling sex).

TABLE 3.1: Attitudes toward sex work in Britain I (%)

Currently in the UK, it is not illegal to pay for sex. INTERVIEWER CAN SAY: It is illegal for people to 'kerb crawl' for sex, for the prostitute to loiter on the street to attract customers, and for anyone to run a brothel. Please tell me whether you agree or disagree with each of the following statements.										
	strongly agree	tend to agree	neither agree nor disagree	tend to disagree	strongly disagree	don't know	refused	total agree	total disagree	
It should be made illegal to pay for sex – this would mean that men who pay for sex with prostitutes commit a criminal offence	27	9	14	22	25	3	<0.5	36	47	
Most prostitutes are only in that role because they are victims of exploitation	28	21	14	18	16	3	1	49	34	
Prostitution is a perfectly reasonable choice that women should be free to make	27	32	12	7	20	2	1	59	27	
Some men need the services that prostitutes offer in order to meet their sexual needs	23	30	13	8	21	4	1	53	29	
Please imagine for a moment that you found out that... In your view, is this behaviour acceptable or unacceptable?										
	Acceptable		Unacceptable		Don't know		Refused			
...a spouse or partner had recently paid a prostitute for sex	9		87		3		1			
...a female family member had been working as a prostitute	19		74		6		1			
Would you feel ashamed or not if you found out a family member was working as a prostitute?										
	Yes, I would feel ashamed		No, I would not feel ashamed		Don't know		Refused			
	60		37		2		1			
Some people have argued that if paying for sex were illegal it would reduce the number of women and children being trafficked into this country from abroad and forced into prostitution. Would you support or oppose making it illegal to pay for sex as part of an attempt to reduce trafficking of women & children from abroad into prostitution in the UK?										
	strongly support	tend to support	neither support nor opposed	tend to oppose	strongly oppose	don't know	refuse	total support	total oppose	Net support (support - oppose)
	44	14	9	10	21	3	0	58	31	27

Source: Ipsos Mori, 2008a

TABLE 3.2: Attitudes toward sex work in Britain II (%)

	very acceptable	fairly acceptable	neither acceptable nor unacceptable	fairly unacceptable	very unacceptable	don't know	refused	total acceptable	total unacceptable
In your opinion, is it acceptable or unacceptable for a man to purchase sex with a woman?	9	30	5	14	38	2	2	39	52
Please imagine that the man purchasing sex is related to you, for example your brother, son or father. In this case would it be acceptable or unacceptable?	6	23	4	11	51	3	2	29	62
In your opinion, is it acceptable or unacceptable for a woman to sell sex to a man?	10	28	5	14	39	2	2	38	53
Please imagine that the woman selling sex is related to you, for example your sister, mother or daughter. In this case would it be acceptable or unacceptable?	4	18	4	11	58	3	2	22	69
				legal	illegal	don't know	refused		
Do you think the purchase of sex by men should be legal or illegal?				50	43	4	3		
Do you think the selling of sex by women should be legal or illegal?				51	42	5	2		

Source: Ipsos Mori, 2008b

3.3.4 THE CORRELATION OF POLICIES AND ATTITUDES

As argued in the previous sections, the regulation of prostitution is likely to influence attitudes toward sex work and, *vice versa*, attitudes toward sex work are likely to influence prostitution policies. Both the academic literature and public opinion polls have attempted to analyse empirically these relationships.

Most of these studies focus on Sweden and evaluate the Swedish legislation imposing the criminalization of the client. The particular focus on Sweden is due to the fact that the Swedish legislation is explicitly aimed at changing attitudes toward sex work (Jakobsson and Kotsadam, 2011); indeed, one of the objectives of the law is to lead public opinion to be more contrary to the purchase of sexual services (Kuosmanen, 2011; Kulick, 2003).

The literature on attitudes towards sex work in Sweden has analysed both attitudes before and after the reform, as well as the change in attitudes from the pre-reform period to the post-reform period. Three surveys on the attitudes toward sex work in Sweden have been conducted prior to the clients criminalization reform (Kuosmanen, 2011): Månsson (1996) and SIFO³⁸ (1999; 2002).

As reported by Kuosmanen (2011)³⁹, Månsson (1996) results' show that, before the introduction of the legislation criminalizing the sex purchase, 32% of respondents regarded paying for sex with a woman as a criminal act^{40 41}; while, in the year when the legislation came into force (i.e. 1999) the fraction of respondents in favour with prohibiting the sex purchase more than doubled to 76% (SIFO, 1999, as reported in Kuosmanen, 2011)⁴². The

³⁸ Svenska Institutet för Opinionsundersökningar, Research International.

³⁹ This evidence has been published only in Swedish; however, Kuosmanen (2011) summarizes the main results in English.

⁴⁰ The question wording adopted is: "A man pays for sexual relations with a woman. Should the man be regarded as a criminal?"

⁴¹ The research showed a gender difference in responses, with 44% of women *versus* 20% of men considering the act to be criminal.

⁴² As Månsson (1996), also SIFO (1999) showed that more females (81%) than males (70%) were in favour of prohibiting the purchase of sexual services (Kuosmanen, 2011).

results of a subsequent SIFO's survey (2002) are in line with the 1999 findings; 76% of respondents⁴³ reported that paying for sex should be illegal (Kuosmanen, 2011)⁴⁴.

A research by Kuosmanen (2011) has attempted to investigate the change of attitudes from the pre-reform period to the post-reform period⁴⁵. The author hypothesizes that: i. the presentation of the government's bill for client criminalization, ii. other proposals enhancing women's rights, and iii. the consequent media coverage of this topic has both increased public opinion attention and generated consensus over the reform. Moreover, in the last decades following the reform, trafficking has been increasingly associated with the debate on prostitution (Kuosmanen, 2011), leading to a higher support for the legislation.

As shown in TABLE 3.3 below, the majority of respondents are in favour of retaining the law that criminalizes the purchase of sexual services. The consensus on the law is higher for women compared to men. These results are in line with the evidence from SIFO (1999, 2002).

⁴³ Males: 69%; females: 83%

⁴⁴ One key difference in the two surveys is the question wording: while Månsson made explicit reference to men paying women for sex, SIFO (and, subsequently Kuosmanen, 2011) posed the question in a gendered neutral way (Kuosmanen, 2011). The details of the survey design by Månsson (1996) and SIFO (1999 and 2002) are not described in Kuosmanen (2011): further information would be needed to assess whether the change in the measured attitudes is partially influenced by a different survey design.

⁴⁵ Attitudes towards sex work are studied on a probability sample of 2,500 Swedes age 18–74. This study suffers from a low response rate (45.4%) and from response bias in gender and educational variables. Women were highly overrepresented: in fact, 57% of respondents were female, while women are only the 49.4% of the reference population – comparisons made by Kuosmanen (2011) with data from Statistics Sweden (Kuosmanen, 2011). Moreover, adults with upper secondary education are overrepresented: respondents without an upper secondary education are 18% (*versus* 23% in the reference population), adults with a minimum of two-three years of upper secondary education is 40% (compared with 44% of the Swedes aged 18-74) and respondents with a post-upper secondary education are 42% (*versus* 31% in the reference population). As the author advises, results should be taken with caution (Kuosmanen, 2011).

TABLE 3.3: “Should we retain the law prohibiting the purchase of sex?” (i.e. clients’ criminalization)

	Men, <i>n</i> (%)	Women, <i>n</i> (%)	Total, <i>n</i> (%)
Yes	288 (59.9)	502 (78.8)	790 (70.7)
No	128 (26.6)	73 (11.5)	201 (18.0)
No opinion	65 (13.5)	62 (9.7)	127 (11.3)
Total	481 (100)	637 (100)	1118 (100)

Source: Kuosmanen (2011)

The author aims at assessing the change of attitudes from before to after the reform. Since the analysis is based on one cross sectional dataset, the author uses two survey questions to study the change in attitudes before and after the legislation. The two questions are: “What was your view about men who purchased sex before the law came into force?” and “What is your view about men who purchase sex now that the law is in force?” (Kuosmanen, 2011). The limit of this method is the use of a retrospective question with a gap of approximately 10 years, as the reform was approved in 1999 and the survey was undertaken in 2008.

As TABLE 3.4 shows, most respondents remained of the same opinion before and after the reform. 10% of respondents changed opinion from neutral to negative, while few from negative to positive (1%) or from neutral to positive (0.6%) (Kuosmanen, 2011). Also, some positions radicalized: 32% of adults having a negative attitude toward prostitution reported having a more negative attitude after the reform, and among the 11 respondents stating they had a positive attitude toward prostitution before the interview, 3 reported a more positive attitude⁴⁶ (Kuosmanen, 2011).

⁴⁶ Analysing the socio-demographic characteristics associated with the support for the reform, the author finds that women and younger respondents are more likely to endorse the clients’ criminalization law. The interaction of gender and education was significantly associated with positive attitudes toward prostitution, with higher educated women more likely to have positive attitudes toward the clients’ criminalization law.

TABLE 3.4: Attitudes toward prostitution before and after the reform

	Neutral	Positive	Negative	Total
Unchanged	291 (88.7)	8 (72.7)	516 (67.1)	815 (73.5)
More positive	2 (0.6)	3 (27.3)	8 (1.0)	13 (1.2)
More negative	35 (10.7)	0 (0.0)	245 (31.9)	280 (25.3)
Total	328 (100)	11(100)	769 (100)	1108 (100)

Source: Kuosmanen (2011)

Given the small sample size, the limitation of adopting a retrospective question and the non response bias, it seems hard to derive conclusions on the effect of the reform in the change of attitudes toward sex work. Moreover, this study does not take into account a source of endogeneity underlined by Immordino e Russo (2015a): as not only policies influence attitudes but also attitudes influence policies, such framework would not enable the establishment of a causal effect. Immordino and Russo (2015a) overcome this issue using an instrumental variables approach.

Besides analysing the attitudes toward sex work, this study elicits the personal experience of sex purchase⁴⁷. 34 (8%) males and 1 (0.2%) female reported paying for sex^{48 49} (TABLE 3.5).

⁴⁷ It is not clear where questions are positioned in the questionnaire, and thus if there are order effects.

⁴⁸ The question wording uses a broader definition of paying for sex compared to the one used in this analysis. More specifically, the question is worded as follows: “Has it happened that, using either money or other means, that you have paid to have sexual contact with someone (sex involving physical contact)?”

⁴⁹ The authors identify that some respondents misreported their sex purchase: in fact, in subsequent questions on paying for sex, a group of both men and women who didn’t report paying for sex in this first question, described their sex purchase. The author argues that this misreporting is consistent with other findings in the sexuality literature (e.g. Abelson and Hulusjö, 2008 as reported in Kousmanen, 2011) and that among respondents misreporting paying for sex, one respondent argued that he did not report paying for sex as: “it was only that one time”.

TABLE 3.5: Paying for sex

	Men, n (%)	Women, n (%)	Total, n (%)
No, this has never happened	392 (87.5)	553 (98.6)	945 (93.7)
No, this has never happened although I have fantasised about it	17 (3.8)	6 (1.1)	23 (2.3)
No, this has never happened but I could consider buying sex	5 (1.1)	1 (0.2)	6 (0.6)
Yes	34 (7.6)	1 (0.2)	35 (3.5)
Total	448 (100)	561 (100)	1009 (100)

Source: Kuosmanen (2011)

Moreover, Kuosmanen (2011) shows that five (15%) of the 34 sex workers' clients declared that they stopped purchasing sex after the reform and two reported lower frequency of purchase. The conclusion the researcher draws from this evidence is that paying for sex has reduced as a consequence of the legislation.

However, the finding should be taken with caution: as after 1999 paying for sex becomes illegal, reporting the illegal behaviour of paying for sex may be less socially desirable than reporting paying for sex when it was legal⁵⁰. In addition to that, reporting a socially undesirable behaviour that happened in the past (with approximately a 10 years lag) may be less socially undesirable than reporting a current socially undesirable behaviour. Furthermore, the author, Kuosmanen (2011) advises that it is unclear whether the findings can be extended to the Swedish population, given the small sample size and the non response bias.

After the Swedish reform, a law criminalizing paying for sex, has been implemented in Norway in 2009 (Kuosmanen, 2011); as for the Swedish reform, also for the Norway reform, one of the objectives was to change attitudes toward sex work, and thus reduce the demand for sexual services (Holmström and Skilbrei 2008; Norwegian Ministry of Justice 2008; Skilbrei 2008 as quoted in Kostadam and Jakobsson, 2014).

Comparing attitudes toward prostitution in Sweden and Norway after the reform, Norwegians show more positive attitudes than Swedes (Jacobsson and Kotsadam, 2009,

⁵⁰ As Kotsadam and Jakobsson (2014) state discussing their own empirical evidence: the legal change may affect the reporting of individual actions. That is, there may be less willingness to report doing an activity if it is illegal than if it is not" (Kotsadam and Jakobsson, 2014: 400)

2011). The authors (Jacobsson and Kotsadam, 2009, 2011) argue that this difference is driven by the stronger Swedish “gendered debate”⁵¹.

A study by Kostadam and Jakobsson, (2014) aims at assessing the effect of policies on: a. attitudes toward prostitution and b. paying for sex, comparing three countries, Sweden, Norway and Denmark⁵².

Following the approach by Della Giusta *et al.* (2008, 2009), Kostadam and Jakobsson (2014) argue that criminalizing paying for sex may affect the equilibrium amount of prostitution services exchanged in the market, through: 1. increasing clients’ feelings of guilt, 2. increasing stigmatization, and 3. implying a direct punishment (Kostadam and Jakobsson, 2014).

The authors show that the share of respondents paying for sex is higher in Denmark – where paying for sex is legal – than in Sweden and Norway, where paying for sex is criminalized (see TABLE 3.6 below). Also, they observe that the share of people knowing someone that paid for sex in the last 6 months is higher in pre-reform Norway (2008 wave) than in post-reform Norway (2009 wave and 2010 survey) and then in Sweden overall (TABLE 3.7).

⁵¹ Regarding socio-demographic factors associated with the endorsement of the reform, Jacobsson and Kotsadam (2009, 2011) show that males and sexual liberals (both males and females) are more likely to have a positive attitude toward prostitution. In contrast, men and women who are conservative or support gender equality are more negative. Moreover, those that hold anti-immigration views have more positive attitudes toward buying, but not selling, sex.

Another study on attitudes towards prostitution in Norway (Jahnsen, 2008, as reported in Jakobsson, 2009) investigate socio-demographic factors associated with attitudes in favour of criminalizing sex worker’ clients. The author shows that women, respondents living in the region of Oslo, feminists, Christians and liberals are more favourable to criminalizing buyers. However this study presents only summary statistics, and thus not control for potential confounding factors.

⁵² The authors use data from a TNS Gallup longitudinal web survey. The first wave consisted of a sample of 2,500 Norwegians and 3,000 Swedes aged 15–65, in August 2008. In August 2009, first wave respondents were invited to the second wave. In August 2010, a second survey was administered on a sample of 4,500 Danes, 4,500 Norwegians, and 3,252 Swedes aged 18–65. In terms of representativeness, the sample is biased towards highly educated respondents.

TABLE 3.6: Prevalence of paying for sex in Sweden, Norway and Denmark

	All		Men		Women	
	%	<i>N</i>	%	<i>N</i>	%	<i>N</i>
Total sample	0.88	54	1.67	51	0.10	3
Norway	0.93	22	1.71	20	0.17	2
Sweden	0.29	5	0.56	5	0.00	0
Denmark	1.30	27	2.63	26	0.01	1

Source: Kotsadam and Jakobsson, 2014

TABLE 3.7: paying for sex and attitudes toward paying for sex.

	Know someone paying for sex in the last 6 moths			Consider paying for sex immoral		
	2008	2009	2010	2008	2009	2010
Norway	0.099	0.068	0.063	6.822	6.770	7.084
s.e.	(0.298)	(0.252)	(0.243)	(3.132)	(3.088)	(3.088)
N	1,033	1,031	2,368	1,033	1,033	2,370
Sweden	0.038	0.038	0.039	7.403	7.439	7.577
s.e.	(0.191)	(0.191)	(0.194)	(2.896)	(2.903)	(2.933)
N	1,316	1,313	1,703	1,317	1,313	1,704

Source: Kotsadam and Jakobsson (2014); standard errors in parentheses, and number of observations

Using a difference-in-difference approach comparing pre and post reform Norway with Sweden, the authors conclude that the Norwegian policy reduced paying for sex. However, they acknowledge that “the legal change may affect the reporting of individual actions” (Kotsadam and Jakobsson, 2014:400). Respondents may be less prone to declare they know someone who had paid for sex in the 6 months when paying for sex is illegal, than when paying for sex was legal. Also, sex workers’ clients may be less likely to share their consumption behaviour with friends and acquaintances if paying for sex is illegal.

In terms of attitudes, paying for sex is considered more immoral in Sweden than in Norway; and negative attitudes become more negative over time in Sweden while they remain stable in Norway from 2008 to 2009 (the small drop is not statistically significant) but become more negative in 2010.

However, the authors see that the introduction of the law in Norway had no effect in changing the attitudes toward paying for sex. The authors conclude that criminalization, while decreasing the amount of sex sold, does not increase the stigmatization of clients. This is in

contrast with the finding by Immordino and Russo (2015a), showing that at the aggregate level, prostitution policies influence attitudes.

One possible explanation of this finding by Kotsadam and Jakobbson (2014) is that attitudes may have changed already before the implementation of the law as a result of the higher attention of the media on the topic; in fact, the attention of the media on the topic started before the law came into force – and before the 1st wave survey started (Kotsadam and Jakobbson, 2014). Also, when the 1st wave of the survey started, it was already “clear that the law would be implemented” (Kotsadam and Jakobbson, 2014:402); thus, the effect on attitudes may have been antecedent to the start of the survey. Alternatively, the effect of the law on attitudes may spread over longer time periods (Kotsadam and Jakobbson, 2014).

As a final interpretation, which is the one endorsed by the authors, criminalization, while decreasing the amount of sex sold, does not increase the stigmatization of clients. Thus, the law reduces the demand for sexual services through the deterrent effect of the law enforcement rather than through an increase in stigmatization.

3.3.5 ASSESSING THE CAUSAL IMPACT OF POLICIES ON ATTITUDES

To the best of my knowledge, the first attempt to establish a causal relation of prostitution policies on attitudes toward sex been was made by Immordino and Russo (2015a). The authors test empirically the hypothesis that attitudes are more favourable towards prostitution⁵³ in countries where sex work is legal or regulated, compared with countries in which prostitution is prohibited⁵⁴. In order to test this hypothesis the authors use data from the word values survey. As the authors point out, both attitudes and policies may be influenced by beliefs and values. To rule out this endogeneity and establish a causal relation,

⁵³ Attitudes are measured through the question “Do you consider prostitution justifiable?”. Response categories vary from 1 to 10, where 1 indicates “Never justifiable” and 10 indicates “Always justifiable.”

⁵⁴ Immordino and Russo (2015b) do not use the classification of policies proposed in Chapter 2. Instead, they class policies as “illegal”, “legal” and “regulated” (Immordino and Russo 2014; 2015; 2015b). More specifically, they label prostitution as “illegal” if sex work is prohibited by law and if actions against prostitution are enforced. Thus, following the terminology adopted in CHAPTER 2, countries opting for “clients’ criminalization” are grouped together with countries with “prohibitionist” approaches. Immordino and Russo (2015b) label prostitution as “legal” if prostitution is legal but not regulated (“abolitionism”). Finally the authors label prostitution as “regulated” if prostitution is both legal and regulated, as in the “*neo-regulationism*” and “decriminalization” approaches outlined in CHAPTER 2.

the authors use an instrumental variable approach. More specifically, legal origins are used as an exogenous instrument for prostitution policy.

The units of analysis are countries, and the authors include a set of country level controls. The authors show that attitudes toward sex work are correlated with religion (in particular with Islam and Buddhism). The percentage of the countries' Muslim and Buddhist respondents to the survey is associated with less acceptance of prostitution.

Also, countries' GDP in PPP is correlated with attitudes with more permissive attitudes in richer countries. The authors' interpretation is that increasing democracy and freedom of expression are associated with economic development.

The percentage of women respondents to the survey in the country is associated with more positive attitudes toward prostitution. The authors interpret this finding as an emphatic sentiment of women toward female sex workers. More specifically, as the majority of sex workers are women, Immordino and Russo (2015a) argue that women may consider sex workers as victims of male exploitation and thus show empathy towards them.

However, I would have considered this interpretation as more compatible with a lower acceptance of prostitution from females. As the prevalence of women respondents to the survey at the country level might be influenced by women's emancipation, I argue that other mechanisms also might be at play.

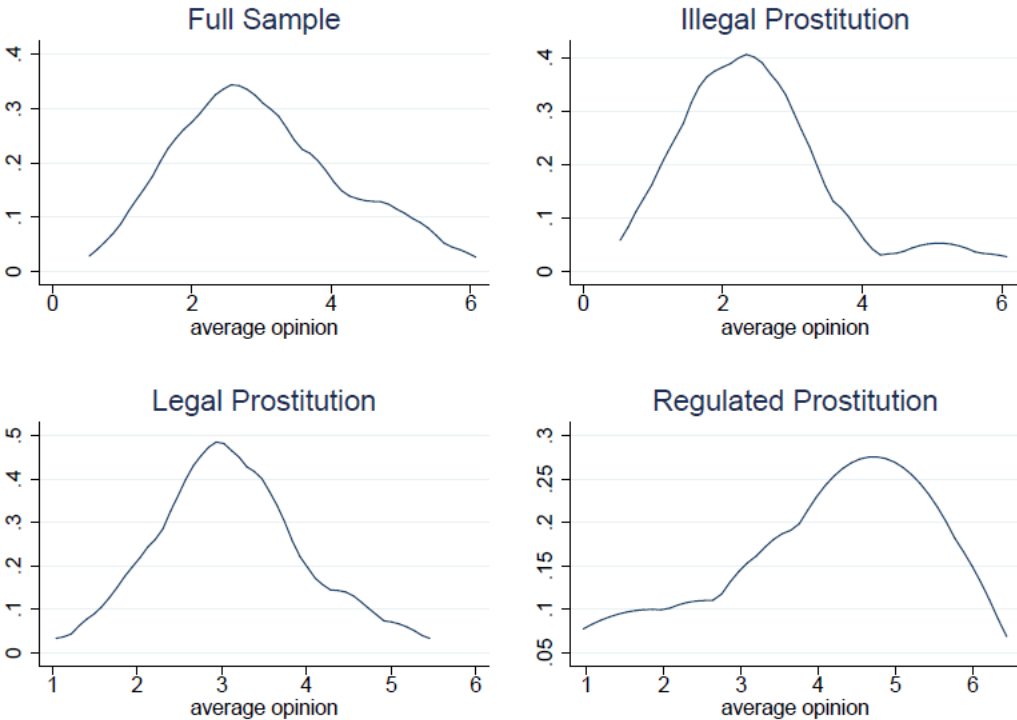
Finally, justification of prostitution is also correlated with justification of violence toward women, and in particular to the spouse, measured through the question: "Do you consider beating the wife justifiable?". Regarding this latter variable, the authors comment that power control and patriarchal attitudes may contribute to violence toward women.

Finally, as shown in FIGURE 3.1, the authors found a higher level of acceptance of prostitution in countries where sex work is legal or regulated compared with countries where sex work is prohibited. Also, legalization and regulation of prostitution correspond to a higher variability in the attitudes toward sex work. However, as acknowledged by the authors, the lack of data on the amount of sex of both within every country does not allow to disentangle the role of the equilibrium quantity, bought and sold in the sex market, with regard to stigma.

It is worth noting that the finding that policies influence attitudes toward prostitution (Immordino and Russo, 2015a) together with the intuition that attitudes influence the

reporting behaviour is particularly relevant as the reported prevalence of paying for sex is used to evaluate policies.

GRAPH 3.1 Attitudes toward prostitution by prostitution policy



Source: Immordino and Russo, 2015a

APPENDIX 3.1: Acceptance of prostitution by prostitution policy

Policy	Country	Year	Average opinion	Std of opinions
Illegal	China	2007	1.4	1.37
	Georgia	2008	1.2	0.61
	Ghana	2007	2	2.14
	Iran	2005	1.6	1.6
	Jordan	2007	1	0.23
	Malaysia	2006	3	2.38
	Moldova	2006	2.4	2.24
	Romania	2005	2.1	2.14
	Russian Federation	2006	2.3	2.23
	Rwanda	2007	1.7	1.54
	Serbia	2006	4.6	3.52
	South Africa	2007	2.5	2.38

	South Korea	2005	2.5	2.02
	Sweden	2006	3.1	2.47
	Trinidad and Tobago	2006	2	1.88
	Ukraine	2006	2.5	2.16
	United States	2006	3.2	2.52
	Vietnam	2006	1.6	1.29
	Zambia	2007	3.2	2.68
	Argentina	2006	4.1	3.33
	Brazil	2006	3.1	2.61
	Bulgaria	2006	3	2.57
	Burkina Faso	2007	2.3	2.37
	Canada	2006	3.3	2.41
	Chile	2006	3.5	2.69
	Cyprus	2006	2.6	2.23
	Ethiopia	2007	2	2.14
	Finland	2005	3.1	2.41
	France	2006	3.4	2.66
Legal	India	2006	3.1	3.1
	Indonesia	2006	1.4	1.41
	Italy	2005	2.4	2.08
	Japan	2005	2	1.84
	Mali	2007	3.3	3.21
	Norway	2007	4.1	2.57
	Poland	2005	2.5	2.23
	Spain	2007	4.6	2.79
	Thailand	2007	2.8	1.7
	UK	2006	3.9	2.74
	Uruguay	2006	5.1	2.92
	Australia	2005	4.6	2.86
	Colombia	2005	1.9	1.88
	Germany	2006	4.5	2.82
Regulated	Mexico	2005	3.9	3.1
	Netherlands	2006	5.6	3.12
	Switzerland	2007	5.1	2.94
	Turkey	2007	1.8	1.59

Source: Immordino and Russo (2005a).

3.4 CONCLUSIONS

As discussed in this chapter, on one hand prostitution policies may influence the stigma associated with paying for sex and the attitudes toward prostitution, on the other hand policies may be influenced by attitudes.

In this chapter, I describe the theoretical model proposed by Della Giusta *et al.* (2006, 2009b), firstly, to guide the discussion on the role of stigma in the sex worker—clients relationship, and, secondly, because this model is the base for the empirical analysis discussed in CHAPTER 9.

The model includes stigma as one of the components that influence the decision of both sex workers and clients to participate in the market of sexual services. Stigma is theorized as a loss of reputation faced both by sex workers and by clients when entering the sex market.

Within this theoretical model, for the sake of simplicity, Della Giusta *et al.* (2006, 2009b) theorized that all the prostitution bought and sold in the market is visible to the members of the community. However, in a real case scenario, sex workers' clients may hide their consumption behaviour.

Revealing paying for sex in surveys, costumers are disclosing a sensitive information. If sex workers' clients consider paying for sex as a stigmatized behaviour, and if they fear there is a possibility of information spillage or data not being treated anonymously, they may avoid answering truthfully to the survey question on paying for sex. Thus, I value stigma as a key component not only in the sex workers-clients relationship, but also on the decision to report paying (or selling) sex.

As revealing paying for sex may be influenced by attitudes, the evidence on attitudes toward sex work is discussed. This is divided in different areas. The early literature have studied attitudes toward sex work with reference to gender equality and personality traits. The main findings include: 1. That individuals with more pro-feminist traits are more likely to have negative attitudes toward sex work; 2. Individuals with authoritarian personalities and most religious respondents are more likely to have negative attitudes toward the legalization

of sex work; 3. Tolerant individuals have more favourable attitudes towards sex work legalization.

A second area of research found a positive association between the endorsement of prostitution myths and rape myths. Moreover, some studies have investigated rape myths acceptance among sex workers' clients, finding mixed evidence: while one study suggests that rape myths acceptance is limited among sex workers' clients, another study – which relies on information reported by sex workers – shows that both the costumers and the police endorse rape myths.

Furthermore, I analyse the attitudes toward prostitution in Britain; survey data suggest that attitudes toward prostitution may vary depending on question wording. When a neutral formulation is proposed the majority of respondents declared being in favour of the legalization of paying for sex; conversely, when the question explicitly refers to criminalizing paying for sex as a strategy to reduce human trafficking, the majority of respondents were in favour of a law that makes paying for sex illegal. Furthermore, paying for sex in Britain is considered as a stigmatizing trait: the vast majority of respondents declared they would be embarrassed of having as a member of the family a sex workers' client.

Fourthly, I analyse the relationship between attitudes toward prostitution and policies, with a particular focus on Scandinavian countries, where reforms explicitly aimed at modifying attitudes toward paying for sex have been implemented in the last decade. Regarding Sweden, the evidence is mixed; some studies find more negative attitudes toward paying for sex after the introduction of the legislation (compared to before), while another study find no difference between before and after the reform. No evidence is found comparing pre and post reforms periods in another country that criminalized paying for sex: i.e. Norway.

Finally, I describe the causal relation of prostitution policies with attitudes; the evidence suggests that there is a higher level of acceptance of prostitution in countries where sex work is legal or regulated compared with countries where sex work is prohibited.

CHAPTER 4 – SAMPLING RARE AND ELUSIVE POPULATIONS: THE CASE OF SEX WORKERS’ CLIENTS

In this chapter, firstly, I define the notions of “hidden”, “marginal”, “elusive”, “rare” and “blurred” populations, and I discuss the extent to which these dimensions apply to the population of sex workers’ clients. Secondly, I describe some examples of sampling strategies adopted in the literature to collect samples of sex workers’ clients. Thirdly, I discuss how adopting different sampling strategies has led to different conclusions on sex workers’ clients’ characteristics.

4.1 SEX WORKERS’ CLIENTS AS A HARD TO REACH POPULATION

Sex workers’ clients are often labelled as a “hard to reach population”. Moreover, this population is often described as “hidden”, “elusive” and “rare”. These terms have been used with different meanings in diverse settings, from the academic community to NGOs and governments.

Even within the academic community of social scientists, different disciplines have used these terms with different meanings. Indeed, Vitalini (2010) notes that there is no clear agreement in the scientific community on the definition of “elusive” and “hidden” populations, and these terms are not used in an unequivocal and clear manner. Thus, the author argues that these terms might be misleading when used in the methodological reflection.

The first and most broadly used term is “hard to reach populations”. The definition “hard to reach” is used, mainly, in the context of local governments to describe

subpopulations difficult to involve in public participation (Brackertz, 2007). A wide range of groups may be labelled as hard to reach populations, as for example: women victims of domestic violence, ethnic minorities, HIV positive people, drug users, sex workers *etc.* (Brackertz, 2007). The term is sometimes used in social research to identify a population difficult to access for research purposes. With this meaning the term “hard to reach” is used as a broad term that includes the more specific notions of “hidden”, “marginal”, “elusive”, “rare” and “blurred” populations.

The term “hidden population”, in the context of sampling, refers to populations that are hidden from the point of view of the researcher (Brackertz, 2007). In this sense, sex workers’ clients of online prostitution are considered a hidden population, while the population of clients that engage in street prostitution are more visible and more accessible to the researcher than those accessing the market online (Bertolazzi, 2012).

Alternatively, a population may be considered as hidden, if it is hidden from the mainstream society. Watters and Biernacki (1989:417) define socially invisible or “hidden” populations those whose activities are “clandestine and therefore concealed from the view of mainstream society and agencies of social control”.

As noted by Watters and Biernacki (1989), members of the hidden population increase their visibility when they enter institutional settings, such as hospital emergency rooms, drug treatment programs, prisons, *etc.* (Watters and Biernacki, 1989). These approaches imply carrying out research on a hidden population when its visibility increases.

In the field of sex work, some researchers have studied customers when they access an institutional setting. For example, Monto (1999 and 2000) and Della Giusta and her colleagues (2006) studied customers arrested for paying for sex; respondents are reached in the context of rehabilitation programmes for sex workers’ clients.

Corbetta (1999) introduces a further term to define these populations, and this is: “clandestine populations”. This term identifies social groups that hide their identity for some moral, legal, ideological or political reason.

Another dimension of a “hard to reach” population is its marginality. We identify two possible acceptations of the term “marginal population”. Firstly, in social sciences, “marginal populations” are defined as populations that are marginalized by society. Secondly, the

marginality may be defined with reference to the social researcher. More specifically, a population is marginal if it is minor, not important nor central to the research; indeed, some research project might start with a focus on a particular population, and subsequently switch the focus to a different population, that, as a matter of fact, becomes relevant.

While the first definition assigns the responsibility of marginalization to society, the second attributes it to the researcher. Thus, in the latter definition the marginality can be easily solved with a redefinition of the research focus.

With reference to the first acceptance, customers of sexual services are not marginal, as paying for sex may not impact a person's role in society. However, if the purchase of sexual services is discovered and socially condemned, sex workers' clients may be marginalized; but, the marginalization depends on the specific situation (e.g. the social context, the rehabilitation strategies adopted by the client, and the clients' role in society). To quote one famous example, the former Italian Prime Minister Silvio Berlusconi, managed to keep public opinion consensus (at least in the first year) after the highly publicized prostitution scandal (for more details see Garcia, 2010).

With reference to the second definition, sex worker's clients are not marginal; on the contrary, they are the core of this research.

Moreover, a hard to reach population can be elusive. A population is elusive when the members of the population don't want to reveal a particular characteristic to the researcher. The respondent might be unwilling to reveal the characteristic because this is embarrassing, not socially desirable or illegal.

In the case of sex worker's clients, the purchase of sex in the UK is not illegal. However, this behaviour might be considered as socially undesirable due to the stigmatization of sex workers' clients; thus I consider this population as highly elusive.

Moreover, hard to reach populations can be excluded. Atkinson (1998) defines social exclusion in relation to three elements: relativity, agency and dynamics. Thus, firstly the concept of social exclusion is relative to a specific time and a specific society. Secondly, exclusion is an active choice; thus, individuals are excluded by the act of another member of society and, consequently, the causes of exclusion can be identified together with possible

remedies. Thirdly, exclusion is a dynamic process which does not only entail current circumstances but also future prospects.

Paying for sex is a stigmatized behaviour, thus, it may lead to social exclusion; however, as the behaviour is easily hidden and men who pay for sex may not reveal their sex purchase within the community, this population is usually not excluded.

Rossi (personal communication 2012) labels a population as “blurred” when the definition proposed by the researcher is not clear and/or univocal. Different social scientists have used different definitions for sex worker’s clients. Some study focus on broader definitions of prostitution which include also non monetary exchanges (i.e. exchanges of sex for goods or favours). Here the focus is on males who pay money for sex with either males or females.

Finally, the definition of rare population is more widely accepted and objectively defined. Kalton and Anderson (1986) use a definition of rare population as a small subset of the total population. The term “small”, may refer to a population “as large as one tenth or as small as one hundredth, one thousandth or even less” (Kalton and Anderson, 1986:65).

However, Groves *et al.* (2009) point out that “what makes a population rare is not its absolute size but its size relative to available frames that cover it”⁵⁵. This sets a potentiality for the researcher to reach the rare population once a group is identified where the population is clustered. However, this potentiality can be exploited only if a sample frame is available for the population under study. Examples of rare population are people affected with a rare disease, tax evaders, top income earners.

As we have seen so far, some hard to reach populations have more than one characteristics at the same time. For example sex workers clients of indoor prostitution in the UK are hidden, elusive, and rare if compared to the general population.

Moreover, these characteristics are to be interpreted as dimensions. Every “hard to reach” population has different degrees of marginality, elusiveness, rarity, *etc.* These dimensions with reference to the population of sex workers’ clients are summarized in TABLE 4.1.

⁵⁵ It should be noted that, among the definitions of “hard to reach” populations presented here, this is the only definition that makes reference to the survey sampling probabilities.

To visualize these dimensions with reference to the sex workers' clients I draw a "spidergram" graph. The closer to the centre of the graph the more the characteristics apply to sex worker's clients. As it can be seen from the graph, I consider customers as a highly elusive population. I also consider customers as "hidden" since their definitional characteristic is not evident. Furthermore, according to the latest survey data available this population is relatively rare in the United Kingdom; among males living in Britain and aged 16-74, 11% (C.I.: 10.1 – 11.9%) reported having had a sexual experience with a sex worker in their lifetime, and 3.6% (C.I.: 3.1–4.2%) reported purchasing sex in the last 5 years (Mercer *et al.*, 2013; Jones *et al.*, 2014; Natsal-3 data).

The painted area of the graph constitutes the space of possible research. The larger this space is the more possibilities of research are available to the researcher.

FIGURE 4.1: Spidergram – the space of possible research

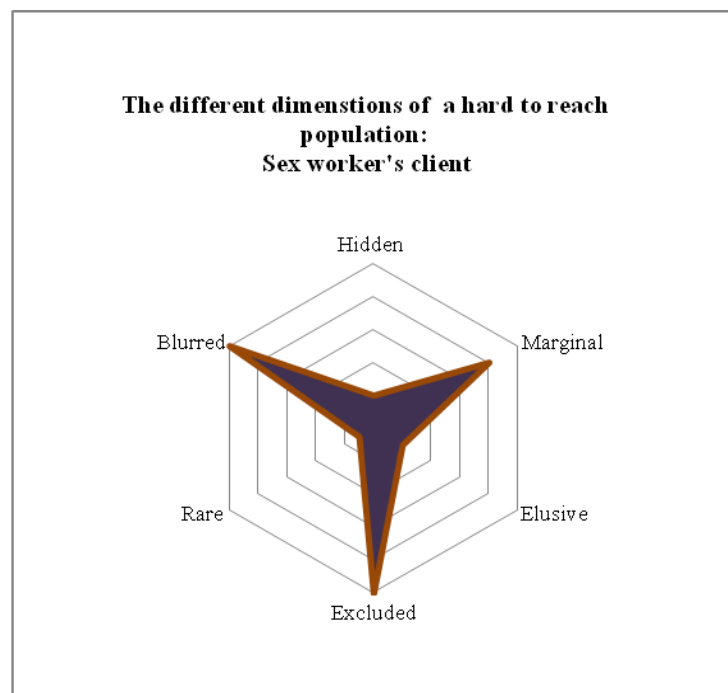


TABLE 4.1: The different dimensions of a hard to reach population

Dimension	Definition's actor	Characteristic	Possible solutions <i>examples</i>	Sex worker's clients <i>examples</i>
Hidden	Intrinsic population characteristic	Visibility	Find a place where the population is not hidden	Depending on type of purchase Yes for sex workers clients of online prostitution No for clients of street prostitution and certain types of indoor prostitution (strip clubs, massage centres)
Marginal	Researcher or society	Focus, judgment and interest of the research Centrality to society	Redefine the focus of the research	In this research, sex workers clients are not marginal, but at the core of the analysis The contemporary literature on sex work is not marginalizing the clients Sex workers' clients may be marginalized (e.g. if paying for sex is criminalized)
Excluded	Society	Attention of society	/	Sex worker's clients are not excluded
Elusive	Intrinsic population characteristic	Unwillingness to reveal the definitional sensitive characteristic	Use special care in asking sensitive question Analysis of incentives and disincentives	Unwillingness to reveal the definitional sensitive characteristic
Rare	Intrinsic population characteristic	Prevalence	Identify areas where the population is not rare	Estimates are variable. The latest figures for Britain show that this population is rare
Blurred	Researcher	Definition	Improve the definition	Definition

4.2 EXAMPLES OF SAMPLING TECHNIQUES ADOPTED IN THE LITERATURE ON SEX WORKER'S CLIENTS

Sex workers clients are defined here as a rare, elusive and hidden population. Indeed, the sampling of a rare population poses problems, because often a complete list of rare elements does not exist – or multiple list cannot be assembled to reach a good coverage (Sudman *et al.*, 1988).

When, elements of the rare population are all included in a larger frame population, the rare population can be covered using a screening method. Evidently, the rarer the population, the higher the screening costs (Groves *et al.*, 2009).

Sudman *et al.* (1988) discuss probability methods for sampling rare and elusive populations developed for geographically clustered populations and populations constituting a social network. None of these methodologies can be applied in sampling customers of sex work, as they are not geographically clustered nor do they constitute a social network.

Indeed, sex workers' clients can be considered as geographically clustered when purchasing sexual activities in the street or in particular venues (strip clubs, massage parlours, *etc*). However, estimates may be biased if some variables of interest for the researcher depend on the location of encounters, and no information is available on the shares of indoor *versus* street prostitution to inform a weighting strategy. Furthermore, these locations may be themselves difficult to access for the researcher.

Despite these challenges, to the best of my knowledge, four nationally representative surveys in Britain collect data on sex workers' clients: the National Survey of Sexual Attitudes and Lifestyles 1 (1990), 2 (2000) and 3 (2010), and the Health Survey for England (2010). While The Adult Psychiatric Morbidity Survey (2007) includes a question on selling sex.

Social researchers willing to collect first hand data on sex workers' clients independently have adopted different sampling strategies for sampling sex workers' clients. Some of these strategies include non conventional approaches, and most of them rely on purposive samples.

For example, Pitts *et al.* (2004) collected a purposive sample of sex workers' clients and non-clients. The authors studied the characteristics of male clients of female sex workers in the state of Victoria in Australia interviewing the participants to the exposition *Sexually Lifestyle Exposition (Sexpo)*⁵⁶ held in Melbourne in December 2001. Data were collected at the information stand of the *Australian Research Centre on Sex, Health and Society* in the area dedicated to health promotion campaigns (Pitts *et al.*, 2004). Everyone who approached the stand was invited to fill in a short anonymous survey. Among this group, 1,225 adults filled in the survey on sex purchases⁵⁷. Data were used to collect information on clients and "non-clients" to compare the two groups. This approach presents problems of *selection bias*: in fact, firstly it relies on the strong assumption that the participants to the exposition are representative of the general population. Secondly, even among the participants to the exposition, only those who approached the information point were interviewed, and this introduces a second form of bias. If feasible, one way to avoid this second criticism would have been to select the participants to the fair randomly to be included in the sample.

Another Australian research (Xantidis *et al.*, 2000) relies on the use of purposive samples to compare clients and "non-clients". In this case, 66 clients that purchased sex in two strip clubs in Melbourne were interviewed. The control group was made up of 66 volunteers – mainly the authors' acquaintances. This sampling strategy poses problems of selection bias. The most relevant concern is the choice of the group of "non-clients": indeed, this strategy is based on the assumption that the authors' social connections are representative of the "non-clients" population.

Alternatively, cluster sampling may be used to survey sex workers' clients who are clustered at the time of purchasing sex (e.g. street prostitution). For example, a study of clients of female prostitution (Nguyen, 2008), conducted in Vietnam, used a two stage cluster sampling. Firstly, a group of peer educators map the beach of Do Son and the red-light districts of Hai Phong (Thien Loi), identifying night clubs, hotels, motels, bars and karaokes

⁵⁶ *Sexpo* is a commercial event hosting different expositors of products related to sexuality. Pitts *et al.*, (2004) affirm that according to official statistics 68.123 person attended the exposition in three days of opening. Data used in the article (Pitts *et al.*, 2004) are collected at the informative stand of the Australian Research Centre on Sex, Health and Society (Pitts *et al.*, 2004).

⁵⁷ The authors do not provide further information on how sample members were selected among those approaching the stand.

that rent rooms. A total of 216 clusters are identified in the beach of Do Son and 198 in the red light district of Thien Loi. Among those, 30 clusters were selected in each of these two areas. In a second phase 5 clients, within the same cluster, were interviewed. The interviews, consisting in a structured interview, were administered with the use of a CD and headphones and response categories were recorded anonymously. Even though this strategy was good for the authors' purposes, it presents some limitation in other contexts: indeed, if the geographical share of the markets is unknown (i.e. the beach, the hotels, the strip clubs *etc.*) and the variables of interest are correlated – either directly or through other variables – with the different types of markets, results might be biased.

Other authors have exploited the illegal character of paying for sex in most US states to gather information on clients who have been arrested. Monto (1999; 2000), Bush and her colleagues (2002), Monto and McRee (2005) and Della Giusta and her colleagues (2006; 2011) use a sample – collected by Martin Monto – of arrested male clients of female street sex workers in four U.S. cities, namely: San Francisco, Portland, Las Vegas and Santa Chiara. Some of the arrested clients were required to participate in the programme as part of their sentence, while others had the incentive of a reduced fine or of the arrest being cancelled from their records. Within the programme clients were asked to complete a self-completion questionnaire.

As noted by Della Giusta and her colleagues (2006; 2011), there are three selection issues associated with the use of these data: firstly, the dataset is constituted only by the clients who have been arrested. The authors have no information on “non-arrested” clients, and on whether those differ from arrested clients. Thus, it is not possible to determine whether there exist a selection bias and which is the extent of such bias. The authors speculate that regular clients⁵⁸ might be more able to avoid arrest. However, I propose the opposite supposition: regular clients are more likely to be arrested because they meet sex workers more frequently.

Secondly, there is a form of self-selection arising because only clients who attend the re-habilitation programme are eligible for the survey. There is no information on the other men, who didn't take part in the project.

⁵⁸ Della Giusta and her colleagues define regular clients as those who have paid for sex more than once.

I would also add that there might be an income effect at play: in some cases, it was possible to exchange a monetary fine with the participation in the programme; thus, I speculate that wealthier clients might be underrepresented in this study.

Moreover, the authors note that there is a non-response error, since some – less than 20% of the course participants – of the eligible clients didn't complete the survey.

Finally, the authors don't address whether there might be a measurement effect due to the fact that the questionnaire – though in self completion – is completed in an institutional setting, where clients are arrested for purchasing sex and the practice of paying for sex is clearly condemned.

Minchiello and his colleagues (1999) studied male clients from a different perspective. They used as proxy respondents male sex workers; the sample of male sex workers was composed of: 1. sex workers who work in licensed escort agencies 2. street sex workers recruited from locations where they are seen to work and could be conveniently reached – i.e. suburbs, streets and parks. Every sex worker completed a diary after each commercial sex encounter with a male client, during a two week period. As the method adopted by Nguyen (2008), also this method is not advisable if the data need to be used to derive a representative description of men who pay for sex; indeed, if clients vary by location of sex purchase in some of the variables of interest for the researcher, results would be biased, unless the sample is weighted by location.

Up until now we have described the sampling strategies adopted in “quantitative” social sciences; in the qualitative realm, Peng (2007) studied the power dynamics in the practice of client-prostitute relations conducting web interviews using an internet chat room diffuse in Taiwan. This purposive sample is composed of both members of the online community and the social network of the researcher. However, the aim of the study rather than being the description of the population, was to understand the interpretation given by the clients of their relationship with the sex worker.

Alternatively, another strategy for collecting purposive samples that has been used in qualitative studies on sex workers' clients is the use of newspapers or radio announcements. Farley and her colleagues (2011) used a purposive sample of males who bought sex in Edinburgh and Glasgow. Clients were recruited through newspaper advertisements. In

particular the researchers used an advertisement with this wording: “Ever been a client of a prostitute? International research team would like to hear your views. Honorarium will be paid. Confidentiality guaranteed.”

Similarly, Leonini *et al.* (1999) used sampling strategies that included newspaper advertisements, and gave the opportunity to clients to tell their stories in an open microphone within a radio night programme. These strategies proved to be a useful method to collect a purposive sample of clients, renouncing to the possibility of extending the results to the entire population.

Finally, besides the presented sampling strategies, some researchers, rather than being interested in sampling sex workers’ clients, may be interested in determining only the dimension of the phenomenon. Given the hidden nature of this population, peculiar methods may be used as the *capture-recapture* technique derived from natural sciences: Roberts and Brewer (2006) used this method to estimate the prevalence of male clients of female sex workers in Vancouver, with data on males arrested by the Police Department in Vancouver for hiring a sex worker.

To sum up, the hidden, rare and elusive nature of this population have posed challenges to social researchers, with the resulting use of alternative sampling strategies. Examples of different strategies, including the research question and sampling method are summarized in TABLE 4.2 below.

TABLE 4.2: Examples of sampling strategies to survey sex workers' clients

Study	Research question	Sampling method
Pitts <i>et al.</i> (2004)	Analysis of demographic, sexual history measures and motivations of men who pay for sex	Purposive sample of the participants at the Sexually Lifestyle Exposition (<i>Sexpo</i>)
Xantidis <i>et al.</i> , 2000	Analysis of demographic, sexual history measures and motivations of men who pay for sex	Purposive sample of acquaintances
Nguyen, 2008	Determine HIV/STI prevalence; factors associated with being potential and active bridgers for STI/HIV; association of drug use and unsafe sex with HIV and/or STI prevalence	Two stage cluster sampling
Monto (1999; 2000), Bush <i>et al.</i> (2002), Monto and McRee (2005) and Della Giusta and <i>et al.</i> (2006; 2011)	Clients' characteristics and motivations to pay for sex (Monto, 1999; 2000; Monto and McRee, 2005); clients' attitudes and characteristics (Bush <i>et al.</i> 2000); conditional association of risky behaviours and socio-demographic characteristics with paying for sex (Della Giusta <i>et al.</i> , 2006; 2011)	Census of arrested clients participating in a re-habilitation course.
Peng (2007)	Interpretation given by the clients of their relationship with the sex worker.	Purposive sample, from an online forum / social networks
Farley <i>et al.</i> (2011)	Clients' attitudes and characteristics	Purposive sample recruited with newspaper advertisements
Leonini (2001)	Clients' characteristics, motivations, and relationships established with the sex-worker	Purposive sample recruited with newspaper advertisements and open microphone at radio night programme
Minchiello <i>et al.</i> (1999)	Mode of recruitment, clients' characteristics, and clients' behaviours	Proxy interviews of sex workers
Di Nicola <i>et al.</i> (2006)	Characteristics of clients of trafficked prostitution (<i>versus</i> clients of non-trafficked prostitution) Motivation to pay a trafficked woman for sex	Snowball sample, purposive sample

4.3 ANALYSIS OF THE “EVERY MAN PERSPECTIVE” HYPOTHESIS BY SAMPLING STRATEGY AND RESEARCH PARADIGM

Monto and McRee (2005) have identified two antithetic views in the social science literature on men who pay for sex: the “every man” perspective and the “peculiar man” perspective. The “every man” perspective implies that sex workers’ clients are not statistically different in terms of socio-demographic characteristics and psychological traits from “non-clients”; while the “peculiar man” perspective, implies that customers have distinctive characteristics and peculiar traits (e.g. psychological, social, or physical inadequacies) compared to “non clients”.

I argue that the sampling strategies and the research paradigm adopted (qualitative *versus* quantitative) to study sex workers clients influence the endorsement of these two theses.

Qualitative studies which used purposive samples (e.g. Leonini, 1999; Moffa, 2011) suggest that paying for sex is transversal to different social groups and do not present peculiar psychological traits; this result is based on the evidence of the existence of men who pay for sex in many different social groups.

Conversely, quantitative studies relying on probabilistic samples have identified some social groups, that are more likely to pay for sex than others. For example, with reference to Britain, in terms of socio-demographic variables, Jones *et al.* (2014) find that age, education, marital status and occupation are associated with paying for sex. Regarding other social traits, Cameron and Collins (2003: 285) show that paying for sex is associated with risk taking (e.g. heavy smoking), social deficiencies (i.e. less developed social networks), and “social controls and supply constraints in their community-specific sexual opportunities” (e.g. pertaining to the Roman Catholic or Muslim communities).

Thus, to sum up, the sampling strategy and the research paradigm adopted influence the substantive conclusions of the literature; while it is clear that the phenomenon is transversal to different social groups, there is also clear evidence, at least for Britain, that there are particular segments of society that are more likely to be sex workers’ clients than others.

4.4 CONCLUSIONS

In this chapter we have defined the terms “hard to reach”, “hidden”, “marginal”, “elusive”, “rare” and “blurred” populations. Sex workers’ clients can be considered “hard to reach” – or “hard to survey”, using the terminology proposed by Tourangeau *et al.* (2014).

Given the stigma associated with paying for sex, customers may be not willing to reveal their behaviour, thus this population is considered highly elusive. Also, estimates from national representative surveys show that paying for sex is rare, at least in Britain; thus, we can consider sex workers’ clients as a rare population. Also, sex workers’ clients may be considered a hidden population; although the level of visibility depends on the type of sex purchase, with clients of street prostitution being more visible than clients of indoor prostitution.

Due to the elusiveness, rarity, and hidden nature of this population, and since sex workers’ clients do not constitute a social network, nor are they geographically clustered, sampling sex workers’ clients is challenging. Researchers willing to collect first hand data on the topic have often used purposive samples.

Alternatively, in Britain, the availability of survey data on the topic allows secondary analyses. Indeed, to the best of my knowledge, four probabilistic surveys collect data on men who pay for sex: these are the Health Survey for England (2010) and the National Survey of Sexual attitudes and Lifestyles (Natsal 1,2, and 3).

Finally, substantive results may be influenced by the elusiveness, rarity and hidden character of the population of sex workers’ clients, through the sampling strategy and research paradigm adopted. Indeed, given the challenges in researching these populations, social researchers have adopted different sampling strategies and research paradigms, that in some cases, lead to contrasting results.

CHAPTER 5 – SENSITIVE QUESTIONS IN SURVEYS ON SEXUAL BEHAVIOUR: THE CASE OF PAYING FOR SEX

As it has been shown in CHAPTER 3, the stigma associated with paying for sex poses a challenge in surveying sex workers' clients. In fact, this population is hard to survey, for two reasons: firstly, this population it is hard to sample⁵⁹ (see CHAPTER 4), secondly, surveying a sex worker's clients implies asking sensitive questions. The latter is the topic of this chapter.

Indeed, research on hard to reach populations is often based on sensitive questions. The reason why a population is hidden, marginalized and elusive is that the defining characteristic of this population is stigmatized by society and/or is illegal (e.g. drug users, sex workers, illegal immigrants, tax evaders). Also, the reason why the researcher is interested in that particular population is exactly the sensitive aspects that define the population. Thus, a research focused on sex workers' clients implies asking sensitive questions on paying for sex, at least to identify the population, but often also because this is the main topic of interest for the researcher.

Questions about paying for sex are sensitive questions about behaviour. This type of question may induce in the respondent "deliberate misreporting and may require special steps to elicit accurate answers" (Groves *et al.*, 2009:243). Indeed, empirical studies comparing the accuracy of survey data with administrative records (e.g. self-reported abortions compared with data from abortion clinics) or other true scores (e.g. self-reported drug use compared

⁵⁹ "Hard to sample" is a characteristics of a population that is "hard to survey". Tourangeau (2014) uses the expression "Hard to survey" – rather than the more diffuse "Hard to Reach"— and includes in this group: "hard to sample", "hard to identify", "hard to find or contact" and "hard to interview" populations.

with urinalysis) have shown that misreporting is quite common and largely situational (Tourangeau and Yan, 2007)

5.1 THE DEFINITION OF SENSITIVE QUESTIONS

There is no standard definition of sensitive questions in surveys and the level of sensitivity is subjective, and varies widely across countries and time. However, Tourangeau *et al.* (2000) identify three aspects that lead to a sensitive question: a. Social (un)desirability of the answer, b. Invasion of privacy⁶⁰ and c. Risk of disclosure of the answer to third parties. In particular, questions about paying for sex follow in the broader category of questions about sexual behaviour, and satisfy all three requisites of sensitivity.

In fact, firstly, since buying sex is stigmatized, questions about this behaviour are subject to social desirability bias. Secondly, questions about “money” (e.g. income, benefits, and personal expenses) and about sexual behaviour are considered particularly intrusive (Tourangeau *et al.*, 2000). Research on the sex industry (e.g. sex work and pornography) is the only field of study that by definition involves asking questions simultaneously about these two taboo topics: sexual behaviour and money – specifically, personal expenses. Thirdly, sexual behaviour is an intimate topic and even in confidential and anonymous settings, respondents may consider questions about sex as an invasion of privacy.

The sensitivity of the question does not depend only on the question’s topic but also on whether the sample member is engaged in the sensitive behaviour or not. Broadly speaking, in sensitive questions about behaviour, respondents face the dilemma of choosing

⁶⁰ Privacy is defined here as “the right of the individual to define for himself, with only extraordinary exceptions in the interest of society, when and on what terms his acts should be revealed to the general public” (Westin, 1967: 373). In survey research, we include in Westin’s definition also attitudes, opinions, and beliefs (Bradburn, Sudman and Wansink, 2004).

Furthermore, there are two main aspects of the privacy that are particularly relevant for survey research. Firstly, privacy is not an absolute right. In some exceptional circumstances the interest of society may justify an invasion of privacy, although in normal circumstances, privacy is to be protected (Bradburn *et al.*, 2004). Secondly, the right to privacy is peoples’ right to have control over personal data they wish to reveal to others, but does not protect a person from being asked a sensitive question. People have the right to decide whether they want to answer a question and under which conditions they want information to be available; and privacy requires that the information revealed in confidential condition remain confidential (Bradburn *et al.*, 2004).

Moreover, in surveys, the term “*informed consent*” implies that sample members should be given sufficient information about the topic (what they are being asked) and the data usage (how their responses will be used) in order to judge the potentially unpleasant consequences that may follow from disclosure (Bradburn *et al.*, 2004:14).

whether to tell the truth or misreport any behaviour that they feel is not socially desirable (Bradburn *et al.*, 2004). Thus, a question may be sensitive for some sample members but not for others.

Reconsidering the definition by Tourangeau and his colleagues (2000), the social desirability of the answer may influence the response propensity only for respondents who have engaged in socially undesirable behaviour. If paying for sex is stigmatized, sex workers' clients may refuse to answer the question or misreport their answer as their behaviour is socially undesirable. While, sample members that did not pay for sex may respond truthfully to the survey question as social desirability is not problematic for them. In this latter case, the true answer to the question (i.e. not having paid for sex) is socially desirable. Since their answer is not socially undesirable, social undesirability does not constitute an incentive to misreport or to skip the survey question.

The same reasoning applies – to a lesser extent – to the other two aspects of sensitive questions identified by Tourangeau *et al.* (2000). A question is more likely to be perceived as an invasion of privacy if the sample member is engaged in sensitive behaviour. Similarly, the risk of disclosure to third parties may be problematic when the respondents did engage in the sensitive behaviour, while it may be innocuous if the sample member did not. This theoretical argument has practical implications as the propensity to respond, and to respond truthfully, to a sensitive survey question varies across sample members. This happens not only because social desirability, privacy concerns and perceived risk (and consequences) of disclosure are subjective, but also because the propensity of correctly reporting sensitive behaviour depends on the respondents' true value of the elicited behaviour.

Other sample member characteristics may influence the reporting behaviour of a sensitive question. Firstly, sample members may attach a different value to privacy and confidentiality. Some sample members may perceive the sensitive attribute as more socially undesirable than others – for example, if they highly value social norms; also, some sample members may consider the potential negative consequences of revealing socially undesirable behaviour – for example due to lack of trust in the survey agency or previous negative experiences or some may consider privacy concerns and risks of disclosures more seriously.

Also, sample members may value differently the sensitivity of a question depending on who is the recipient of the sensitive information. Indeed, sensitivity “depends on respondents' concerns about disclosing any information about certain topics, about disclosing

information to an interviewer, and about disclosing to third parties” (Tourangeau *et al.*, 2000: 259). The first two are components of privacy concerns – i.e. the desire to not reveal information about oneself to anyone else (Singer *et al.*, 1993); while the third factor is attributable to a confidentiality concern, such as the desire to avoid the information passing from one agent to another (Singer *et al.*, 1993).

Finally, a further aspect that influences social desirability is how prevalent the socially undesirable behaviour is in the population. On this point, two different effects may go in opposite directions: on the one hand the potential for understatement is greater for behaviour that is common, because more people behave in a socially undesirable manner, and thus more people have an incentive to misreport⁶¹. On the other hand, the higher the proportion of people that have behaved in this socially undesirable manner, the lower the threat for the respondent to admit that behaviour.

5.2 EMPIRICAL EVALUATION OF THE SENSITIVITY OF A SURVEY QUESTION

In the previous section I used theoretical arguments and assumptions to determine whether the topic object of this study is sensitive. In an early work on sensitive questions, Bradburn and his colleagues (1979) rate the sensitiveness of survey topics asking respondents to evaluate survey questions (see TABLE 5.1). Masturbation resulted as the most sensitive topic and sexual intercourse the third, reinforcing the suspicion that sexual behaviour is among the most sensitive topics in surveys. Here we mention two other alternative ways of assessing whether a question is sensitive: the level of item missing data, and mode effects.

Indeed, mode effects have been used to assess the sensitivity of survey questions (Tourangeau *et al.*, 2000). In fact, data collection mode influences reporting sensitive behaviours, as respondents are more likely to disclose embarrassing and private information in self-completion (Tourangeau *et al.*, 2000). Instead, the impact of self completion compared with other data collection modes seem negligible for non-sensitive items (Tourangeau *et al.*, 2000). Thus, the difference in reporting the behaviour with a self completion mode compared with an interviewer administered question can be used as an index of the sensitivity of the

⁶¹ The same reasoning applies, but in the opposite direction, for socially desirable behaviour. There is more potential for over-reporting socially desirable behaviour that is rare, as the proportion of the population behaving in a socially undesirable manner is larger. Thus more people have an incentive to misreport (Bradburn *et al.*, 2004).

item (Tourangeau *et al.*, 2000) – for a wider discussion of mode effects in sensitive questions please see section 5.6.4.

TABLE 5.1: Proportion of respondents reporting that most people would be “very uneasy” about a topic

Topic	% most people would be “very uneasy”
Masturbation	56.4
Use of Marijuana	42.0
Sexual Intercourse	41.5
Stimulants and depressants	31.3
Intoxication	29.0
Petting and kissing	19.7
Income	12.5
Gambling with friends	10.5
Drinking	10.3
General leisure	2.4

Source: Bradburn *et al.* (1979)

5.3 SENSITIVE QUESTIONS AND NON RESPONSE

In order to cope with sensitive questions respondents may simply avoid answering them. For sensitive questions, as well as for any other survey question, there are two types of non response: the sample members may avoid answering one specific question (item non response) or they may refuse to take part at all in the survey (unit non response).

There are several reasons why a sample member might decide not to answer a single survey question (item non response). The respondent may not know the answer, may forget to answer the question, may refuse to answer the question considering it too private or because the questionnaire might be too long to complete *etc.* (de Waal *et al.*, 2011). In some cases, item non response is not related to an action of the respondent but values may have gone missing in the editing phase, and in other cases, data may be lost (de Waal *et al.*, 2011).

Finally, sometimes rather than skipping the survey question, the respondent may misreport the answer. Groves *et al.* (2009) argue that “sometimes refusing to answer a question may be more awkward than simply underreporting some embarrassing behaviour”. For example, refusing to answer a question about cocaine use may be considered an admission of using cocaine (Groves *et al.*, 2009). Similarly, refusing to answer a question about paying for sex may be considered an admission of paying for sex. Thus rather than

refusing, the strategy adopted by the sample member to avoid revealing the sensitive behaviour may be misreporting rather than refusing to answer the survey question.

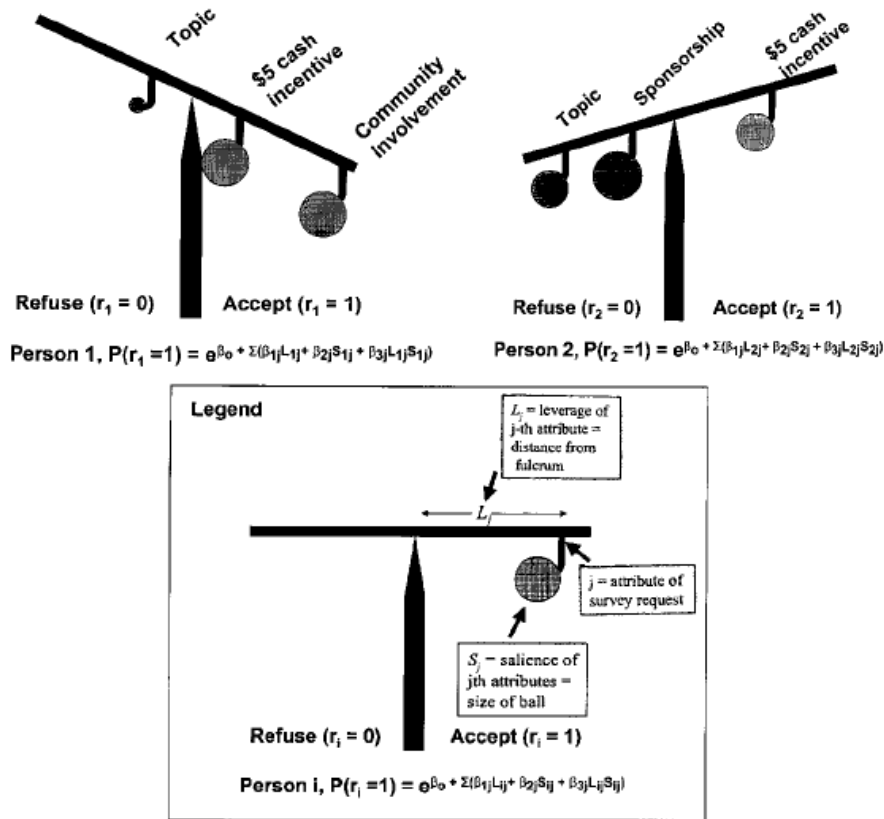
5.3.1 SENSITIVE QUESTIONS AND UNIT NON RESPONSE

Sensitive questions may also alter the decision to participate in a survey. The decision to participate in a survey is different in cross-sectional surveys compared with panel surveys. Indeed, participation in a cross-sectional survey is typically a one-off choice⁶², while the decision to participate in a panel survey is taken by the sample member multiple times, and it is affected by previous interview experiences. Thus, participation in longitudinal surveys is a cumulative choice. In this chapter, I analyse the participation in a survey as a one-off choice, studying the participation in a cross section.

The survey literature agrees that topic matters in the sample members' decision to take part in a survey. The leverage-saliency theory (see FIGURE 5.1 below) – theorized by Groves *et al.* (2000) – “suggests that a single survey design attribute will have different “leverages” on the cooperation decision for different persons. Furthermore, the activation of the potential leverage depends on whether the attribute is made salient to the sample person during the survey request.” (Groves *et al.*, 2000: 306-307). The theory applies to sensitive topics in multiple ways.

⁶² For the sake of this discussion, we ignore here particular cases of follow-up surveys within cross sectional studies.

FIGURE 5.1: The leverage saliency theory



Source: Groves *et al.*, 2000

Firstly, the survey topic can be a leverage on the sample member cooperation decision. To the best of my knowledge, questions about paying for sex are elicited in surveys on physical health (e.g. the Health Survey for England), on mental health (e.g. Adult Psychiatric Morbidity Survey, 2007), and on sexual health (e.g. The National Survey for Sexual Attitudes and Lifestyle)⁶³. Sample members that highly value health research might be activated by the leverage of the survey topic if it deals with health. Conversely, the leverage activated by surveys on sexuality might be weaker, as it might be harder to convey to respondents the relevance of collecting survey data on sexuality (regardless of how strongly these data can inform policies, and contribute to scientific research in fields including epidemiology, sociology, social policy, economics, and demography).

⁶³ Whereas questions about attitudes on paying for sex are elicited in surveys focused on values (e.g. the word value survey), multipurpose surveys or polls.

Secondly, sample members more concerned about sensitive topics “would assign high positive leverage to modes of data collection offering privacy (e.g., audio CASI)” (Groves *et al.*, 2000: 307). Thus, particularly in the case of sensitive topics, more “confidential” modes of data collection, exercise leverages on the cooperation decision of the sample member.

Thirdly, confidentiality assurance is a characteristic of a survey that may activate a leverage in the cooperation decision of the respondent and the leverage might be stronger if the survey covers a sensitive topic. Indeed, confidentiality assurance is used in surveys on sensitive topics to reassure the respondent about the protection of confidentiality of the data provided⁶⁴.

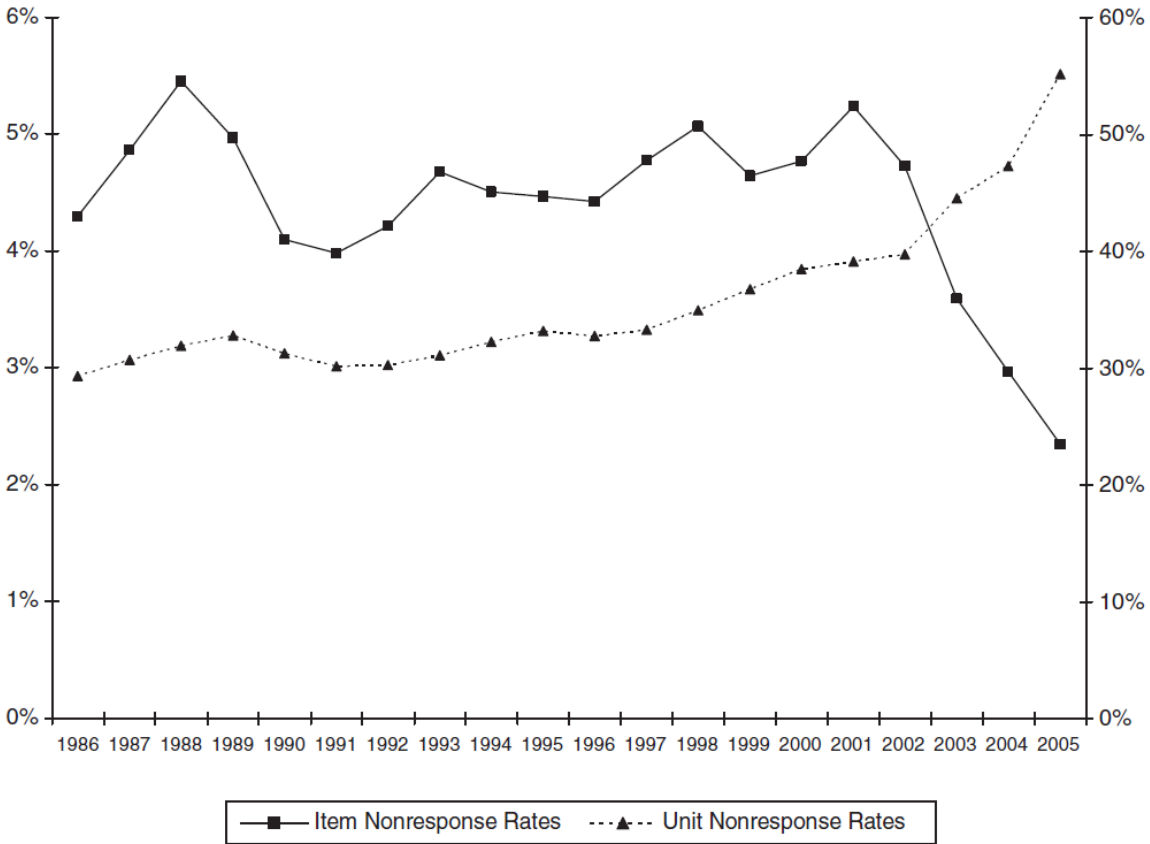
Finally, different social environments influence the cooperation decision of the sample member. The place where the respondent is at the time of the interview is a factor that influences reporting (Haseldon and Joloza, 2009) as well as participating in surveys. In different situations, not only different factors contribute differently to the individual perception of the self but also concern regarding privacy in each setting changes (Haseldon and Joloza, 2009). This interacts with the sensitivity of the survey topic as concern regarding privacy varies according to the setting and has a pivotal role in surveys on sensitive topics.

5.3.2 SENSITIVE QUESTIONS AND ITEM NON RESPONSE

The relationship between item non response and unit non response is shown by Yan and Courtin (2010). As we can see in GRAPH 5.1, data from the survey of consumers shows that while item non response has decreased in the last decades, unit non response has increased. Thus the reduction in item non response might be due to a self-selection of participants that are more interested in the survey, rather than an actual reduction of item non response. In the case of surveys on sexual behaviour, once participation in the survey is gained, item non response might be low as the respondent already expects to be asked very sensitive questions on sexuality (Lynn, 2014 – personal communication).

⁶⁴ Singer *et al.* (1995), in a meta-analysis, found a small but significant effect in including confidentiality assurances when the survey topic is sensitive.

GRAPH 5.1: Item non response and unit non response 1986 - 2005



Source: Yan and Courtin, 2010, data from the Survey of Consumers

5.4 THE COGNITIVE PROCESSES IN ANSWERING SENSITIVE QUESTIONS: THE CASE OF PAYING FOR SEX IN THE NATIONAL SURVEY OF SEXUAL ATTITUDES AND LIFESTYLES -2

Answering a survey question is a multistage experience that involves four groups of processes: “comprehension”, “retrieval”, “judgment”, and “reporting” (Groves *et al.*, 2009). Comprehension refers to the respondents’ interpretation of the survey question; retrieval refers to the processes of recalling the information needed to answer the survey question; judgement, refers to the process of summarizing and putting together the recalled information in order to respond to the question; and reporting is the process of formulating the response according to the format required (Groves *et al.*, 2009).

Let’s now analyse the response process in the main questions of paying for sex adopted in this study. I am measuring the concept of paying for sex using the variable “ever

paid for sex” in the National Survey of Sexual Attitudes and Lifestyles, Natsal-2. The variable is mainly based on two survey questions: “Have you ever paid for sex with a woman?” and “Have you ever paid for sex with a man?”.

In answering this survey question, the respondent is firstly asked to comprehend the meaning. He needs to delimit correctly the word “sex”, which here includes vaginal, oral and anal sexual intercourse; and, in case of doubt, he is expected to consult the definitions provided. Also, he needs to interpret the concept “paying” deciding whether it includes only monetary payments or also payments in kind (e.g. sustenance, promotions, clothes, drugs). Moreover, clients paying for sex with a transsexual sex worker would need to decide whether the transsexual should be labelled as “man” or “woman”. To sum up, words “sex”, “paying” and even “men” and “women” may be subject to multiple interpretation. This does not necessarily lead to misleading answers, as the respondent may use the information provided in the survey or he may ask the interviewer for clarification.

After completing the comprehension process, the respondent needs to retrieve the correct information from his long term memory⁶⁵: thus search through his life memories for the experience of paying for sex. Groves *et al.* (2009) describe retrieval as an iterative process where respondents formulate cues including an abstract of the question: these are prompts to the long term memory. Cues recall information from the long term memory, that can either constitute the answer to the survey question, or – more commonly – prompt further cues that may lead to the answer (Groves *et al.*, 2009). The iterative process of generating cues and retrieving information from the long term memory ends when the respondent identifies the information requested to answer to the survey question, or when he/she gives up (Groves *et al.*, 2009). Easiness and success in the retrieval process depends, among other things, on the nature of the event questioned (e.g. distance in time, repetitiveness, salience).

In answering the question on paying for sex, the respondent is asked to consider his entire lifespan. Elderly respondents that have been sex worker clients in youth may need to remember events which happened over 20 years earlier⁶⁶. However, paying for sex may be a salient event in a person’s life, therefore, it may be impressed in the memory of the sample member. As a matter of fact, retrieval may not be as problematic as with other survey

⁶⁵ “Long term memory is the memory system that stores autobiographical memories, as well as general knowledge” (Groves *et al.*, 2009:221).

⁶⁶ The population under study is constituted by men aged 16-44.

questions (e.g. number of sexual partners). The process of retrieval may be more challenging in the subsequent questions, when the respondent is asked to place the event in a timeframe and to count the number of men and/or women he paid for sex.

The process following retrieval is judgement (or estimation). This consists in combining or supplementing the information retrieved (Groves *et al.*, 2009). The judgment process is relatively straightforward in these survey questions on paying for sex as the information asked for is generic: whether the respondent has paid or not for sex in his lifespan. While subsequent questions ask for more details (e.g. when was the last occasion of paying for sex) and may require more judgment and estimation of retrieved information.

The process of reporting consists in selecting and communicating the information in the required format (Groves *et al.*, 2009). Reporting the answer depends on the fit between the identified answer and the constraints imposed by the question (Groves *et al.*, 2009). Thus, the process includes tailoring the answer to the response categories (Groves *et al.*, 2009). In the question analysed here this means finding the appropriate answer to a closed question with categorical response options: “yes” or “no”. Once the respondent has identified the answer, he goes through a further sub-process of deciding whether to report the answer or not. The respondent may deliberately misreport a socially undesirable answer to avoid embarrassment, for fear of disclosure to third parties, for privacy concerns, *etc.* Alternatively, the respondent may decide to avoid answering the survey question and skip it. It should be noticed that both the processes of unintentionally misreporting (genuinely producing a wrong answer) and item non response (due, for example, to lack of time or commitment) may happen at all other stages. Misreporting and item non response in the question on paying for sex is described in more detail in the next chapter.

Survey respondents may not go through every single theoretical cognitive step – or at least not through every single step accurately (Groves *et al.*, 2009). Also, respondents may go through these processes in a different order, and there may be overlap between processes (Groves *et al.*, 2009). Moreover, this list of processes is not exhaustive (Tourangeau, 1984). Respondents may go through additional processes, as, for example, deciding whether to reveal the true score elicited, and, if not, evaluate which strategy to adopt in order to avoid reporting the true score: refusing to answer the survey question or misreporting.

There is a further cognitive process involved in answering any survey question: “encoding”. This starts before (and independently from) the survey interview and refers to the

process of “forming memories from experiences” (Groves *et al.*, 2009: 219). Questionnaire design may be improved by taking into account how the respondent has encoded the requested information (Groves *et al.*, 2009). With reference to paying for sex, the respondent may have formed negative memories of this experience. For example, paying for sex may have implied cheating on the partner, or violating social norms, or failing to find a “non paid” partner. Some sex worker clients that have formed negative memories associated with their experience of paying for sex may find it painful to retrieve the information. This may have an influence both on the propensity to provide a valid answer and on the propensity to report the behaviour truthfully.⁶⁷ Finally, self completed paper administered questionnaires require the further cognitive process of understanding the questionnaire instructions and navigating the questionnaire to identify which the subsequent survey question they are invited to answer is (Groves *et al.*, 2009). The respondent may incur in “navigational errors”. Those are survey errors that consist in skipping an item that the respondent was expected to answer or answering a question that was not requested, due to the misunderstanding of the questionnaire introduction and incorrectly navigating a self completion paper questionnaire. Limited attention is paid to this aspect here, as this questionnaire section is mainly administered with CASI.

The survey methodology literature has proposed other cognitive models of answering a survey question. The recalled cognitive processes described by Groves *et al.* (2009) has been previously discussed by Tourangeau (1984). Caneell, Miller and Oksenberg (1981) proposed a model with two alternative response strategies: while some respondents answer the question carefully (or at least adequately) going through all cognitive steps (comprehension, information processing, evaluation, evaluation of the question threat and reporting)⁶⁸; others may find it difficult to go through all processes carefully, especially if the question requires a strong effort to provide an accurate answer or if the answer is embarrassing. Thus, some respondents may adopt shortcuts to complete the survey faster: for

⁶⁷ Evidently, paying for sex may also be a positive or neutral experience, and this may not affect negatively reporting paying for sex.

⁶⁸ These are similar to the processes proposed by Groves *et al.* (2013), with the difference that Caneell *et al.* (1981) include also the cognitive process of evaluating the “psychological meaning of the response in relation to personal goals extraneous to the survey” (Caneell *et al.*, 1981:394) arguing that “Some respondents, however well intentioned, will probably evaluate an intended answer in terms of its potential threat to their personal goals-for instance, self-esteem-in addition to the goal of giving accurate responses.” (Caneell *et al.*, 1981:394).

example they may answer the question based on situational cues, based on the interviewer appearance, the questionnaire or the survey organization (Caneell *et al.*, 1981).

The idea of two different response styles, is carried forward in the “satisficing” model by Krosnick and Alwin (1987) and Krosnick (1991). This model stresses the idea that the same respondent may change response styles during the interview. Initially, respondents may perform the cognitive steps in answering a survey question carefully and comprehensively, with a so called “optimizing” response strategy (Krosnick, 1991). As the interview proceeds, burden (fatigue, distraction, impatience, disinterest) increases. Many survey respondents may shift their response style, opting for acceptable answers (“satisficing”) rather than optimal answers (Krosnick, 1991). This is particularly the case when optimal answering would require strong cognitive effort (Krosnick, 1991). Satisficing takes either the form of “incomplete or biased information retrieval and/or information integration” (Krosnick, 1991:213) or the form of “no information retrieval or integration at all” (Krosnick, 1991:213). Response strategies of the satisficing respondents include: choosing the first response alternative that seems reasonable, agreeing with an assertion made by a question, endorsing the *status quo* instead of social change, failing to differentiate in rating diverse objects, choosing the “don’t know” option and randomly choosing a response alternative (Krosnick, 1991:214).

Either of these two latter response models may be applied to the question on paying for sex under study. However, the theoretical framework for the analysis of non response in paying for sex is the original model by Tourangeau (1984) and integrated by Groves and his colleagues (2009).

5.5 POSSIBLE SOLUTIONS: QUESTIONNAIRE DESIGN, MODE OF DATA COLLECTION, INDIRECT QUESTIONING TECHNIQUES AND OTHER METHODS

The two main factors that influence the extent of misreporting are: (1) Whether the respondent has/hasn’t engaged in any embarrassing behaviour, and (2) the design features of the survey (Tourangeau and Yan, 2007). Obviously, as social scientists, we can work only on the second factor. The survey methodology literature has identified three main families of strategies to decrease misreporting in sensitive questions: (a) questionnaire design techniques aimed at increasing valid responses (b) the choice of the best mode of data collection and (c) the use of indirect questions.

In this paragraph I focus on questionnaire design, in the next I shall discuss data collection modes, while in the third, I shall discuss indirect questioning techniques. In the last section I will list other suggestions for asking sensitive questions in surveys.

5.5.1 QUESTIONNAIRE DESIGN

As in day to day interactions, survey questions are subject to ambiguities and miscommunication (Brauburn *et al.*, 2004). In everyday life miscommunication may be identified when unexpected behaviour occurs (or expected behaviour does not occur). Whereas in surveys, the identification of ambiguities and miscommunications is assigned mainly to pretests. In fact, not every error becomes evident from lack of consistency across data.

All cognitive processes that lead to the identification of the answer to a survey question (described in the section above) entail potential sources of error. In order to minimize these errors the methodological literature has identified guidelines for writing survey questions. In particular, Sudman and Bradburn (1982) and Bradburn *et al.* (2004) proposed a list of recommendations for sensitive questions about behaviours⁶⁹. The main recommendations are summarized here, combining the suggestions with the most recent literature on the topic.

To start with, the use of open ended questions is – when possible – recommended (Bradburn *et al.*, 2004). In fact, close ended questions suffer from two main disadvantages. Firstly, they inevitably lose information. Secondly, the respondent may interpret closed categories as informative of the behaviour's distribution in the general population, and model his answer accordingly, not choosing the extreme values (Groves *et al.*, 2009). In fact, close ended questions may require, in some situations, an ordering of alternatives (e.g.: “once a month”; “once a week” or “more than once a week”). Respondents may tend to avoid extreme answers (the first or the last) and chose an answer in the middle. This is based on the idea that middle answers are thought to indicate the values considered, by the researcher, as most likely or, in any event, less extreme, in the population (Bradburn *et al.*, 2004).

Let's consider a question from the National Survey for Sexual Attitude and Lifestyles-2, Natsal-2. This is the question eliciting the number of sexual intercours. It is an open

⁶⁹ Sensitive questions about behaviour are defined by Braudburn *et al.* (2004) as “threatening questions about behaviour”.

ended question formulated as following: “On how many **occasions** in the last **4 WEEKS** have you had sex with a (*WOMAN/MAN*)?”⁷⁰ A possible close ended version of this question may have as response alternatives: “0”, “from 1 to 3 times”, “from 4 to 7 times”, “from 8 to 19 times”, “20 or more times”. On the one hand, the close end version of the question would have lost some information – specifically the number of intercourses of respondents that had more than 20 sexual intercourses in the last 4 weeks, i.e. approximately 3% of sexually active respondents according to Natsal-2 data. On the other hand, due to social desirability respondents at the extremes of the distribution (e.g. those with 20 or more sexual intercourses or those with 0 intercourses) may report a middle value.

Further advice for asking questions on sensitive topics is the use of long questions (Bradburn *et al.*, 2004). Long questions enhance recall, as they give respondents more time to remember and they may provide more details on the behaviour elicited (Groves *et al.*, 2009) – for example, a question about sexual behaviour may include all types of sexual behaviours that are elicited (e.g. vaginal, oral, anal sex) clarifying the boundaries of the category. Also, longer questions initiate the respondent in the topic of the question, which may lower social desirability.

The use of familiar words is usually advised. The suggestion is to: 1. avoid technical terms in favour of everyday words (e.g. the word “sex” is preferred to the more technical “coitus”), 2. use explicit frequency categories instead of vague quantifiers (e.g. “every day” instead of “often”) and 3. adopt concrete rather than vague modifiers (“most of the time” instead of “usually”) (Groves *et al.*, 2009). Also, if vague or technical terms need to be used, it is advised to define them, preferably just before the question (Groves *et al.*, 2009).

The position of the sensitive question in the questionnaire may influence the reporting of the sensitive behaviour. Indeed, the level of sensitivity is partially related to the context in which the question is embedded (Bradburn *et al.*, 2004). Firstly, if a sensitive question is asked after other survey questions that are more sensitive, the question may appear less threatening. It is not advisable to start a survey with very sensitive questions, as this may generate discomfort that may lead to lower cooperation during the rest of the interview (Bradburn *et al.*, 2004).

⁷⁰ Bold and capitals as in the original text. Source: Natsal-2 questionnaire.

Moreover, Bradburn *et al.* (2004) notice that questions about events from the past should be less salient and sensitive than questions about current behaviour (Bradburn *et al.*, 2004). Thus, questions starting with “Did you ever, even once..,” are more likely to obtain candid answers than questions asking concurrent behaviours (Bradburn *et al.*, 2004). Subsequent questions in the questionnaire may then refer to the behaviour in a specific and concurrent timeframe. However, for more common behaviours (e.g. using a seatbelt, attending concerts) the most effective strategy is asking directly the behaviour in a short and defined period of time – e.g. “Thinking about the last time you got into a car, did you use a seat belt?” (Bradburn *et al.*, 2004). To sum up, Bradburn *et al.* (2004) suggest, for socially desirable behaviours to ask respondents about their more recent behaviour, while for socially undesirable behaviours to ask respondents about their usual behaviour, and later, query their current behaviour.

In addition to these recommendations, the literature on sensitive questions describes the potentialities of “forgive introduction”⁷¹ (Brauburn *et al.*, 2004; Groves *et al.*, 2009). This technique implies wording the question in a way that normalizes the socially undesirable behaviour, rendering it easier for the respondent to admit it. Forgiving introductions are used in an attempt to reduce the sensitivity of the question and the concerns about negative consequences of giving a truthful answer (Tourangeau and Yan, 2007). The use of this technique is based on the assumption that in the presence of a forgiving introduction, respondents give fewer socially desirable answers (Peter and Valkenburg, 2011).

Bradburn and his colleagues (2004) identify different methods of using forgiving introductions. Firstly, the researcher may use the so called “everybody does it” approach: the introduction to the question indicates that the behaviour is very common in order to reduce the threat of the question (Bradburn *et al.*, 2004). For example, a question about parenting may be formulated as following:

“Even the calmest parents get angry at their children some of the time. Did your child(ren) do anything in the past seven days, since (date), to make you, yourself, angry?” (Bradburn *et al.*, 2004: 110).

⁷¹ Also described as “loading”, “enhanced wording” or “forgive wording”.

Secondly, providing reasons why the respondent may not have engaged in a socially desirable behaviour (e.g. voting, using seatbelts) may provide more truthful reporting. For example a seatbelt usage question may state:

“Many drivers report that wearing seat belts is uncomfortable and makes it difficult to reach switches, such as lights and windshield wipers. Thinking about the last time you got into a car, did you use a seat belt?” (Bradburn *et al.*, 2004:111).

Finally, the respondent may value a forgiving introduction more if this is attributed to a respectful authority (e.g. doctors, researchers, scientists). An example on drinking behaviour may be:

“Many doctors now believe that moderate drinking of liquor helps to reduce the likelihood of heart attacks or strokes. Have you drunk any liquor in the past year?” (Bradburn *et al.*, 2004:111)

Forgiving introduction has been applied by Catania *et al.* (1996), on a sensitive question about behaviour: the number of sexual partners. Social desirability in this question acts differently depending on the gender of the respondent. In fact, given the sexual double standard, it may be considered socially undesirable to report: a. many sexual partners for females, b. few sexual partners for males. The question wording used by Catania *et al.* (1996) is the following:

“The number of sexual partners people have had differs from person to person. Some people report having had one sex partner, some two or more partners, and still others report hundreds of partners”.

The authors find that forgiving introductions increased the reporting of sensitive sexual behaviour. As a drawback, the authors find that the method leads to higher dropouts: the interpretation of this finding is that respondents may have become impatient due to the long introduction of many survey questions and thus decide to dropout. This limitation may be bypassed by applying forgive introduction to a limited number of items.

The empirical literature finds mixed evidence on the effectiveness of using forgiving introductions in lowering socially desirable bias. Holtgraves, Eck, and Lasky (1997) found that the technique increased reporting of some socially undesirable behaviours, as academic cheating, but not of others, as shoplifting. Belli, Moore, and Van Hoewyk (2006) and Belli *et al.* (1999) find less over reporting of voting with forgiving introduction. While Abelson, Loftus, and Greenwald (1992) did not find this effect. Peter and Valkenburg (2011) find that

forgiving introduction did not increase reporting of using sexual media content for the overall sample analysed, but they did find an effect for particular subgroups. Indeed, Holtgraves *et al.* (1997) have warned that the technique may have a different level of effectiveness for different sample members: individual characteristics may play a role in determining the usefulness of the technique. Peter and Valkenburg (2011) find that respondents with a high “Socially Desirability Response Style”⁷² reported more often the sensitive behaviour than did respondents with low “Socially Desirability Response Style” if assigned to the forgiving introductions treatment. Also, young people (12-25 years old) with a high “social desirability response style” reported more socially undesirable behaviours if assigned to the forgiving introduction, while the treatment caused little difference for older respondents (over 25).

While Catania *et al.* (1996) find that forgiving introductions were increasing dropouts, Peter and Valkenburg (2011) showed that the method increased the level of item non response, even if only slightly. According to the authors, this happens because forgiving introductions increase the “respondents’ awareness that they are answering sensitive questions, resulting in higher refusal rates” (Peter and Valkenburg, 2011:786).

It should be noticed that forgiving introductions normalized the behaviour asked about, and this may generate a question behaviour effect⁷³. Moreover, the approach is applicable to behaviours that are, to some extent, tolerated. Otherwise the forgiving introduction may increase, rather than lower, the threat of the question. For example, a forgiving introduction would not be applicable in a question about violence towards women. Regarding survey questions about paying for sex, the use of a forgiving introduction may not be appropriate for two reasons. Firstly, the topic may be too controversial for using forgiving introductions, secondly the question behaviour effect may cause ethical problems in using a forgiving introduction for this topic (for more details about the question behaviour effect, please see paragraph 5.7).

Another technique for eliciting sensitive information is the “normative method”:⁷⁴ respondents are asked to report the sensible behaviour not of themselves, but of their friends or other people in their networks. Tourangeau and Smith (2007) report an example of a question asked with the normative method:

⁷² Social desirability response style (SDRS) refers to a tendency to give a positive self-description, that is stable in time and independent from the questionnaire (Paulhus 2002). Respondents may adopt a SDRS style by avoiding socially undesirable answers. SDRS is a respondent’s character trait rather than a situational attribute (Paulhus, 2002; Tourangeau and Yan, 2007). Forgiving introductions may be particularly effective among individuals interested in giving a positive self-description (Holtgraves *et al.*, 1997).

⁷³ The question-behaviour effect is the phenomenon for which questioning respondents about a behaviour may influence the future respondents’ behaviour (Dholakia, 2010; Sprott *et al.*, 2006)

“How many of your friends used heroin in the last year?”⁷⁴

This method is applicable only for behaviours that are shared and known by members of a social network. As the sampling technique of respondent driven sampling is not applicable to survey men who pay for sex (see CHAPTER 4), this method can't be used in eliciting paying for sex as this is a behaviour that might not be shared with friends.

Another method that Bradburn and his colleagues (2004) list for asking sensitive questions is card sorting. This technique works as follows: the interviewer gives the respondent a set of cards listing various behaviours, some of which are sensitive (Bradburn *et al.*, 2004). Respondents are invited to place each card in a box, labelled as “yes” or “no”. During the interview process, cards in the “no” box can be reallocated if necessary (Bradburn *et al.*, 2004). The underlying idea is that some respondents may prefer to admit a socially undesirable behaviour through a non verbal task (Bradburn *et al.*, 2004).

Moreover, Bradburn and his colleagues (2004) suggest, in order to validate the sensitivity of the survey questions, asking at the end of the interview which questions were considered threatening. The information derived may be used both to evaluate the level of sensitivity and to give an indication of the respondents' veracity (Bradburn *et al.*, 2004).

Finally, in some situations sensitive information may be collected with administrative records or other sources that are not based on survey questions (Bradburn *et al.*, 2004). For example, in the case of paying for sex, in countries where the sex purchase is legal and regulated, administrative records may be used as a source of information on sex workers' clients. If both administrative and survey data are available triangulation may be used to compare estimates (Bradburn *et al.*, 2004).

5.5.2 DATA COLLECTION MODE

Data can be collected from respondents using a variety of different modes of data collection. Modes differ along many dimensions: i. whether the questionnaire is administered by the interviewer or by the respondent, ii. whether the questions are displayed or heard, iii.

⁷⁴ For an example of the application of this technique see Sudman *et al.* (1977).

whether answers are given aurally or written/typed. The empirical literature has shown that these three dimensions matter in reporting sensitive behaviours⁷⁵.

The first widely recognized mode effect on reporting sensitive behaviours is that self administration⁷⁶ encourages reporting socially undesirable behaviours, as answers are recorded without the presence of an interviewer (Tourangeau *et al.*, 2000)^{77 78}. In general, in interview situations, respondents tend to be agreeable or acquiesce (Schuman and Presser, 1981). Respondents are influenced by the presence of the interviewer in answering survey

⁷⁵ Before discussing the evidence from the literature on the effect of modes of data collection on reporting sensitive behaviours, I define the different modes of data collection and their acronyms. Paper Administered Personal Interview (PAPI) is a face-to-face interview administered through a paper questionnaire; this type of interview being conducted face-to-face, questions are administered by an interviewer. As PAPI also Self-Administered Paper Questionnaire (SAQ) is a type of paper questionnaire; but, while in PAPI answers are recorded by the interviewer, in SAQ answers are recorded by the respondent without the presence of the interviewer. Modes of data collection using a computer include Computer Administered Paper Interview (CAPI), which is the computer administered version of PAPI: questions are asked face-to-face by an interviewer who types the answers in the computer. In Computer Administered Telephone Interview (CATI) questions are aurally administered by an interviewer who types responses into a computer. A self completion mode of data collection that makes use of the computer is the Computer Administered Self-Interview (CASI). In this mode of data collection questions are self-administered and responses are keyed in the computer. A variation of CASI that asks questions both visually and aurally is Audio Computer Administered Self-Interviewing (ACASI): in this mode of data collection the computer displays the question on a screen, and, simultaneously, it plays a digitalized version to the respondents, usually through earphones (Tourangeau *et al.*, 2000). A similar technique is the Interactive Voice Response (IVR): after being contacted by telephone, or dialling into a toll free number, respondents are connected to a system that administers a recording of the questionnaire (Tourangeau and Yan, 2007); the respondent provides the answers by dialling a number on the telephone or by saying out loud the number corresponding to the answer. Finally, one of the increasingly common modes of data collection is Web Self Interviewing, WSI (also called CAWI or, generally, “web surveys”). In WSI the respondent answers in self completion to the question on a survey scripted on the web. Web surveys can be administered on different devices (e.g. computer, mobile, tablet) and the device can either be provided by the survey agency or owned by the respondent.

⁷⁶ PAPI, CAPI and CATI are interviewer administered modes of data collection, while SAQ, ACASI, IVR and WSI are self administered modes.

⁷⁷ In self completion modes respondents are more likely to report socially undesirable behaviours such as illicit drug use (Aquilino, 1994; Aquilino and Lo Sciuto, 1990; Corkrey and Parkinson, 2002; Gfroerer and Hughes, 1992; Schober *et al.*, 1992; Tourangeau and Smith, 1996; Turner *et al.*, 1992; Richman *et al.*, 1999 – meta-analysis) abortions (Lessler and O’Reilly 1997; Mott, 1985), teenage smoking (Brittingham, Tourangeau, and Kay, 1998; Currivan *et al.*, 2004; Moskowitz, 2004), depression, anxiety and other mental health symptoms (Epstein, Barker, and Kroutil, 2001; Newman *et al.*, 2002, Richman *et al.*, 1999 – meta-analysis). Also, respondents are less likely to report socially desirable behaviours as attendance to religious services (Presser and Stinson, 1998).

⁷⁸ In addition to the methodological literature, the substantive literature that focused on a hidden population highlights that face to face is not the ideal mode for data collection on sensitive topics. As pointed out by Duncan *et al.* (2003) “data collection procedures that relies on face-to-face interviews confront serious problems when inquiring about socially disapproved behaviour” (Duncan *et al.*, 2003:221).

questions, and are more prone to giving socially desirable answers, and less likely to report socially undesirable behaviours (Epstein *et al.*, 2001). Being sexual behaviour, a sensitive topic, self administration leads to better data quality.

The most famous example on mode effects on sexual behaviours is the gender difference in the self reported number of heterosexual sex partners. Smith (1992) showed that men report significantly more sexual partners than women. Similarly, Tourangeau and Smith (1996) show that men recorded an average of 2.9 opposite sex sexual partners in the last year, while women reported an average of only 1.6. Moreover, Wadsworth *et al.* (1996) using data from Natsal-1, show that men recorded an average of 1.2 sexual partners in the last year, while women reported 1.0.

The research community has provided various interpretations of this discrepancy. Tourangeau *et al.* (2000) argue that men and women should report the same total number of sexual partners because they refer to the same pairings. Also, the average number should also be similar, given that the population size for the two sexes are nearly equal (Tourangeau *et al.*, 2000). In line with this reasoning, many sex researchers have interpreted the discrepancy as a sign of men over-reporting sexual partners and women underreporting (Herold and Way, 1988; Klassen, Williams and Levitt, 1989; May, Anderson, and Blower, 1989). The difference should be routed in the sexual double standard as it is considered socially undesirable for men to report a low number of sexual partners, and it is seen as undesirable for women to report a high number of sexual partners (Tourangeau *et al.*, 2000).

Brewer *et al.* (2000) show empirically that this difference may be due to sampling bias. Since female sex workers are underrepresented in national surveys, once their undersampling is taken into account (together with the high number of sexual partners of sex workers) this discrepancy disappears (Brewer *et al.*, 2000). Similarly, Wadsworth *et al.* (1996) find a difference in the self-reported number of heterosexual partners and argues that one of the reasons for this discrepancy is undersampling of sex workers as well as other subgroups of the population with numerous sexual partners⁷⁹.

Another interpretation of this discrepancy lies in the process by which respondents recall the number of sexual partners (Tourangeau *et al.* 2000). Tourageau *et al.* (2000) point

⁷⁹ One way to rule out this possibility would be to count only “unpaid” sexual partners (and excluding partner acquisition abroad).

out that outliers (specifically, respondents with large number of sexual partners) may estimate the number of sexual partners differently by gender. Women may tend to round the estimate downwards, while males may try to recall every sexual partner they had. Thus, even if the mechanism at play is not deliberate misreporting, the sexual double standard is driving this difference influencing how respondents edit their answers by gender.

Moreover, a range of sexual behaviours (e.g. frequency of intercourse and condom use) are reported differently by males and females even within the same couple (Bachrach, Evans, Ellison, and Stolley, 1992; Padian, 1990; Udry, 1980; Upchurch *et al.*, 1991; Whisman and Allan, 1996). This evidence reinforces the suspicion that the sexual double standard is one of the mechanisms at play in reporting sexual behaviours in surveys.

Furthermore, Tourangeau and Smith (1996) show that the discrepancy in the number of sexual partners is reduced in self-administered questionnaires, and this finding is consistent with the idea that the gap is at least partially driven by the social undesirability of the answer, acting in different directions depending on the respondents' gender. More specifically, computer assisted self interview (CASI) and audio computer assisted self interview (ACASI) reduces sharply the difference in number of sexual partners reported by females and males.

TABLE 5.2 below shows the results of experiments on mode of administration and reported number of sexual partners. In both experiments the average number of partners reported in self administration compared with interviewer administered modes is equal or higher than one, signifying that women report at least as many or more partners in self administered modes compare to interviews where the interviewer is present. As expected, in almost all cases males reported an equal or smaller number of partners in self administration compared with interviewer administration.

TABLE 5.2: Ratios of self reported average number of sexual partners by mode of data collection and sex

Study	Mode	Sex	Time frame		
			Past year	Past 5 years	Lifetime
Tourangeau <i>et al.</i> , 1997	SAQ vs. PAPI	Females	1.00	1.18	1.59
	CASI vs. CAPI	Females	1.39	1.58	1.00
Tourangeau and Smith 1996	CASI vs. CAPI	Females	1.48	1.16	1.24
		Males	0.54	0.70	0.90
	ACASI vs. CAPI	Females	1.64	1.88	1.66
		Males	0.75	1.00	1.01

Source: Adapted from Tourangeau, Rips, and Rasinsky, 2000

Regarding paying for sex, Turner *et al.* (1998) assessed mode effects on questions on the purchase of sexual services. The authors used audio computer-assisted self-interviewing (ACASI) to test a set of risky behaviours in the US 1995 National Survey of Adolescent Males. This survey is conducted on a probability sample of US males teenagers aged 15-19. Participants were randomly assigned to two treatment groups: one group received an ACASI questionnaire while another group received a SAQ questionnaire. Paying for sex was the only heterosexual behaviour for which a statistically significant difference was found depending on the mode of data collection: respondents interviewed with ACASI were 3.6 times as likely to report paying for sex compared to respondents interviewed with paper SAQ. The prevalence of the behaviour was 2.5% in ACASI versus 0.7% in SAQ. The results were statistically significant at the 1% level. The authors observe that this behaviour is more sensitive than any other heterosexual behaviour elicited in the study (i.e. sexual intercourse with a female in the last year, more than 5 lifetime partners, condom use at last sex, heterosexual anal intercourse, made a girl pregnant, fathered a child, ever had heterosexual vaginal/oral/anal intercourse, ever been paid for sex).

In addition respondents were significantly more likely to report in ACASI compared to SAQ: i. six different measures of homosexual behaviours, ii. injected drug use iii. measure of risky behaviours in conjunction with sexual behaviours – i.e. ever had sex with someone who shoots drugs; been drunk or high (or partner drunk/high) at last heterosexual intercourse; always/often drunk or high during heterosexual intercourse last year; drinking (or partner drinking) at time of last heterosexual intercourse. Thus, ACASI seems a promising mode of data collection for questions on paying for sex.

Finally, Knapp and Kirk (2003) compare results from a SAQ, IVR and WSI on a range of sensitive behaviours, including prostitution, but they focus on selling rather than buying sex. The authors do not find evidence of a significant difference in the modes of data collection.

5.5.3 INDIRECT QUESTIONING TECHNIQUES

The literature on sensitive questions has identified several indirect questioning techniques that can be adopted to elicit sensitive information. These are: the Randomized Response Technique (RRT), Item Count Technique (ICT), and the three card method. The main advantages of indirect questioning techniques is that these methods guarantee totally the

respondents' privacy. In fact, the question threat is lowered by the "promise that no one (including the principal investigator, the database administrator, outside "hackers," *etc.*) would ever be able to discover a respondent's status with respect to the sensitive question" (Droitcour, Larson and Scheuren, 2001: 1). There are two main disadvantages: 1. in most cases it is not possible to identify individual level data, and 2. there is no guarantee that the respondents understand that their privacy is protected.

Firstly, let's analyse the Randomized Response Technique (RRT) (or Warner's technique, by the name of its inventor)⁸⁰. This method is used to determine only aggregate prevalence of a phenomenon in the population under study – or in their subgroups. In a face to face interview, the population under study is randomly divided in two groups: A and B. The interviewer is not aware of the group allocation. The respondent is equipped with a spinner (or dice, or coins), that will point group A with a probability p or group B with probability $(1-p)$. If the respondent is assigned to group A, he/she will respond to question A, if the respondent is assigned to group B, he/she will respond to question B. The interviewer will only record the answer and in all the process remains unaware of which question has been answered by the respondent⁸¹.

Variations from the first Warner's technique are the "unrelated question methods" and the "forced alternative methods". In the "unrelated question method" respondents assigned to group A will answer a sensitive question, while respondents assigned to group B will answer a non sensitive question, with known probability⁸². In the "forced alternative method" the

⁸⁰ See Warner (1965).

⁸¹ The example provided by Tourangeau and Smith (2007) is the following: the respondent will be asked to answer "yes" or "no" to one of these two questions:

- I am for legalized abortion on demand
- I am against legalized abortion on demand

Only the respondent will know which one of the two statements he responded to.

⁸² It is crucial to have an estimate of the prevalence of the non sensitive item, in order to derive the estimate. The researcher may use auxiliary sources (e.g. census data) (Tourangeau and Smith, 2000) or the "not sensitive" behaviour can be surveyed by asking a sample of the population this item. This latter version of the Randomized Response Technique was used in the 1973 National Survey of Family Growth, to estimate the prevalence of abortion during a 12 month period in the United States (Shimizu and Bonham, 1978). In this case, the design implies two different groups, each of them was assigned to a Randomized Response Technique (RRT). The first group answered the non sensitive questions "This time last year, did you live in a different county or State than this one?". Afterwards, the respondent is faced with the two questions. The respondent is asked to reply to the first one if the coin, once tossed, shows "heads", the second one if the coin shows "tails"

- In the past 12 months, I had an abortion done to end a pregnancy. (ANSWER "YES" OR "NO. ")

randomizing device determines whether the respondent should choose “yes”, “no”, or should answer the question. Finally, in the “additive constants method”⁸³ respondents are asked to add random constant to their responses to cardinal survey questions (Droitcour *et al.*, 1991; Lee, 1993).

The main criticism of the Randomized Response Technique – and its several variations – is the difficulty of conveying to respondents the validity of the methods. Firstly, the techniques rely on the respondent’s skills in handling the required devices (Chaudhuri and Christofides, 2006). Secondly, it is not guaranteed that the respondents understand and trust that their privacy is protected (Couatts and Jann, 2011). Thirdly, the respondent may find that the use of randomization devices is not appropriate in a serious setting such as a survey (Droitcour, 1991). Holbrook and Krosnick (2010) showed empirically that respondents provide self-protective answers irrespective of the outcome of the randomizing device.

To overcome these issues, a possible alternative is the Item Count Technique (ICT)⁸⁴. In this technique, respondents are asked to count how many behaviours they have done in a list of behaviours. Respondents are randomly divided into two groups, A and B. Group A is asked to count behaviours from list A that include the sensitive item. While group B is asked to count items from the list B, which does not include the sensitive item. Taking the example of Droitcour and his colleagues (1991), group A receives the survey question:

“How many of the following have you done since January 1: Bought a new car, travelled to England, donated blood, gotten a speeding ticket, and visited a shopping mall?”

- Was your mother born in April? (ANSWER "YES" OR "NO. ")

In the second group, the respondent is asked these two question. As before, they are requested to answer the first or the second question depending on the coin result.

- In the past 12 months, I had an abortion done to end a pregnancy. (ANSWER "YES" OR "NO. ")

- This time last year, I lived in a different county or state to this one. (ANSWER "YES" OR "NO. ").

In another part of the survey the respondent is asked the non sensitive question: “In what month and year was your mother born?”

With this method the non sensitive behaviour is not derived from secondary data analysis of auxiliary sources. Instead, it is elicited, with direct questioning, from a random subsample of respondents. This feature has the advantage of avoiding the use in the analysis, of estimates that come from different sample frames and that are collected with different data collection designs.

⁸³ Also called “Aggregate Response Technique”.

⁸⁴ Also known as “Unmatched Count Technique” (UCT).

While group B receives a question that is identical, apart from the fact that it does not contain the sensitive item: the speeding ticket. The difference in the mean of the items counted in the list B and list A gives an estimate of the prevalence of the sensitive behaviour in the population⁸⁵.

Both the Randomized Response Technique (RRT) as well as the Item Count Technique (ICT) (and their variations) may be applied to questions on paying for sex. Estimates derived from these methods might be used to evaluate standard direct questioning techniques. However, while the Item Count Technique (ICT) has been used to estimate sexual behaviours – e.g. the study on sexual assault by Krebs *et al.* 2011⁸⁶ – to the best of my knowledge, this technique has never been adopted for paying for sex questions. Conversely, the Randomized Response Technique (RRT) has been used in a study on sex workers' clients in South Korea, where prostitution is illegal (Wonsoon, 2013). In this study more males report paying for sex in the RRT items compared with the direct questions. It is not clear how much of the advantage of RRT compared with direct questioning techniques would be observed in a general probability sample that uses a different sampling strategy. In fact the study adopts a stratified sampling where within every strata sample members are not chosen randomly, instead the authors' acquaintances and friends were recruited⁸⁷. It is possible that the researchers' acquaintances and friends are particularly reluctant to report paying for sex with direct questioning given their connexion with the researcher. Intuitively, RRT should work better the higher the social (un)desirability of the answer, thus the difference between RRT

⁸⁵ A variation of the item count technique that provides lower variance (but at the expenses of more respondent burden) is the “two lists method”. An application of this method can be found in Biemer and Brown (2005); the method is also reported by Tourangeau and Yan (2007). An additional variation of the item count technique, called “Item Sum Technique” has been recently ideated by Trappmann, Krumpal, Kirchner and Jann (2014).

⁸⁶ The study finds evidence of a slightly higher reporting of sexual assault with the ICT technique compared with direct questioning among a purposive sample of undergraduate students. As the estimate was neither substantially nor statistically different from the estimate obtained with direct questioning, the authors conclude that either the estimate obtained with direct questioning is “reasonably valid” or the item count technique does not produce better estimates (Krebs *et al.*, 2011).

⁸⁷ The sampling strategy adopted by Wonsoon (2013) is defined as follows: “Using the concept of stratified sampling, I recruited for the survey; I set strata by the criteria: age and employment state. To represent the general South Korean adult male population, I asked approximately 1,000 public servants, 1,600 professional workers” (...) “900 college and graduate students, 800 major company employees, 1,500 employees from small- and medium-sized companies, 1,000 private business owners, 200 part-time workers, and 400 retired workers to participate in the survey by e-mail. I obtained these contacts through acquaintances and friends” (Wonsoon, 2013:126).

and direct questioning may be smaller in surveys adopting sampling strategies that don't rely on personal networks.

Another method for collecting sensitive information is the three card method (GAO, 1998; Droitcour, Larson and Scheuren, 2001). This method requires a design with mutually exclusive categories, of which only one is sensitive⁸⁸. Since not every notion can be conceptualized with mutually exclusive alternatives, the applicability of the methods depends on the research topic. Specifically, in the cases of sex work, I am not aware of any attempt to study this topic with the three card method.

To sum up, the methodological literature identifies a series of indirect questioning techniques to elicit sensitive information. However, to the best of my knowledge the only application of an indirect questioning technique to survey sex workers' clients is the work of Wonsoon (2013) using the Randomized Response Technique (RRT).

5.5.4 OTHER METHODS FOR ASKING SENSITIVE QUESTIONS IN SURVEYS

Bradburn *et al.* (2004) consider the potentialities of adopting proxy respondents, using diaries and panel studies, and investing in interviewer training for eliciting sensitive information.

Firstly, proxy respondents may provide more reliable information than respondents, for some particular sensitive topics: e.g. book reading, drinking, voting (Bradburn *et al.*, 2004). The authors, however, suggest avoiding to ask parents about their children as they (1) may report more socially desirable answers than children would have given (2) they may not know the true score. In general, every time the sample member has reasons for hiding his behaviour to the proxy respondent, it is not advisable to ask him/her for the sensitive information.

⁸⁸ More specifically, the method works as follows. The sample is divided into a number of subgroups –let's take as an example three subgroups. These subgroups must be “three independent samples, each of which is (1) selected to be representative of the population of interest, (2) composed of completely different persons, and (3) asked the same potentially threatening question”. The estimation of the sensitive item is obtained subtracting the prevalence of the other non sensitive items. For example, Droitcour and his colleagues (2001) applied this method for the estimation of the prevalence of illegal immigrants in the United States. However, none of the respondents are asked if they are illegal immigrants. On the contrary, group 1 is asked if they have a green card or some other status; group two is asked whether they were US citizens or had some other status; group 3 is asked whether they have a visa (student refugee, tourist *etc.*). Since the groups are mutually exclusive the probability of having either a green card, the US citizenship, a visa, or being illegal is calculated by 1 minus the values of the three other possibilities.

Secondly, diaries with repeated records about a behaviour and panel studies may reduce the level of threat of a survey question (Bradburn, 2004). In fact: (1) repeated events become less threatening as they become routine (Bradburn, 2004); and, (2) with time, sample members may become more confident about the survey organization and/or the researcher. Finally, interviewer training – advisable in any data collection process – may be particularly important in lowering social desirability bias: In fact, through training the interviewer may learn methods of establishing the relationships with the respondent, putting him/her at ease, and being – or at least appearing – non-judgmental (Bradburn *et al.*, 2004).

5.6 ETHICAL ISSUES IN ELICITING INFORMATION ON PAID SEX: THE QUESTION BEHAVIOUR EFFECT

There is at least an additional important challenge in eliciting information on paying for sex and risky behaviours: the ethical issue. Some authors showed that asking survey questions can change the subsequent respondent's behaviour (Fitzsimons and Moore, 2008; Fitzsimons and Shiv, 2001; Dholakia, 2010) and that asking about risky behaviours can increase the propensity of respondents to engage in such activities (Fitzsimons and Moore, 2008; Fitzsimons and Shiv, 2001; Dholakia, 2010). Even if paying for sex is not necessarily a risky behaviour – though it might be – purchasing sex is socially undesirable. Asking questions on sex purchase itself may normalize this behaviour and slightly change the respondent's attitude towards paying for sex, generating a higher propensity for the sex purchase.

The debate on whether prostitution is socially harmful, what are its links with human trafficking and to what extent paying for sex is ethically acceptable goes beyond the scope of this analysis. However, since this behaviour is controversial from an ethical point of view, it would be an undesirable consequence if studies eliciting this information were – even to a very small extent – to increase the respondent's purchase of sex. Further research may address to what extent the question behaviour effect applies to paying for sex.

5.7 CONCLUSIONS

As discussed in this chapter, survey questions about paying for sex are sensitive, as they incorporate the three main requisites of sensitivity: the social desirability of the answer, the invasion of privacy and the risk of disclosure to third parties. When questions about paying for sex are included in surveys about sexual behaviour, since sexuality is often considered a taboo topic and the topic salience may be weaker (compared to the salience of other topics, as health) surveys on sexuality may suffer from high unit non response.

Moreover, given the sensitivity of the topic, another challenge of questions about the demand for sexual services is item non response (this may be particularly the case in survey that elicit paying for sex but are not specifically focused on sexuality, as respondents are not self-selected). Among the possible solutions for increasing the share of usable/unusable data and reducing misreporting on sensitive questions, I discuss questionnaire design, the use of self-administered modes of data collection and the use of indirect questioning techniques.

The survey methodological literature has identified several suggestions for the design of sensitive questions. Firstly, it is advisable to use, if possible, open ended and long questions, composed of familiar words (i.e. avoid technical, vague and ambiguous terms). Also it is not considered advisable to place sensitive questions at the beginning of a survey, as this may create discomfort and negatively influence the respondents' cooperation. Furthermore, techniques such as "card sorting", "forgive introduction", and "normative methods" may be used in eliciting sensitive questions; although the latter two may be not advisable for asking questions on paying for sex. Finally, the researcher may consider validating the survey questions using respondents' evaluation about the items' sensitivity and triangulating the information with other sources.

With reference to the modes of data collection there is some evidence that, at least among teenagers, Audio CASI leads to more reporting of paying for sex than CASI interviews.

Finally, while some indirect questioning techniques are not applicable to eliciting information on paying for sex (e.g. the three card method) the randomized response technique has been adopted in a study of sex workers' clients in South Korea. To the best of my knowledge, Item Count Technique has not been adopted in measuring paying for sex, even though it seems a promising method for eliciting information on such a sensitive topic.

CHAPTER 6 – THE IMPUTATION STRATEGY FOR ESTIMATING THE CORRELATION BETWEEN “PAYING FOR SEX” AND “RISKY BEHAVIOURS”

As reported in CHAPTER 5, item non response can be caused by several reasons, and it does not always originate from the unwillingness of the respondent to reveal the requested information. Indeed, item non response can be due to the respondent skipping the question because he/she doesn't know the answer, or she/he forgets to answer; or item non response can even be totally unrelated to the respondent's behaviour as it may be due to the researcher/survey agency losing the data or indicating the item as missing in the editing phase (de Waal, Pannekoek and Scholtus, 2011).

In survey practice, the researcher must decide whether a sufficient number of answers are collected from the sample member to consider him/her as a respondent –and, thus, treating the missing data as an item non response – or whether there is not a sufficient number of “valid answers” for the sample member, and thus the entire record has to be considered as unit non response (de Waal *et al.*, 2011)⁸⁹.

Missing data may bias population inferences, if missing values are distributed differently from observed items. Thus, when data are missing, the researcher may impute an estimated value for the missing items. “Imputation” is the statistical process of estimating a feasible value for a missing value in a dataset (de Waal *et al.*, 2011). This chapter gives an

⁸⁹ It should be noted that item non response is often handled with *listwise*, *case*, or *pairwise* deletion (Allison, 2002; Ibrahim *et al.*, 2005). These methods will be described in detail in the next sections.

overview of imputation methods for dealing with item non response⁹⁰. Firstly, I define key concepts guiding the discussion of imputation models. These concepts are: missing data patterns (e.g. univariate and multivariate patterns) and different types of item missing data – “Missing Completely At Random” (MCAR), “Missing At Random” (MAR) and “Missing Not At Random” (MNAR). Secondly, to justify the choice of the imputation method used in the analysis (i.e. multiple imputation), other models are briefly discussed showing the limits of these methods for imputing “paying for sex” and “risky behaviours”. Thirdly, multiple imputation is discussed.

6.1 MISSING DATA PATTERNS AND MECHANISMS

The choice of the imputation model depends on both missing data patterns and missing data mechanisms. Little and Rubin (2002) define “missing-data pattern” as the pattern by which some data are missing, while others are not missing, while missing data mechanism (or mechanisms), are the relationship between “missingness and the values of variables in the data matrix” (Little and Rubin, 2002: 4). Thus, while missing data pattern refers to the configuration of missing and not-missing data in a dataset, missing data mechanism refers to the relationship between observed items and the probability of the missing data (Enders, 2010). The missing data pattern indicates where data are missing, while the missing data mechanisms attempt to explain why data are missing, at least to establish associations between observable variables and missing items (if not causal links).

According to the type of missing data pattern, item non response can be put into different categories. “Univariate missing-data pattern” means that the missing values only occur in a single response item (Durrant, 2005), while “multivariate missing data pattern” means that missing values occur in more than one item (Durrant, 2005).

Little and Rubin (2002) propose a more general detailed categorization (see FIGURE 6.1), proposed also by Enders (2010). The FIGURE shows a classification of missing data patterns. $Y_1 - Y_5$ are different items, grey areas refer to missing data, while white areas refer to observed data.

⁹⁰ Item non response is defined in CHAPTER 5 as a type of non response occurring when the sample member avoids answering one specific question. While unit non response is a type of non response which happens when the sample member refuses to take part at all in the survey.

The first case (a) is the already recalled univariate missing data pattern where only one item (Y_5) has missing data. The second case (b) “multivariate two patterns missing data” is characterized by missing data in more than one item, but all in the same data unit (or in the same units)⁹¹. An example of the “multivariate two patterns missing data” is the unit non response pattern: some sample members participate in the survey while others decide not to participate in the survey. Sample members not participating in the survey (unit non respondents) have data missing in all items. Alternatively, this situation may arise when a subsample of respondents are assigned to a questionnaire module and others are not. In this case, the item would be missing for the subset not assigned to the module.

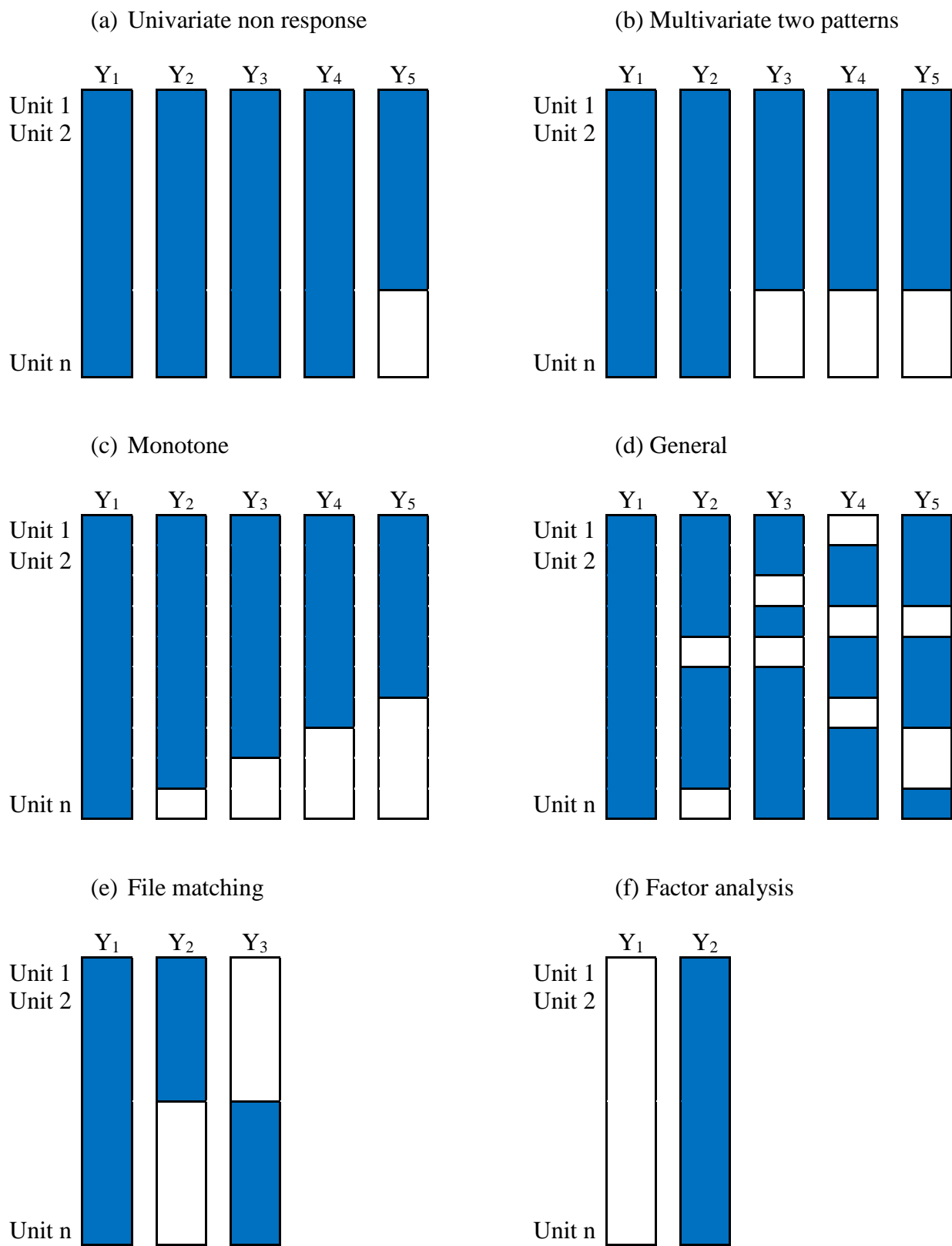
In the third case (c) items can be arranged in a sequence, (Y_1, \dots, Y_z) so that Y_1, \dots, Y_{j-1} are observed whenever Y_j is observed, for $j=2, \dots, z$. This case happens more frequently in unit non response rather than in item non response. More specifically, it is the situation of longitudinal surveys where missing data arise from attrition (Little and Rubin, 2002; Andridge and Little, 2010). It is referred to as “monotone missing data”.

In the fourth case (d) missing data have a haphazard pattern: more than one item is missing data, and not the same item is missing across units. This is the most common case of item non response in surveys, and it is also the case examined in this analysis. The fifth case (e) arises when item missing data derives from the combination of different data sources. Finally, case (f) relates with how we conceptualize missing data: Little and Rubin (2002) argue that an unobserved latent item can be regarded as a missing data issue; thus, non response theory may be applied to deal with the estimation of parameters in presence of latent items.

In the case of paying for sex and risky behaviours, the missing data pattern is the “general case” (d). Indeed, some of the values missing for “pay for sex” are also missing in “risky behaviours” (as well as in other items), and *vice versa*.

⁹¹ Differently, Durrant (2005) groups cases b-d in FIGURE 7.1 under the common label “multivariate missing data pattern”.

FIGURE 6.1: Missing data patterns classified



Source: Little and Rubin, 2002

6.2 ITEM NON RESPONSE: MCAR, MAR AND MNAR

A key definition in item non response research is the distinction between “Missing Completely At Random” (MCAR), “Missing At Random” (MAR) and “Missing Not At Random” (MNAR)⁹². To discuss this difference in the case of paying for sex and risky behaviours I firstly introduce some notation, following Durrant (2005).

Let’s define U as the finite population (in our example men living in Britain at the time of the survey) of size N , s the sample of size n . H is the complete data matrix composed of h_{ik} elements, where $i=1, \dots, n$ and $k=1, \dots, K$.

$$H = \begin{bmatrix} h_{11} & \dots & h_{1n} \\ \dots & & \dots \\ \dots & & \dots \\ \dots & & \dots \\ \dots & & \dots \\ h_{k1} & \dots & h_{kn} \end{bmatrix}$$

We denote H_{obs} as the observed part of the matrix H and H_{mis} as the missing part. R is a matrix denoting the values we observe, thus:

$$r_{ik} = \begin{cases} 1 & \text{if } h_{ik} \text{ observed} \\ 0 & \text{if } h_{ik} \text{ missing} \end{cases}$$

The non response mechanism is $f = (R|H)$. The main problem with missing data is that the density function f – expressing how missing values are generated – is usually unknown (Durrant, 2005). Thus, assumptions regarding the non response mechanism are usually made, but the researcher is not able to verify these assumptions (Kalton, 1983; Nordholt, 1998; Lessler and Kalsbeek, 1992, Little and Rubin, 2002).

The stronger assumption is called “Missing Completely At Random”. This means that the pattern of missing does not depend on any other item – included or not included in the

⁹² These typologies of missing data mechanisms have been firstly introduced by Rubin (1976).

analysis (Hardt and G3rger, 2008). The missing completely at random assumption can be formalized as:

$$f = (R|H_{obs}, H_{mis}) = f(R)$$

Thus missingness does not depend on *Hobs* nor on *Hmis*.

For example, if only one item has missing values, this means that the probability of response to that item does not depend on the item subject to nonresponse, nor on any other item (Rubin, 1987). The MCAR assumption is particularly strong, and it is likely to be violated in many social science contexts.

A more relaxed condition is the ‘‘Missing At Random’’ (MAR) assumption. This refers to the case where data are missing depending on another variable, and this variable is available in the data (Hardt and G3rger, 2008). Thus, given all the information available in the dataset, that missing is at random (Hardt and G3rger, 2008). The distribution of the missing-data mechanism does not depend on the missing values *Hmis* but only on the observable values (Rubin, 1987). Thus:

$$f = (R|H_{obs}, H_{mis}) = f(R|H_{obs})$$

In the example of only one variable with missing values, this means that the probability of response does not depend on the variable with missing values but may depend on other variables that are observable (Durrant, 2005). More precisely, the missing pattern may depend on the variable that has missing values, but after controlling for other observable variables the dependency is eliminated and no relationship remains between the variable with missing values and the missing pattern, r_i (Durrant, 2005).

The last assumption is ‘‘Missing Not At Random’’ (MNAR). This holds if data are missing depending on unobservable values: i.e. the variable with missing data itself (even when conditioning on the observed values) (Durrant, 2005), any other observable variable with missing data, or an unobservable variable.

In addition to MCAR, MAR and MNAR, another distinction has been made in the literature between *ignorable* and *non ignorable* missing data. The missing data mechanism is defined ignorable if: a. data are MAR, and b. the missing data mechanism is due to parameters that are unrelated to the parameters to be estimated (Allison, 2002). Conversely,

the missing data mechanism is not ignorable if data are not MAR or data are MAR but the missing data mechanism is due to parameters that are associated with parameters to be estimated. However, Allison (2002) argues that that condition (b) is often met in real-world applications, saying: “because it is hard to imagine real-world applications where condition (b) is not satisfied, I treat MAR and ignorability as equivalent conditions” (Allison, 2002: 5); and adds: “Even in the rare situation where condition (b) is not satisfied, methods that assume ignorability work just fine, but you could do even better by modelling the missing data mechanism”.

6.3 LISTWISE AND PAIRWISE DELETION

Listwise deletion (or complete case analysis, or case deletion) and *pairwise* deletion (or available case analysis, or *pairwise* inclusion) are two missing data handling techniques based on deletion of missing data. *Listwise* deletion includes in the analysis only units that have “observed values for all variables under consideration” (Schafer and Graham, 2009). Thus, *listwise* deletion consists in “deleting from the sample any observation that has missing data on any variable in the model of interest and then applying conventional method of analysis for complete data sets” (Allison, 2002: 6). For example, under *listwise* deletion the sample covariance matrix for items X_1, \dots, X_p omits from the analysis any case that has a missing value on any of the variables X_1, \dots, X_p (Schafer and Graham, 2009).

Conversely, *pairwise* deletion “uses different sets of sample units for different parameters” (Schafer and Graham, 2009:155). For example, considering again the set of variables X_1, \dots, X_p . The standard deviation of X_j , will be computed using observed values for X_j . The covariance of X_j and X_k will be computed using every observed pair of values (X_j, X_k). For the correlation between X_j and X_k , the sample correlation coefficient might be computed “using the same set of units that we used to estimate the covariance” or alternatively “we could also divide our estimated covariance by the estimated standard deviations” (Schafer and Graham, 2009: 155).

As Allison (2002:8) describes:

“a linear regression can be estimated using only the sample means and covariance matrix or, equivalently, the means, standard deviations, and correlation matrix. The idea of *pairwise* deletion is to compute each of these summary statistics using all the cases that are available. For example, to compute the covariance between two

variables X and Z, all the cases that have data present for both X and Z are used. Once the summary measures have been computed, they can be used to calculate the parameters of interest, for example, regression coefficients”.

Regarding the properties of these two methods, one of the main advantages of *listwise* deletion compared to any other missing data handling technique the easiness with which it can be implemented; also this is a standard option in many statistical packages (Schafer and Graham, 2009). Conversely, available case analysis presents computational challenges, as different subsets may be used for estimating covariances and variances (Schafer and Graham, 2009). Both *listwise* and *pairwise* deletion have important drawbacks (Enders, 2010), including a loss of statistical power; available case analysis deletes fewer cases than complete case analysis; thus, the loss of efficiency is smaller compared with complete case analysis but still larger than if the analysis had been conducted on the entire sample, including both observed and missing data.

A cause for concern is that both *listwise* deletion and *pairwise* deletion produce biased estimates if the MCAR assumption does not hold (Enders, 2010, King *et al.*, 2001). More specifically, if data are MCAR, *listwise* deletion and *pairwise* deletion lead to unbiased parameter estimates; also, under the MCAR assumption, estimated standard errors and significance levels are correct for the subsample analysed (observed data), but they are often larger compared with the standard errors that would have been obtained on the entire sample – i. e. observed and missing data (van Buuren, 2012).

The analysis from Della Giusta *et al.* (2014) is based on listwise deletion. As it will be shown in the analysis, data on paying for sex and risky behaviours are not MCAR, thus, the use of *listwise* deletion is not advisable in this case.

6.4 IMPUTATION

Imputation is the statistical process of estimating a feasible value for a missing value in a dataset (de Waal *et al.*, 2011). The two main reasons for imputing missing data (instead of leaving the corresponding field empty) are: i. to obtain a complete data set, thus improving data quality (de Waal *et al.*, 2011), ii. the consequent improvement of population inferences (Little and Robin, 2002) through reduction of non response bias which occurs because

missing values are distributed differently from observed items (Durrant, 2005)⁹³. Imputation recreates a balanced design, thus cases subject to item-nonresponse are not deleted and sample size is maintained (Durrant, 2005). This leads to higher efficiency than case deletion (Durrant, 2005).

Here imputation is discussed separately from correction. Groves and his colleagues (2009) define imputation as the placement of one or more estimated answers into a field of a data record that previously: 1. had no data (item missing data) or 2. had incorrect or implausible data. I distinguish the two cases, defining imputation as the process of filling in cases when no data is available, and correction as the process of filling in the data when the item is considered by the researcher as incorrect or implausible. Correction is discussed in the next paragraph, while imputation will be discussed in the next chapter's sections.

6.5 CORRECTION

An approach used to increase data quality that is different from imputation is “correction” (de Waal *et al.*, 2011). When an item is not missing but the researcher has reason to believe that it is not correct, it can be modified (i.e. “corrected”). For example, in the case of “men who pay for sex” that conduct the interview in the presence of the spouse, the researcher may have reasons to believe that paying for sex is underreported: more specifically, in this context (question on paying for sex elicited during an interview conducted in the presence of the spouse) a “non valid” answer as “prefer not to say” or “don’t know” may be interpreted by the spouse as an admission of having had a sexual relation with a sex worker. Thus, the only socially desirable answer to the question “Have you ever paid money for sex with a woman?” is “no”. The negative response for paying for sex, when reported in presence of the spouse, might be considered as item non response, as data may not be reliable⁹⁴.

⁹³ Little and Rubin (2002) stress this point, arguing that surveys usually are conducted to derive inferences about population parameters (e.g. means, correlations and regression coefficients), while values of individual cases are usually not the main interest. Thus, the objective of imputation is not identifying the best possible prediction of missing values, but the replacement of missing values with plausible values in order to use the non missing information of incomplete cases for the inference about population parameters (Little and Rubin, 2002).

⁹⁴ For a wider discussion of imputation methods for correcting contradictory values, deleting inconsistent values and imputing new values see Andridge and Little (2010).

6.6 IMPUTATION MODELS

In this section I describe different imputation models, making reference to the summary provided by Little and Rubin (2002). A first distinction is between single imputation methods and multiple imputation methods. Single imputation methods impute one value for each missing item, while multiple imputation imputes more than one value for a missing value.

A second classification of imputation models is based on two different approaches: explicit modelling and implicit modelling. Explicit modelling is a type of modelling where the predictive distribution is formed on a formal statistical model and model assumptions are explicit. Examples of explicit models are: mean imputation, regression imputation, stochastic regression imputation (Little and Rubin, 2002). Implicit modelling is a type of modelling where the imputation is based on an algorithm that implies an underlying model and assumptions are implicit. Examples of implicit modelling are hot deck imputation, substitution and cold deck imputation (Little and Rubin, 2002).

6.7 EXPLICIT MODELLING

6.7.1 DEDUCTIVE IMPUTATION

This is an imputation method based on assumptions, derived from the literature or on the opinion of subject matter experts. One example described by de Waal and his colleagues (2011) is the following: when the respondents' age is 16 and marital status missing, the researcher may assume that the marital status is "unmarried", if this is what subject matter experts, literature, or other data sources suggest about the population under study. In the case of imputing a value for "paying for sex" item non response with deductive imputation is not possible. In fact, logical rules that may be used in the imputation such as: "respondents not reporting any sexual intercourse in the last 5 years haven't paid for sex in the last 5 years" are already taken into account in the questionnaire design with the implementation of filters.

6.7.2 MEAN IMPUTATION

The method consists in filling in the missing value with the arithmetic mean of the observed cases (Little and Rubin, 2002, Enders, 2010). The principal drawback of this method is that it distorts the estimates even under the MCAR assumption (Enders, 2010): in fact, it reduces the variability of the data, as all missing data share the population average; this

attenuates standard deviation and variance. Also, it reduces the magnitude of covariances and correlations across variables (Enders, 2010). Considering the formula of the sample covariance:

$$\sigma_{XY} = \frac{\sum(x_i - \hat{\mu}_X)(y_i - \hat{\mu}_Y)}{N - 1} \quad (1)$$

And correlation coefficient

$$r = \frac{\hat{\sigma}_{XY}}{\sqrt{\hat{\sigma}_X^2 \hat{\sigma}_Y^2}} \quad (2)$$

Imputing missing data in either X or Y with mean imputation would attenuate the covariance, “because they contribute a value of zero to the numerator of the formula” 1 (Enders 2010: 43). As the covariance is a key component of the correlation, the same reasoning applies to the correlation, equation 2 (Enders, 2010).

As Enders (2010:43) notes “Little and Rubin (2002: 61–62) give adjustment terms that produce unbiased estimates of variances and covariances with MCAR data, but these corrections end up producing estimates that are identical to those of pairwise deletion”.

I should finally point out that the main variables under study (paying for sex and risky behaviours) are categorical variables: thus, besides the drawbacks already outlined, mean imputation would lead to meaningless values (non integers for categorical variables). The equivalent of mean imputation for categorical variables is the imputation of the mode. In the case under analysis, the mode for the main dummy variables considered is 0, meaning “not having paid for sex”, “no unsafe sex”, *etc.* This is also the socially desirable option. Intuitively, it does not seem appropriate to replace all missing values with the socially desirable option, since skipping the survey question is expected to be related to social undesirability.

6.7.3 REGRESSION IMPUTATION

This method “replaces missing values by predicted values from a regression of the missing item on items observed for the unit, usually calculated from units with both observed and missing variables present” (Little and Rubin, 2002:60). The method replaces missing values with predicted values from a regression equation (Enders, 2010).

The regression imputation is divided into two steps: 1. In the first step, a set of regression equations are estimated to predict the incomplete variables from the complete variables: these models are usually run in a complete-case analysis. In the second step, the predicted scores are used to fill in the missing values (Enders, 2010).

Apart from being applied when the dependent variable is a numerical variable, regression imputation can also be applied with categorical variables (de Waal *et al.* 2011). Starting from the logistic regression model

$$\ln \frac{p}{1-p} = \alpha + \beta_1 x_1 + \dots + \beta_k x_k + \varepsilon \equiv \alpha + \mathbf{x}^T \boldsymbol{\beta} + \varepsilon$$

where p is the probability that y assumes value 1, thus in our case, p is the probability that the person was a sex workers' client.

Once the parameter $\boldsymbol{\beta}$ is estimated the probability of imputing a value 1 is

$$\hat{p} = \frac{e^{\hat{\alpha} + \mathbf{x}^T \hat{\boldsymbol{\beta}}}}{1 + e^{\hat{\alpha} + \mathbf{x}^T \hat{\boldsymbol{\beta}}}} = \frac{1}{e^{-(\hat{\alpha} + \mathbf{x}^T \hat{\boldsymbol{\beta}})} + 1}$$

In the presence of multiple missing data patterns the imputation process would require a unique regression equation for each missing data pattern (Enders, 2010). This process may be automated by the use of the computational algorithm “sweep operator” (Dempster, 1969; Goodnight, 1979; Little and Rubin, 2002).

The drawbacks of the regression imputation are the attenuation of the variance and the overestimation of correlations and of the R^2 (Enders, 2010). Indeed, imputed values fall on a regression line (or flat surface in multiple regression), they lack the variability that may be observed in the real data, which attenuate variance and covariance – though to a lower extent than mean imputation (Enders, 2010)

6.7.4 STOCHASTIC REGRESSION IMPUTATION

This is a type of imputation that “replaces missing values by a value predicted by regression imputation plus a residual, drawn to reflect uncertainty in the predicted value” (Little and Rubin, 2002:60). As with regression imputation, also stochastic regression imputation adopts regression equations to predict the missing values, from the observed values, but it adds an error term to each predicted score (Enders, 2010). The process is the same as the two-stage process for regression imputation, with the addition to a third phase, where the lost variability is restored adding a normally distributed error term to each predicted

score (Enders, 2010). This additional step increases the variability and eliminates the bias: indeed, this technique leads to unbiased estimates under the MAR assumption (Little and Rubin, 2002; Enders, 2010)⁹⁵.

As in regression imputation with multivariate datasets with several missing data patterns, “each missing data pattern requires a unique regression equation (or set of equations)” (Enders, 2010: 47); and each regression equation would require a residual distribution (Enders, 2010). This is a normal function with zero mean, and variance varying across missing data patterns (Enders, 2010).

As a drawback, stochastic regression imputation attenuates standard errors (Enders, 2010). Theoretically, the bias in stochastic regression standard error can be corrected with bootstrap resampling (Enders, 2010) but, from a practical point of view, this may require more effort than implementing multiple imputation (Enders, 2010).

6.8 IMPLICIT MODELS

6.8.1 HOT DECK IMPUTATION OR HOT DECK DONOR IMPUTATION

Hot-deck imputation is an imputation model extensively used in survey practice (Andridge and Robin, 2010) and suitable when dealing with categorical data (Durrant, 2005). It involves substituting the missing values from a sample member (called recipient) – non respondent to that particular item – with observed values from another respondent – called donor (Andridge and Robin, 2010). The donor and the recipient must be similar with respect to other auxiliary variables, which are observed in both cases (Andridge and Robin, 2010). The basic idea is to impute the missing values using the observed value of other respondents; the most common application (random hot deck) implies “replacing each missing value with a random draw from a subsample of respondents that scored similarly on a set of matching variables” (Enders, 2010:49).

More specifically, for each item non respondent i , a donor record d is searched in the data which is as similar as possible to the item non respondent i , and the auxiliary variables are considered to be correlated to the target variable y (de Waal et al., 2011). As de Waal and

⁹⁵ Also, evidence from computer simulation studies (Gold and Bentler, 2000; Newman, 2003) shows that parameter estimates are similar in stochastic regression imputation and maximum likelihood and multiple imputation. The similarities with multiple imputation are not surprising, as the two methods share the same routine, and MI can be conceptualized as an iterative stochastic regression imputation.

his colleagues (2011) describe, the selected donor score, y_d is imputed in the missing value for item non response i , as follows:

$$\tilde{y}_i = y_d$$

There are multiple ways to select a donor, some strategies follow in the category of using imputation classes, while others search for a donor by minimizing a distance function (de Waal *et al.*, 2011).

“Random hot deck imputation” and “sequential hot deck imputation” follow in the group of imputation strategies that use imputation classes (de Waal *et al.*, 2011). In random hot deck imputation, potential donors and recipients are divided into imputation classes based on auxiliary variables. Within an imputation class⁹⁶ a potential donor is randomly selected for the recipient.

In “sequential hot deck imputation”, for each item non response the score on the target variable in the first subsequent/or precedent record with the first subsequent/precedent record for the auxiliary variable is imputed for the missing value. Groves *et al.* (2009) summarize random hot deck imputation as follows: firstly, the dataset is sorted by selected auxiliary variables. Secondly, for the first case: if the value is missing, this is replaced with the value from the sample (e.g. the sample mean of the value under study). This value is usually called “hot deck”. If the first value is not missing, this is labelled as “hot deck value”. When the next case is estimated: 1. if this is missing, it is replaced by the most recent stored “hot deck value” 2. if this is not missing, the researcher moves to the following case. The process is continued until the end of the sample.

The assumption (and the intuition) behind hot deck imputation is that if the characteristics of two individuals are the same, then the values of the target variables to be imputed will be similar (de Waal *et al.*, 2011). In particular, in random and sequential hot deck imputation, donor and recipient have the same values of the auxiliary variables – thus, they are in the same imputation class.

As a drawback of hot deck approaches, they are not suited for estimating measures of associations (Enders, 2010), as the relations in the data are not preserved; Estimates of correlations and regression coefficients may be substantially biased (Brown, 1994; Schafer

⁹⁶ Other ways to refer to “imputation classes” is “donor pools” (Andridge and Robin, 2010).

and Graham, 2002). The hotdeck approach underestimates standard errors, correction mechanisms (e.g. jackknife) have been proposed (Enders, 2010).

6.8.2 SUBSTITUTION

This is a method for dealing with unit nonresponse during the field work and it is used for unit non response rather than with item non response. It consists of replacing unit non response with alternative units not selected into the sample (e.g. a non contacted household is substituted with a household that was not selected in the sample and comes from the same housing block). Evidently, the “new” substituted units (in the described example, the household) are respondents – while the “old” units (in the above example the non contacted household, were “non respondents”) –hence the two units differ systematically. This difference needs to be taken into account at the analysis stage. Evidently, this method is not applicable in the case here analyzed. In fact, firstly, I am proposing here, to impute values for item non response rather than for unit non response. Secondly, even if the analysis is focused on unit non response this method is performed at the data collection phase, while I aim to apply an imputation procedure at the analysis phase (Little and Rubin, 2002).

6.8.3 COLD DECK IMPUTATION

This model replaces a missing value of an item by a value coming from another source. The terminology originates in contraposition with “hot deck” as data used as donors are not currently being processed (i.e. “hot”); conversely, pre-processed data are used as donors (Andridge and Little, 2010). Examples of cold deck donors are values from a different survey or, in longitudinal studies, values from a previous wave.

6.8.4 COMPOSITE METHODS

Rather than using a single method of imputation, in some cases a combination of multiple methods may be applied (Little and Rubin, 2002) As an example, Little and Rubin (2002) describe the possibility of combining hot deck and regression imputation: which has been applied, for example, by David *et al.* (1986).

6.9 SINGLE AND MULTIPLE IMPUTATION MODELS

Besides the distinction on implicit and explicit modelling, another possible way to classify these methods is to distinguish between single and multiple imputation methods. The

single imputation approaches “generate a single replacement value for each missing data point” (Enders 2010: 42), whereas multiple imputation “creates several copies of the data set and imputes each copy with different plausible estimates of the missing values” (Enders, 2010). As has been discussed above, most single imputation methods distort estimates even under the MCAR assumptions; also, the only approach that produces unbiased parameter estimates under the MAR assumption (instead of the MCAR) is stochastic regression imputation (Enders, 2010).

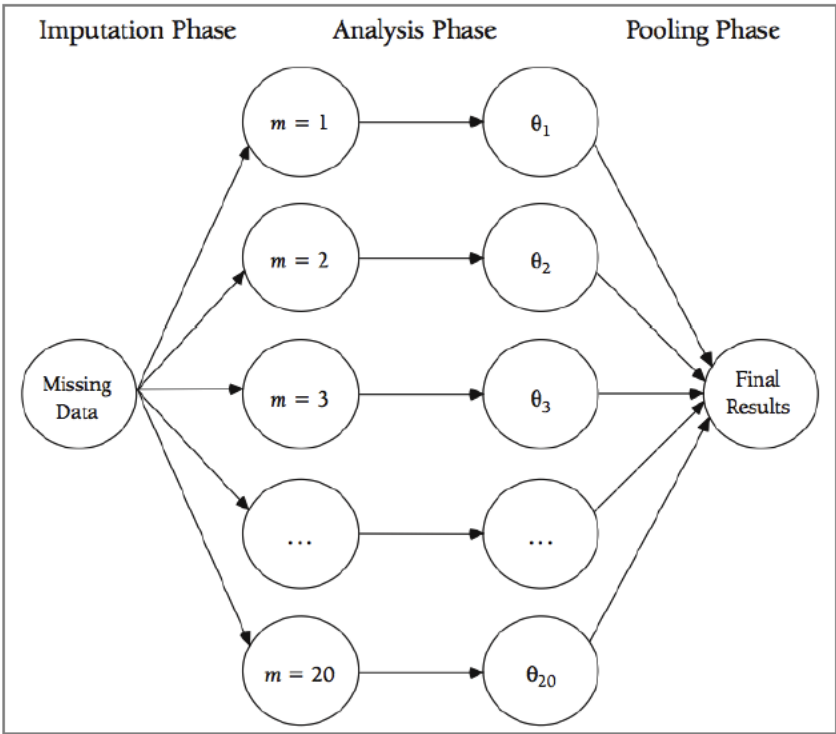
In general, in single imputation methods, when imputed data are treated as real data, the additional error derived from the missing data is ignored (Enders, 2010). Single imputation methods produce inferences about parameters based on the imputed data without taking into account imputation uncertainty (Little and Rubin, 2002). As a matter of fact, “standard errors computed from the filled-in data are systematically underestimated, P values of tests are too small and confidence intervals are too narrow” (Little and Rubin, 2002: 72). Conversely, with multiple imputation, imputing more than one value for each missing item allows the assessment of the imputation uncertainty (Little and Rubin, 2002). All models described so far are single imputation models; multiple imputation techniques will be described in the next paragraph.

6.10 MULTIPLE IMPUTATION

Multiple imputation analysis is articulated into three steps: the imputation phase, the analysis phase and the pooling phase (Enders, 2010) – see FIGURE 6.2. In the imputation phase, multiple copies of the dataset are created in such a way that they each contain different estimates of the missing values. In the analysis phase, the imputed datasets are analysed. The procedure is similar to the analysis that would have been conducted if the dataset were complete, with the only difference that the analysis is performed multiple times, as many times as copies of the dataset have been created; this phase yields m sets of parameters and standard errors. In the pooling phase, the multiple sets of parameter estimates and standard errors are combined together in a single dataset (Enders, 2010). The pooled parameter estimate is the arithmetic average of the estimates from the analysis phase (Enders, 2010). Standard errors are combined taking into account two sources of variance: the within-imputation variance and the between imputation variance. The within-imputation variance is the average of the sampling variances in the m different datasets. The between-imputation

variance “quantifies the variability of an estimate across the m imputations” (Enders, 2010:252). These two sources of variance combined together form the total sampling variance, and the corresponding standard error.

FIGURE 6.2: Illustration of the multiple imputation process



Source: Enders (2010: 188)

The phases of imputation, analysis and pooling are common to all multiple imputation procedures: however, the imputation phase may be implemented differently as multiple algorithms have been proposed for this phase (e.g. Royston, 2005; Honaker, Joseph, and Scheve, 2001; Raghunathan, Solenberger, and Van Hoewyk, 2002).

6.10.1 SELECTION OF THE MULTIPLE IMPUTATION MODEL

The imputation model adopted in this research uses multiple imputation by chained equations ⁹⁷. This chained equations approach “imputes missing values by iteratively fitting a set of regression equations where each variable is successively treated as the outcome variable and regressed on all other variables in the model” (Johnson and Young, 2011: 927). In other words, the method “imputes each variable in turn, using a regression of the observed values of that variable on the observed and currently imputed values of all other variables” (White *et al.*, 2010).

⁹⁷ MICE has been applied in studying a variety of risky behaviours including smoking, alcohol = consumption and drug use (e.g. Schnoll *et al.*, 2006; MacLeod *et al.*, 2008; Caria *et al.*, 2009; Morgenstern *et al.*, 2009; Adamczyk, 2008; Cummings, 2006; Mueller, 2008; O' Callaghan *et al.*, 2006).

As described by White *et al.* (2010: 2268), in order to take into account correctly the uncertainty of the parameter estimates, MICE uses a two steps procedure: “(1) draw the regression parameters from their posterior distribution, and (2) draw the imputed values from the regression model using the sampled regression parameters”.

More specifically, in a first stage, all missing values are replaced with observed values chosen by simple random sampling with replacement (White *et al.*, 2011). The first variable with missing values (X_1) is regressed on all other variables X_2, \dots, X_k , using only observations with observed X_1 . The values that are missing in X_1 “are replaced by simulated draws from the corresponding posterior predictive distribution of X_1 ”⁹⁸ (White *et al.*, 2011:378). The second variable with missing values (X_2) is regressed on all variables, with the exception of X_2 (i.e. X_1, X_3, \dots, X_k) using observations with observed X_2 , and using the previously imputed values of X_1 . As for X_1 , missing values in X_2 “are replaced by draws from the posterior predictive distribution of X_2 ” (White *et al.*, 2011:378). This process is repeated for every k variable with missing values.

Then, the full procedure is repeated for several cycles. These cycles are the iterations; in this particular case, iterations are set to 50. The iterations produce a single imputed data set. The procedure is then repeated for each of the imputed datasets (in this case 50).

The main feature of MICE is that the imputation model is specified separately for each variable (van Buuren and Oudshoorn, 2011). As it will be detailed in CHAPTER 7, I adopt a logistic regression model for binary variables, ordered logistic regression model for categorical variables and Predictive Mean Matching (PMM) for continuous variables. The latter is a semi-parametric imputation technique introduced by Rubin (1986) and Little (1988); it is an example of a hot-deck method, where regression is used to define matches (Van Buuren, 2011; Andridge and Little, 2010).

⁹⁸ The posterior probability is a key concept in Bayesian statistics. The main elements in Bayesian statistics are the likelihood function, the prior distribution and the posterior distribution (Glickman and van Dyk, 2010). The prior distribution expresses the information about the parameters before observing data; the likelihood function expresses the information about the parameters contained in the data; the posterior distribution is the composite distribution that combines information from the prior distribution and the likelihood function (Glickman and van Dyk, 2010) “to generate an updated set of relative probabilities” (Enders, 2010:167). These three main elements can be interpreted as three analysis steps: (i.) the specification of a prior distribution for the parameter of interest, (ii.) the use of a likelihood function to summarize the evidence from the data on the parameters of interest, and (iii.) the combination of information from a prior and likelihood function to generate a posterior distribution (Enders, 2010).

More specifically, predictive mean matching calculates the predictive values of a target variable according to a regression model (van Buuren, 2011). For each missing value, the method identifies a set of potential donors with predicted values close to the predicted value of the missing value (van Buuren, 2011). The missing value is then replaced with a donor chosen randomly among the set of potential donors. The main advantage of Predictive Mean Matching is that the imputed values are values that are actually observed in the data. Thus, the method avoids implausible and meaningless imputed values – e.g. negative number of sexual partners (van Buuren, 2011)⁹⁹.

6.10.2 SPECIFICATION OF THE IMPUTATION MODEL

Van Buuren *et al.* (1999) provide a summary of general rules on how to specify correctly the imputation model. More specifically, the imputation model should include:

- a. all the variables that appear in the complete data model, meaning the analysis model that will be estimated after imputation (Little, 1992; Moons *et al.*, 2006)
- b. variables that are relevant for non response – e.g. factors that may have influenced the missing data (Van Buuren *et al.*, 1999) – and
- c. factors that are explanatory of a large fraction of the variance, as these predictors reduce the uncertainty of the imputation (Van Buuren *et al.*, 1999).

The imputation model should not include variables with many missing data unless these variables are included in the analysis model (Van Buuren *et al.*, 1999).

On the one hand, the authors suggest the inclusion of as many predictors as possible to make the MAR assumption more plausible, and reduce the need to adjust for MNAR. On the other hand, in some cases the inclusion of all relevant information may not be feasible for both computational problems as well as for multicollinearity (Van Buuren *et al.*, 1999). The analysis presented here is one of these cases.

⁹⁹ Recently, the potentiality of predictive mean matching for imputing also categorical variables have been highlighted. One of the pitfalls of PMM is that few studies have evaluated the performance of the method yet (Allison, 2005). However, in a simulation study, Marshall *et al.* (2010) concluded that predictive mean matching produced the “least biased estimates and better model performance” compared to other methods; another simulation study (Marshall *et al.*, 2010b) reached the conclusion that when missing data are less than 50% and data are not MNAR, MICE PMM may be the preferred MI approach.

Furthermore, Van Buuren *et al.* (1999) notice that since the increase in explained variance in linear regression is typically negligible after the 15 variables that best specify the model, the inclusion of many more covariates in the imputation model may not even be necessary, provided that the variables included in the model specify it correctly. Thus, as a rule of thumb, a suitable set of 15-25 covariates is generally considered sufficient (Van Buuren *et al.*, 1999).

I have followed the indications detailed above for the choice of variables to be included in the imputation model. The full list of variables is presented in CHAPTER 8.

In addition to these general rules, the methodological literature on multiple imputation has discussed several practical problems on multiple imputation such as whether to include the dependent variable in the imputation model, and how to deal with missing values when they occur both in the dependent and in the independent variables.

Allison (2002) stresses the importance of including the dependent variable in the imputation model, when imputing dependent variables with missing data. Von Hippel (2009) recommends the imputation and analysis models to be “compatible”, meaning that “any relationship in the analysis model should also be part of the imputation model” (Von Hippel, 2009: 2). Considering the example of a complete variable Y that is regressed on an incomplete variable X , the values of X should be imputed conditionally on Y . Conversely, if Y is not included in the imputation model, the imputed X values will have no conditional relationship with Y ¹⁰⁰; as a matter of fact, in the analysis the correlation between X and Y would be biased toward zero as no correlation between X and Y was allowed in the imputation model (Von Hippel, 2009)¹⁰¹.

¹⁰⁰ It should be noted that a relationship may still be present through another variable – or other variable(s) – included in the imputation model. For example, if the imputation model includes variable X and a variable Z correlated with both X and Y , but fails to include Y , then the two variables X and Y may still be correlated via the additional variable Z ; however, as no conditional relationship was allowed between X and Y , the correlation of the two would be biased towards zero.

¹⁰¹ This comparability requirement applies also to transformed variables – e.g. squared terms and interactions (Von Hippel, 2009). Thus, if interactions need to be included in the analysis model, these interactions need to be included also in the imputation models (Von Hippel, 2009). The two main approaches for dealing with transformed variables in imputation are the: i. “transform, then impute” approach, and ii. “impute, then transform” approach (Von Hippel, 2009). The “transform then impute” approach consists in calculating the interactions in the incomplete data, and then impute transformations; the “impute, then transform” approach imputes variables in their original form and then transforms the imputed variables (Von Hippel, 2009). Comparing the two approaches, Von Hippel (2009) concludes that the “transform-then-impute” approach is

As will be shown in the analytical section, the case under study is characterized by missing data in the dependent variable. Von Hippel (2007) proposes a new approach to deal with the analysis when data are missing in the dependent variable: the “multiple imputation, then deletion” (MID) approach. This method shares the same steps as an MI standard approach, but cases with an imputed dependent variable are deleted before the analysis^{102 103}.

MID is tested empirically by Young and Johnson (2010). The authors compare three practices: (1) excluding the dependent variable from the imputation model, (2) MID, and (3) including the dependent variable in the imputation model and retaining the imputed values in the analysis phase. Consistently with other authors (e.g. Von Hippel, 2009), Young and Johnson (2010) suggest the inclusion of the dependent variable in the imputation model; also, they suggest that values imputed in the dependent variable may be retained in the analysis phase, provided that a sufficient number of datasets are generated (Young and Johnson, 2010). As von Hippel (2007) himself found in his simulation study, increasing the number of imputed datasets the difference between the MID approach and retaining the dependent variable with the imputed cases becomes trivial. Moreover, with levels of missingness from 5% to 15% the MID does not offer a discernible advantage. In addition to this evidence, in a recent simulation study, Sullivan, Salter, Ryan, and Lee (2015) showed that when data is

preferable as it “yields good regression estimates, while the impute-then-transform method is biased” (Von Hippel 2009: 3). The source of bias lies in the analysis and imputation model being inconsistent. In fact, the analysis model includes the transformed variables and specifies their relationship with the dependent variable, while the imputation model ignores the transformed variables and their relationship with the dependent variable (Von Hippen, 2009).

¹⁰² Von Hippel derived the reasoning from the work of Little (2002). More specifically, Little (2002:1227) states “if values of X are missing as well as Y , then cases with Y missing can provide a minor amount of information for the regression of interest, by improving prediction of missing X 's for cases with Y present”. Thus, as summarized by Von Hippel (2007), the imputation step should include cases with missing Y as they may contain useful information for imputing X . However, after imputation, cases with imputed Y do not add any additional information (Von Hippel, 2007).

¹⁰³ Compared to MI, MID “tends to give less variable point estimates, more accurate standard-error estimates, and shorter confidence intervals with equal or higher coverage rates” (Von Hippel, 2007:85). Thus, MID “tend to have greater power while maintaining equal or lower significance levels” (Von Hippel, 2007:85). Another advantage of MID is that it is robust to problems in the imputation model; in fact, problems in imputing Y do not influence the MID estimates, as the imputed values of Y are deleted before analysis; if missing in X occurs in the same cases as missing in Y , also problems in imputing X do not affect the MID estimates as these cases will be deleted from the analysis (Von Hippel, 2007). MID relies on the assumptions that missing Y values are ignorable, i.e. “the unobserved Y values are similar to observed Y values from cases with similar values for X .” (Von Hippel, 2007:86). Also, X values need to be ignorable in cases with missing Y (Von Hippel, 2007). A final assumption required by MID is that the imputed Y contains no useful information.

missing both in the dependent and independent variable and auxiliary variables are associated with the missingness in the dependent variable the MID approach leads to biased parameters estimates¹⁰⁴.

As will be shown in the analysis section, in the case under study missing data occur both in the dependent variable (paying for sex) as well as in the independent variables (i.e. risky behaviours). Thus, both Y (paying for sex) and Xs (e.g. risky behaviours) are incomplete. Also, in most cases, the same units have missing values in both sets of variables. Item missing data in the case under study is rare, while MID is especially attractive when the dependent variable Y has a lot of missing data and the specified imputation model is not fully convincing (Von Hippel, 2007). Thus, given the limited number of item missing data in the analysis under study, and the creation of several imputed datasets (20), I do not use MID. Instead, I keep the imputed cases of the dependent variable in the analysis.

6.11 CONCLUSIONS

In this chapter I have defined key concepts in non response analysis. Firstly, I have distinguished between different data patterns. As will be shown in the analysis section, the data used in the empirical part of this project follow a missing data pattern called “general case”. In fact, some of the values missing for one item are missing also for others. This is the case not only for items that I impute in the empirical section (i.e. “paying for sex”, “overseas partner acquisition”, “unprescribed drug use”, and “unsafe sex”) but also for other items used in the analysis.

Different types of missing data (MCAR, MAR and MNAR) are introduced and described in the chapter. In particular, I make reference to the criticisms and challenges that any of these situations impose on the estimation of parameters.

The concepts of imputation and correction are introduced and different imputation methods are presented. Among those, I adopt a multiple imputation by chained equation approach.

¹⁰⁴ Also, when the auxiliary variables were unrelated with the missing mechanism, both MI and MID produced negligible bias but MI performed better in most settings.

CHAPTER 7 – RESEARCH HYPOTHESIS AND METHODS

In the first section of this chapter I define the research hypothesis and the research questions; subsequently, I describe the methods that will be adopted to answer these research questions. The chapter will describe the empirical specification of the model by Della Giusta *et al.* (2014) and possible modifications of the model. Reference is made to the CHAPTER 6 on imputation, for a more detailed discussion of different imputation techniques and of multiple imputation.

7.1 RESEARCH HYPOTHESIS

As paying for sex and risky behaviours (injected drug use, unsafe sex, and overseas partner acquisition) are measured using sensitive questions – characterized by the social undesirability of the answer, the risk of disclosure to third parties and privacy concerns – sample members may refuse to answer these questions. Thus, these variables are expected to have item missing data. The first hypothesis that I test is:

HYPOTHESIS 1: Paying for sex and risky behaviours have item missing data, and they have higher missing data than other non sensitive items.

This leads to the following research questions: what is the prevalence of item missing data in paying for sex and other risky behaviours? Is the prevalence of item missing data in paying for sex and risky behaviours significantly higher than the prevalence of missing data in other non sensitive items?

HYPOTHESIS 1 has relevant implications for the analysis as the presence of item missing data in the variables of interest may, in the best case scenario (i.e. MCAR) reduce the

sample size for the analysis, and in the worst case scenarios (i.e. MNAR or MAR) generate biased estimates.

Secondly, sample members with different socio-demographic characteristics may have a different probability of answering the sensitive question. Also, the probability of answering the survey question may differ depending on the privacy of the interview setting, on the respondents embarrassment and on the respondents commitment to the survey. In technical terms, item missing data may not be missing completely at random (MCAR). Conversely, respondents characteristics and interview settings may be associated with item non response in the sensitive variables, in which case data are MAR. Thus, the second hypotheses are:

HYPOTHESIS 2: In the variables paying for sex, injected drug use, unsafe sex and overseas partner acquisition item missing data are not Missing Completely at Random.

HYPOTHESIS 2.1: Item non response in paying for sex and risky behaviours are correlated with respondents' socio-demographic factors.

HYPOTHESIS 2.2: Item non response in paying for sex and risky behaviours are correlated with the privacy of the interview settings, respondents' commitment to the survey and respondents' embarrassment.

Thirdly, as recalled in the previous chapters, respondents may decide to skip the survey question due to the social undesirability of the answer; as social undesirability may vary across different survey questions, the missing data may differ across different variables. Thus:

HYPOTHESIS 3: The propensity to produce valid answers varies across the variables considered: paying for sex, unsafe sex, overseas partner acquisition, and injected drug use.

This leads to the following research question: What is the missing data pattern for paying for sex and risky behaviours?

As the question on paying for sex is likely to be skipped for the social desirability of the answer, non respondents to this item are expected to be sex workers' clients and/or to

have engaged in risky behaviours¹⁰⁵. Thus, I would expect the prevalence of the risky behaviour and the paying for sex to be higher for non respondents than for respondents.

This leads to the following research hypothesis:

HYPOTHESIS 4: The prevalence of paying for sex and risky behaviours is higher among the respondents with item missing values compared with the prevalence among the observed values.

As a consequence of research HYPOTHESIS 4, the additional research question will be answered: what is the prevalence of paying for sex and risky behaviours among sample members with item non response? Is the prevalence of the socially undesirable behaviour (e.g. admit paying for sex) higher for sample members with item non response in paying for sex and risky behaviours compared to sample members responding to the survey question?

In order to answer these research questions, we would need to observe the true values of paying for sex and risky behaviours both for sample members responding to the survey question as well as for sample members that did not respond to the survey question. However, we observe a value only for sample members responding to the survey question. Moreover, the value we observe for sample members reporting the survey question may not be the true values, as sample members may misreport their answer.

We therefore need to: i. impute a value for item missing data in paying for and risky behaviours, ii. make the assumption that the imputation model is correctly predicting the true value in paying for sex and risky behaviours (Assumption 1), and iii) make the assumption that observed values are true values (no misreporting).

In an ideal situation, the true value for respondents and non respondents would have been compared. However, as for non respondents the true values are not observed, imputation is used to impute an answer for sample members that skipped the survey question. Thus, the comparison is based on imputed and observed data, and relies on the assumption of a correctly specified imputation model.

¹⁰⁵ For example, in the extreme case scenario, in which everyone that did not reply to the question on paying for sex skipped the question for social desirability as he is a sex workers' client, the prevalence of paying for sex among non respondents that are sex workers' clients would be 100%.

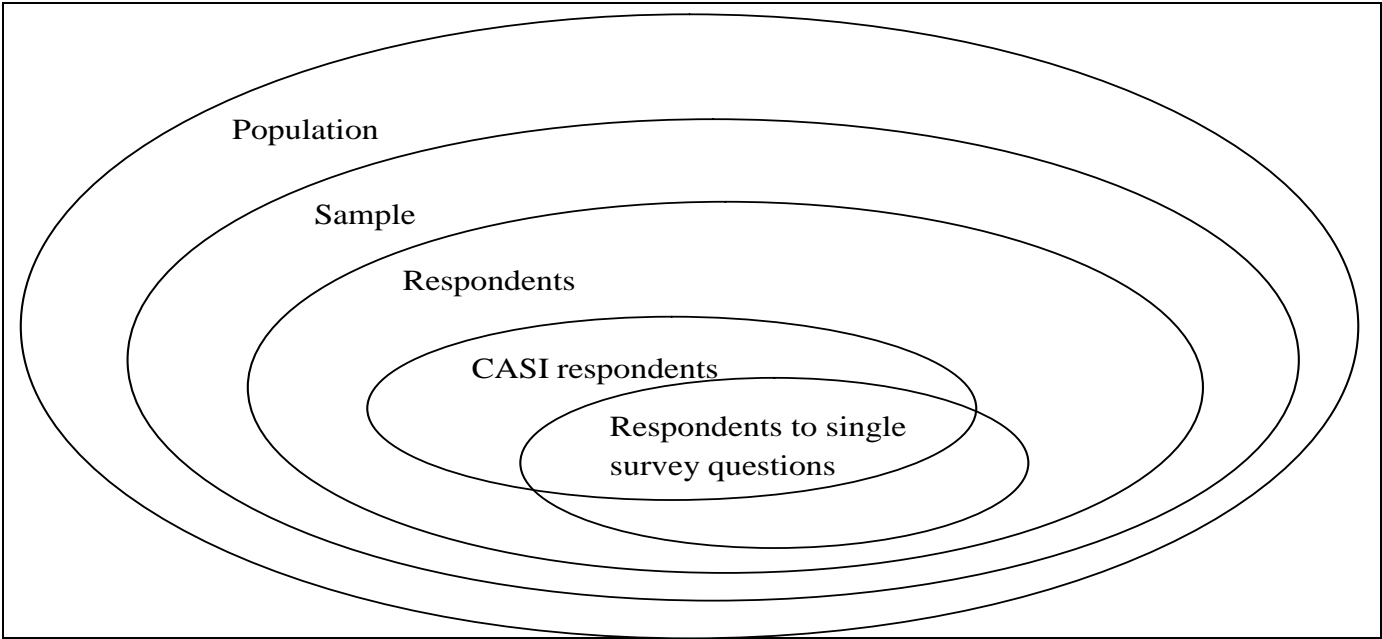
Moreover, I expect the correlation of paying for sex and risky behaviours to be distorted as a result of the missing data; this would lead to the following research hypothesis:

Hypothesis 5: Due to missing data – that are not missing completely at random – in paying for sex and risky behaviours, the correlation of these two sets of variables is biased.

This leads to the following research question: after imputing a value for item non response in paying for sex and risky behaviours is the correlation of paying for sex and risky behaviours different compared to the list-wise deletion method adopted by Della Giusta *et al.* (2014)?

Finally, it should be noticed that paying for sex and the risky behaviours under study are asked in the self-completion section of the questionnaire (CASI). Thus, analysing the correlation of paying for sex with risky behaviours, I am restricting the analysis to respondents that are eligible for the CASI section (see FIGURE 7.1 below). Non response weights are included in the analysis to reduce the non response error due unit non response. No weight is provided to correct the non response in the CASI section of the questionnaire.

FIGURE 7.1: Response to the survey question on paying for sex and risky behaviours



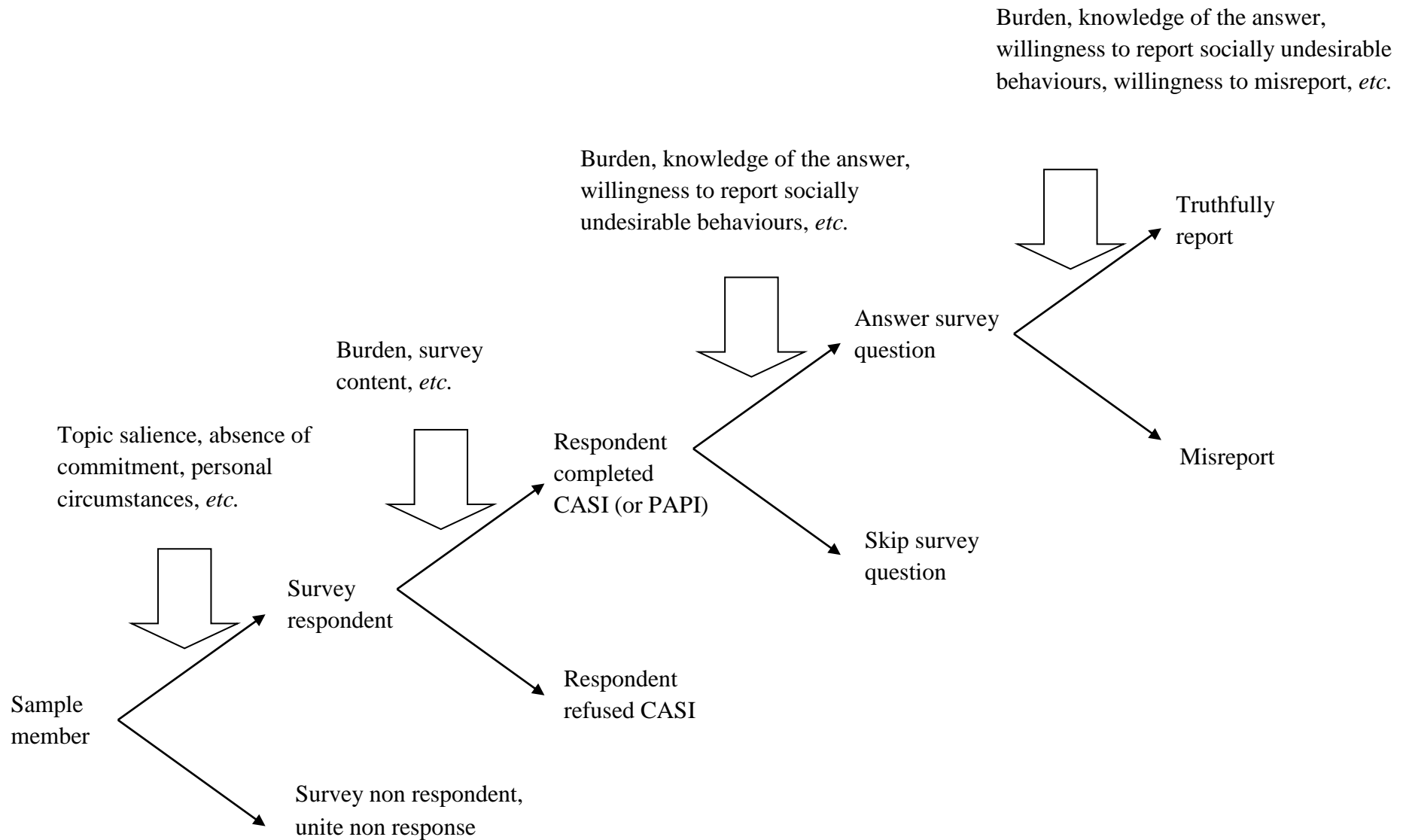
This situation may be described differently considering the sequential steps of the response process. Firstly, sample members may decide either to take part in the survey, or to refuse (unit non response). Several factors may influence this choice, such as the topic salience, commitment and trust to the survey agency, personal circumstances, *etc.* (see CHAPTER 5).

Once the respondent is taking part in the survey, he/she is invited to fill in the self completion part, and, thus, face an additional choice: participating to the self completion section or refusing to take part. At this point the respondent has additional information on the survey, and these information may be used to take an informed choice on the participation to the self-completion questionnaire. In a survey on sexuality, as the one analysed, a clearer idea of the survey content may induce respondents not willing to reveal in detail their sexual behaviours to skip the self-completion section of the survey. In addition (or substitution) to this effect, other factors may be at play. For example the response burden is likely to increase with the survey length: thus, sample members that were initially willing to take part in the whole survey may decide to refuse participation in the self completion section. Furthermore, the interview circumstances may change (e.g. the sudden arrival at home of another household member) and this may lead the respondent to decide to skip one survey section.

Sample members that decided to take part in the self completion section of the survey are then faced with the choice to answer specific survey questions. As recalled in previous chapters, several reasons may lead the sample member to skip the survey question; not all of these reasons are related to the sensitive nature of the question, for example, the respondent may genuinely not know the answer, or may skip the survey question to minimize the response burden. In addition to these situations, in sensitive questions, the unwillingness to reveal a socially undesirable behaviour, the fear of disclosure to third parties and privacy concerns may lead the respondent to skip the survey question.

Finally, once answering the survey question, the sample member may report the true value or misreport it. Also in this case, misreporting is not necessarily due to the sensitive nature of the question, but may be caused by the respondent not knowing the true value that is elicited. In some cases both mechanisms may be at play. For example, household income may be misreported for social desirability, but also because the head of household may not be aware of the amounts of different sources of incomes of different household members. In the field of sexual behaviour the same reasoning applies to number of sexual partners. Although reporting is part of the response process, this latter step is out of the scope of this analysis.

FIGURE 7.2: Survey response process to sensitive questions in CASI section



7.2 METHODS

In this chapter I describe the methods adopted to answer the proposed research questions and test the hypotheses. Firstly, I detail how I am going to explore the missing data types and patterns (Section 7.2.1). Secondly, I described the analysis model that will be tested under two different item missing data handling techniques: *listwise* deletion and multiple imputation (Section 7.2.2). Thirdly, I propose some minor modifications in the definition of selected variables in the analysis model (Section 7.2.3). Fourthly, I describe Multiple Imputation by Chained Equations and I outline the multiple imputation model (Section 7.2.4). Moreover, I describe the comparison of imputed and observed values and the comparison of estimates from listwise deletion and multiple imputation (Section 7.2.5 and Section 7.2.6). Finally, I describe the robustness check, which consists in computing estimates bounds (Section 7.2.7).

7.2.1 MISSING DATA TYPES AND PATTERNS

HYPOTHESIS 1 is tested using descriptive statistics showing the proportion of item missing data in the paying for sex and risky behaviour variables. I will show here the share of item missing data (if any) in the considered variables, and I will compare the share of item missing data with other survey variables.

More specifically, I compute the average item missing data for four categories of survey questions:

- Socio-demographic questions
- Socio-demographic questions including partners' employment/income variables
- Non sensitive questions about behaviours
- Sensitive questions about behaviours
- Attitudinal questions

Using a t-test the prevalence of item missing data in paying for sex and each of the three risky behaviours under study will be compared with the average item missing data for the four categories of questions considered (socio-demographic items, socio-demographic questions including partners' employment/income variables, non sensitive items about behaviours, sensitive items about behaviours, and attitudinal items).

HYPOTHESIS 2 (i.e. missing data in paying for sex and risky behaviours are not Missing Completely at Random) is tested using a set of logistic regression models. With respect to paying for sex, the probability of having a missing value in paying for sex is regressed on socio-demographic factors, privacy of the interview settings, respondent commitment to the survey and respondents embarrassment. The model is specified as following:

$$paymiss_i = \alpha + \beta X'_i + \gamma privacy_i + \delta embarrassment_i + \lambda commit_i + \varepsilon_i$$

Where:

Missing data in paying for sex is a dummy variable taking value 1 if the paying for sex is missing

X is a set of socio-demographic factors

privacy is a dummy variable measuring the privacy of the interview setting

embarrassment is a dummy variable measuring the respondents embarrassment

commit is a dummy variable measuring the respondents willingness to participate in the survey

The same holds of the other risky behaviours, thus I will estimate other five models specified as following:

$$unsafemiss = \alpha + \beta X'_i + \gamma privacy_i + \delta embarrassment_i + \lambda commit_i + \varepsilon_i$$

$$overseasmiss = \alpha + \beta X'_i + \gamma privacy_i + \delta embarrassment_i + \lambda commit_i + \varepsilon_i$$

$$injectedmiss = \alpha + \beta X'_i + \gamma privacy_i + \delta embarrassment_i + \lambda commit_i + \varepsilon_i$$

If any socio-demographic factor is significantly associated with the risky behaviours, we can conclude that the item missing data is not MCAR. Finding a significant correlation of the missing data in our variable of interest with other covariates is a sufficient condition to infer that data are not missing completely at random, MCAR – i. e. they are either MAR or MNAR. However, the condition is not necessary: a significant correlation between the missing data in our variable of interest and other covariate may not be found, yet data may still be not missing completely at random, but MNAR – i.e. the missing data depends on unobservable variables. In fact, when missing data are MNAR the missing data may not be

correlated with any of the observable variables but only on unobservable variables. More specifically, missing data may depend either on observable and unobservable variables, or on unobservable variables only. If the second case applies, the missing data would not be correlated with other observable variables.

Thus, if our model shows that socio-demographic factors are associated with the missing data in the variable of interest, we can infer that data are not MCAR: they are either MAR or MNAR. Conversely, if our model shows that the observable socio-demographic factors are not associated with the missing data in our variables of interest, then we can infer that the mechanisms is not MAR, but this model does not allows us to disentangle between the two extreme cases: MCAR and MNAR¹⁰⁶.

The third hypothesis (HYPOTHESIS 3 – i.e. the propensity to produce valid answers varies across variables) will be tested using graphical diagnostics, specifically the diagnostics for missing data patterns and missing data mechanisms¹⁰⁷. A visualization method is chosen as it helps to understand the distribution of the incomplete information, identify the structure of the missing values and the relation of missing values with available information (Templ, Alfons, and Filzmoser, 2011). In particular the histogram, spinogram and matrix plot for missing data in the MIV R package are adopted.

7.2.2 THE ANALYSIS MODEL

This work compares the estimates of the conditional association of paying for sex and risky behaviours obtained with two different missing data handling techniques: *listwise* deletion and multiple imputation. The model to be estimated is developed by Della Giusta and her colleagues (2014). This is a probit model specified as following:

$$paysex = \beta_0 + \beta_1 age + \beta_2 nchild + \beta_3 edu + \beta_4 prof + \beta_5 risk + \beta_6 frs + \beta_7 att + \beta_8 rel + \beta_9 fsage + \varepsilon$$

where:

¹⁰⁶It should be noticed here that the MAR assumption per se, without any further assumption about the data is not testable (Jaegel, 2006); while techniques to test is has been proposed under the other distributional assumption as the naive Bayes assumption (Jaegel, 2005, 2006).

¹⁰⁷ These will be plotted using the VIM package in R.

pay sex is a dummy variable taking value 1 if the respondent ever paid for sex and 0 otherwise;

age is a continuous variable measuring the respondent's age;

nchild is a continuous variable measuring the respondent's number children;

edu is a set of dummy variables measuring the level of education of the respondent. These are: degree; levels/as-levels/slc higher grade; o-level/other;

prof is a set of dummy variables measuring the professional status, specifically: professional/managerial, technical/managerial, skilled manual or non-manual, partly skilled;

risk a set of dummy variables measuring the risky behaviours, these are: had partner outside UK in the last 5 years, had unsafe heterosexual sex in last year; ever a smoker; ever injected drugs or other substances; high or medium alcohol consumption;

frs are a set of dummy included by the authors as a proxy of the access to unpaid (i.e. free) sex, these are: a continuous variable measuring the number of occasions of heterosexual sex in last 4 weeks; a continuous variable measuring the number of new heterosexual sex partners in the year prior to the interview; a dummy variable taking value 1 if the respondent is married or cohabiting or widow or divorced and 0 otherwise;

att are a set of dummies measuring conservative opinions and religiosity. More specifically, they are: sex before marriage always, mostly or sometimes wrong; sex between 2 men always, mostly or sometimes wrong; abortion always or mostly wrong; current belonging to any religion;

afsex are three dummies to take into account the age at first sexual intercourse (i.e. 13-15; 18-19; 20+);

As a sample selection, the analysis proposed by the authors run only on sexually active men. In fact, the dependent variable and many of the covariate in the analysis are asked in the self completion section of the questionnaire, which is asked only to sexually active respondents¹⁰⁸. This is coherent with the focus of the survey, which is on sexually related

¹⁰⁸ More specifically, the self completion section is asked to respondents aged 17+ years old who said in the earlier section that they had at least one heterosexual or homosexual experience (Erens *et al.*, 2001). Among

topics, and do not generate problems in analysing sexual behaviours. In fact, by definition sexually inactive respondents' are not sex workers' clients, didn't have any new heterosexual partner in the last year *etc.* However for the analysis of risky behaviours, as for injected drug use, the analysis can be conducted only to respondents that are sexually active.

7.2.3 A DIFFERENT SPECIFICATION OF THE ANALYSIS MODEL

I propose a slightly different specification of the model. More specifically, the model by Della Giusta *et al.* (2014) adopts as a reference category for socio-economic status the group "unskilled, unclassifiable, army, other". As shown in the analysis section, the prevalence of paying for sex is significantly different in the subgroup "unclassifiable, army, other" compared to the subgroup "unskilled". Thus, I propose to disentangle this group of respondents in two groups: "unskilled" and "unclassifiable, army, other"; and to consider "unskilled" as a reference category and "unclassifiable, army, other" as an additional covariate to be included in the model. Moreover, regarding the variable measuring smoking, replicating the analysis by Della Giusta *et al.* (2014) I noticed that the variable used in the analysis is "currently being a smoker", rather than "ever a smoker" as reported in the text. For consistency with the authors' analysis and since results do not change widely, I model the smoking behaviours using the variable "currently being a smoker".

Finally, regarding drug use, the analysis by Della Giusta *et al.* (2014) includes the variable "injected drugs", which is a risky behaviour for the diffusion of sexually transmissible diseases (see CHAPTER 1). I propose to include injection of nonprescribed drugs as this may be a more precise indicator of a propensity toward risk. Thus, the proposed model specification is:

$$paysex = \beta_0 + \beta_1 age + \beta_2 nchild + \beta_3 edu + \beta_4 prof + \beta_5 risk + \beta_6 frs + \beta_7 att + \beta_8 rel + \beta_9 fsage + \varepsilon^{(1)}$$

where:

pay sex is a dummy variable taking value 1 if the respondent ever paid for sex and 0 otherwise;

age is a continuous variable measuring the respondent's age;

respondents aged 16-17 years old the self completion questionnaire is given to respondents who had at least one experience of heterosexual intercourse (Erens *et al.*, 2001).

nchild is a continuous variable measuring the respondent's number children;

edu is a set of dummy variables measuring the level of education of the respondent. These are: degree; a-levels; o-level;

prof is a set of dummy variables measuring the professional status, specifically: professional/managerial, technical/managerial, skilled manual or non-manual, partly skilled, unclassifiable, army, other;

risk a set of dummy variables measuring the risky behaviours, these are: had partner outside UK in the last 5 years, had unsafe heterosexual sex in last year; currently a smoker; injected un-prescribed drugs or other substances; high or medium alcohol consumption;

frs are a set of dummy included by the authors as a proxy of the access to unpaid (i.e. free) sex, these are: a continuous variable measuring the number of occasions of heterosexual sex in last 4 weeks; a continuous variable measuring the number of new heterosexual sex partners in the year prior to the interview; a dummy variable taking value 1 if the respondent is married or cohabiting or widow or divorced and 0 otherwise;

att are a set of dummies measuring conservative opinions and religiosity. More specifically, they are: sex before marriage always, mostly or sometimes wrong; sex between 2 men always, mostly or sometimes wrong; abortion always or mostly wrong; current belonging to any religion;

afsex are three dummies to take into account the age at first sexual intercourse (i.e. 13-15; 18-19; 20+);

7.2.4 THE SPECIFICATION OF THE MULTIPLE IMPUTATION MODEL

The two models specified above will be estimated using two different data handling techniques: multiple imputation and *listwise* deletion. *Listwise* deletion (or complete case analysis) “discards the data for any case that has one or more missing values” (Enders, 2010:39); while multiple imputation replaces the missing values with feasible estimates (see CHAPTER 6).

The imputation method adopted is Multiple Imputation by Chained Equations (MICE). More details on the choice of the imputation strategy are described in CHAPTER 6, where different approaches are compared and discussed. MICE run with 50 iterations, generating 20

imputed datasets. Numerical variables are imputed with predictive mean matching, dummy variables with logistic regression and categorical variables with ordered logistic regression. For replication purposes, the seed of the imputation model is set at 27654.

As recalled in CHAPTER 6 the imputation model should be compatible with the analyses model, and, thus, it should incorporate all the predictors included in the analysis model, as well as the dependent variable. Also, the imputation model should include factors that are explanatory of a large fraction of the variance; in fact, these predictors reduce the uncertainty of the imputation. Thus, I do include factors associated with the main variables of our interest that will be imputed in the model: overseas partner acquisition, unsafe sex, and injected drug use.

Factors associated with overseas partner acquisition have been identified relying on the work of Mercer *et al.* (2009). The authors use data from Natsal-2 to find predictors of overseas partner acquisition, among males resident in Britain from at least 5 years. The authors' sample selection is different from the subsample used in this analysis; also, the model is specified differently; thus, I use a logistic regression model to test whether the factors identified by Mercer *et al.* (2009) are associated with overseas partner acquisition, after controlling for the variables included in the analysis mode by Della Giusta *et al.* (2014). The model is tested on the subsample of sexually active males aged 26-44 and it is specified as following:

$$\begin{aligned}
 \textit{overseas} = & \beta_0 + \beta_1 \textit{age} + \beta_2 \textit{nchild} + \beta_3 \textit{edu} + \beta_4 \textit{prof} + \beta_5 \textit{risk} + \beta_6 \textit{frs} + \beta_7 \textit{att} + \beta_8 \textit{rel} + \\
 & \beta_9 \textit{fsage} + \beta_{10} \textit{eth} + \beta_{11} \textit{London} + \beta_{12} \textit{hom} + \beta_{13} \textit{HIV} + \beta_{14} \textit{STD5} + \beta_{15} \textit{sex5yrg} + \beta_{16} \textit{pay sex} + \varepsilon
 \end{aligned}
 \tag{2}$$

Where¹⁰⁹:

overseas is a dummy variable taking value 1 if the respondent had a partner outside the UK in the last 5 years

eth is a set of dummy variables to measure ethnicity: black, white, Indian, other Asian, other.

London is a dummy variable taking value 1 if the respondent is resident in London and 0 otherwise

¹⁰⁹ For the definition of all other variables, besides the variables included here, please see equation 1.

hom is a dummy variable taking value 1 if the respondent had a same sex partner in the last 5 years and 0 otherwise

HIV5 is a dummy variable taking value 1 if the respondent had an HIV test in the last 5 years and 0 otherwise

STD5 is a dummy variable taking value 1 if the respondent was diagnosed with at least one STI in the last 5 years and 0 otherwise

sex5yrs is a set of dummy variables measuring the number of sexual partners (heterosexual and homosexual) in the last 5 years (i.e. 0, 1, 2-4, 5-9, 10+)

As a result of the analysis, overseas partner acquisition resulted associated with: the number of partners in the last five years, residence in London, and HIV test in the last 5 years. Thus the imputation model will be estimated including residence in London and HIV test in the last 5 years. Conversely, number of partners in the last 5 years is not included in the model as this factor is collinear with one of the predictors: number new sexual partners in the last year.

Factors associated to unsafe sex are identified relying on the work by Cassell *et al.* (2006). Using data from Natsal-2 the authors predict unsafe sex at last sexual intercourse. The concept I am interested in estimating (i.e. unsafe sex in the last two years) does not match perfectly the concept estimated by the authors (i.e. unsafe sex at the last sexual occasion, provided that it occurred in the last year). Also, the subsample under analysis is different: my analysis is run on sexually active respondent aged 26-44 while the work of Cassell *et al.*, 2006 on all males.

Thus, I test the association of the factors identified by Cassell *et al.* (2006) with unsafe sex in the last two years, after controlling for the variables included in the model by Della Giusta *et al.* (2014), on the subsample of my interest. For this purpose, I run the following model:

$$usex = \beta_0 + \beta_1 age + \beta_2 nchild + \beta_3 edu + \beta_4 prof + \beta_5 risk + \beta_6 frs + \beta_7 att + \beta_8 rel + \beta_9 fsage + \beta_{10} eth + \beta_{11} sex1yr + \beta_{12} STDc5 + \beta_{13} STD5 + \beta_{14} paysex + \varepsilon$$

(3)

Where:

usex is a dummy variable taking value 1 if the respondent had unsafe heterosexual sex in the last year

eth is a set of dummy variables to measure ethnicity: black, white, Indian, other Asian, other.

sex1yr is a set of dummy variables measuring the number of sexual partners (heterosexual and homosexual) in the last year (i.e. 0, 1, 2, 3-4, 5+)

STDc5 is a dummy variable taking value 1 if the respondent visited a STI clinic in the last 5 years and 0 otherwise

STD5 is a dummy variable taking value 1 if the respondent was diagnosed with at least one STI in the last 5 years and 0 otherwise

It should be noticed that Cassel *et al.* (2006) include in the specification of their model a number of variables related to the current sexual partner (e.g. whether the last sexual occasion was also the first sexual occasion; duration of partnership with last sexual partner; partnership type with last sexual partners). The inclusion of such variables in the model is consistent with the authors' goal to investigate unsafe sex at last sexual intercourse, however, these factors may not be explanatory of unsafe sex in the last two years.

From model (3) it resulted that number of sexual partners in the last year are associated with unsafe sex (in the last two years). However, this measure is not included in the imputation model as it is collinear with the variable "number of new heterosexual sex partners in the last year", which is part of the analysis model estimated by Della Giusta *et al.* (2014).

Regarding the injection of un-prescribed drugs, due to the lack of probabilistic data on the general population regarding injected drug use, to the best of my knowledge, studies on the topic rely on purposive samples. For example, Fuller *et al.* (2001) compare adolescence initiation and adulthood initiation among drug users; Miller *et al.* (2006) compares early adolescent initiation (before 17 years old) into injection drug use with later initiation (before 30 years old); and Fuller *et al.* (2002) compare injected drug users with users of non injected drugs. Roy *et al.* (2003) compare injected drug users with non injected drug users among street youths. None of this evidence result useful in identifying factors associated with injected drug use in the general UK population. Furthermore, the focus of Natsal-2 is on sexuality; the main socio-demographic predictors that may be associated with injected drug use (e.g. education, employment) are already included in the imputation model; and there

seem no reason to include other factors sexual lifestyles factors besides the predictors already included in the imputation model. Finally, it should be noticed that the main variables identified in the literature as associated with paying for sex¹¹⁰ are already included in the original model by Della Giusta *et al.* (2014).

To sum up, the variables included in the imputation model are listed in TABLE 7.1, below. These variables are grouped along two dimension. The first dimension concerns whether the variables are characterized (or not) by item missing data, and thus, whether a valid value needs to be imputed for the missing data. The second dimension concerns the reason for the inclusion of the variables in the imputation model.

More specifically, regarding the first dimension, variables with no missing data are listed in the first section (I)¹¹¹, while variables with missing data are listed in the second section (II); for this latter group of factors, I do impute a valid value for the missing data. Regarding the second dimension, three reasons for inclusion in the imputation model are listed. Factors are included in the imputation model because of: a. their inclusion in the analysis model¹¹²; b. their association with the missing data mechanism, or c. their association with risky behaviours.

Overall, 22 variables are included in the imputation model; this is close to – but lower than – the upper limit (25 variables) suggested as a rule of thumb, for the number of variables to be included in an imputation model by van Buuren (2011).

¹¹⁰ Several factors are identified in the literature as associated with paying for sex, these are: age (Freund, Lee and Leonard, 2001; Pitts *et al.*, 2004; Ward *et al.*, 2005; Brewer *et al.*, 2008; Jones *et al.*, 2014), education (Brewer *et al.*, 2008; Pitts *et al.*, 2004), marital status (Freund, Lee and Leonard, 2001; Monto and McRee, 2005; Brewer *et al.*, 2008; Ward *et al.*, 2005; Jones *et al.*, 2014), occupation (Jones *et al.*, 2014; Della Giusta *et al.*, 2014) area of residence (Ward *et al.*, 2005)¹¹⁰.

¹¹¹ Indeed, some items are included in the imputation model, but not imputed as they do not have missing data. These items are socio-demographic variables (i.e. age and London residence), and attitudinal variables (i.e. current belonging to any religion, attitudes toward sex before marriage and attitudes toward sex between two males). Also, average item non response in other sensitive questions is included in the imputation as an explanatory variable for the missing data pattern; by definition, this variable do not have any missing data, and thus there is no need to impute it. As suggested by van Buuren and Oudshoorn (2011) survey weights are included in the imputation model – and, obviously, this variable is not imputed as it does not have any missing value.

¹¹² This is because the analysis and the imputation model need to be compatible.

TABLE 7.1: The specification of the imputation model

I. Variables included in the imputation model but not imputed		
a. Factors included in the analysis model		
<u>Socio demographic variables</u>		
Age		
London residence		
<u>Conservative opinions/religion</u>		
Belongs to any religion now		
Sex before marriage always, mostly or sometimes wrong		
Sex between two men always, mostly or sometimes wrong		
b. Factors associated with the missing data mechanism		
Item non response in other sensitive questions ¹¹³		
<u>Weights</u>		
II. Variables included in the imputation model and imputed		
a. Factors included in the analysis model		
	Variable type	Method
<u>Socio-demographic factors</u>		
Pay for sex	Dummy	Logistic regression
Number of children	Numerical	Predictive mean matching
Education (degree; a-level; o-level; no education)	Ordinal variable	Ordered logistic regression
Professional status (professional/ managerial; technical/managerial; skilled manual or non-manual; partly skilled; unskilled; unclassifiable, army, other)	Ordinal variable	Ordered logistic regression
<u>Risky behaviours</u>		
Partner outside UK in the last 5 years	Dummy	Logistic regression
Unsafe het. sex in last year	Dummy	Logistic regression
Currently a smoker	Dummy	Logistic regression
Ever injected non-prescribed drugs	Dummy	Logistic regression
High or medium alcohol consumption	Dummy	Logistic regression
<u>Free sex</u>		
Number of occas. of het. sex in last 4 weeks	Numerical	Predictive mean matching
Number of new het. sex partners, last year	Numerical	Predictive mean matching
Married/cohabiting/previously married	Dummy	Logistic regression
Age at first het. Intercourse (13-15; 16-17; 18-19; Aged 20+)	Ordinal variable	Ordered logistic regression
b. Factors associated with the missing data mechanism		
Interviewer evaluation of respondent's embarrassment: Very embarrassed	Dummy	Logistic regression
Difficulty in convincing the respondent to take		Ordered logistic regression

¹¹³ This is calculated as the average number of missing value by individual, with the macro-group of items based on sensitive questions about behaviour.

part in the survey (not at all difficult; not very difficult; fairly difficult; very difficult)

c. Factors associated with risky behaviours		
HIV test in the last 5 years	Dummy	Logistic regression

7.2.5 THE COMPARISON OF IMPUTED AND OBSERVED VALUES

HYPOTHESIS 4 states that “the prevalence of paying for sex and risky behaviours is higher among the respondents with item missing values compared with the prevalence among the observed values”. This hypothesis is tested comparing the prevalence of the socially undesirable behaviours in the imputed datasets with the prevalence in the incomplete data. In order to test HYPOTHESIS 4 I confront the confidence intervals of the mean estimate of the variables of interest, in the imputed data only, observed data only and complete data (imputed and observed).

7.2.6 THE COMPARISON OF THE ESTIMATES USING *LISTWISE* DELETION VS. MULTIPLE IMPUTATION

HYPOTHESIS 5 states that “due to missing data – that are not missing completely at random – in paying for sex and risky behaviours, the correlation of these two sets of variables is biased”. This hypothesis is tested comparing the coefficients and marginal effects of the analysis model specified in section 7.2.2 handling missing data with *listwise* deletion vs. multiple imputation.

7.2.7 ROBUSTNESS CHECK: COMPUTING BOUNDS

As recommended by Manski (1989, 1994, 1995) I consider extreme scenarios with missing data set all to 1 or all to 0, for each of the main variables of interest. The different scenarios are used to construct bounds on the final model estimate. Such bounds will inform on the degree on which the missing data are affecting the inference.

More specifically, the models to be estimated are 16 and they correspond to the 16 possible permutation of 1 and 0 across the 4 variables. For example: in the first model all the missing values in the 4 variables of interests are set to 1; in the second model the missing values for paying for sex, overseas partner acquisition and unsafe sex are set to 1, while the missing values for injected drug use are set to 0; in the third model, the missing values for

paying for sex, and overseas partner acquisition are set to 1 while the missing values for unsafe sex and injected drug use are set to 0. The procedure continues until all possible permutation of 1 and 0 are covered. The models specification is shown in tables TABLE 7.2. Each column of the table represents a different model; every cell from row 2 to row 5 represent the value assigned to each missing value in the corresponding variable.

TABLE 7.2: Permutations of 1 and 0 on the four behaviours under study

Model Number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Pay for sex	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
Overseas partner acquisition	1	1	1	1	0	0	0	0	1	1	1	1	0	0	0	0
Unsafe sex	1	1	0	0	1	1	0	0	1	1	0	0	1	1	0	0
Injected drug use	1	0	1	0	1	0	1	0	1	0	1	0	1	0	1	0

CHAPTER 8 – DATA

This analysis uses data from the National Survey for Sexual Attitudes and Lifestyles 2 (Natsal-2). Given the focus of this work on item non response, unit non response and sensitive questions, attention is given to the methodological description of all survey phases. In particular, I focus on aspects that influence item non response such as: questionnaire structure and design; modes of data collection; privacy of the interview settings and respondents' trust relationship with the data collection agency. As the analysis is focused only on males, statistics shown in this section are restricted to the male subsample.

Firstly, I describe the sampling strategy that led to data collection, differentiating the sampling adopted for the general population survey and for the ethnic minority boost sample. Secondly, I discuss the data collection phase, describing in detail the pre-test and pilot questionnaire. Thirdly, I describe the questionnaire structure and content, with a particular emphasis on where questions on paying for sex and risky behaviours are positioned; I also show modes of data collection adopted for different questionnaire sections and consent rate for participation in the self-completion part of the survey. Fourthly, I discuss the fieldwork phase, focusing on respondents' contact with the data collection agency. Fifthly, I show response rates separately for the general population sample and for the ethnic minority boost sample. Finally, I outline the weighting strategy adjusting for unequal selection probability and unit non response, and I compare main socio-demographic characteristics from Natsal-2 data with other population estimates. The chapter is largely based on the methodological report by Erens *et al.* (2001), but also refers to the questionnaire, the fieldwork materials, experimental results published elsewhere (e.g. Johnson *et al.*, 2001a), and the literature on the topic.

8.1 SAMPLE

The National Survey for Sexual Attitudes and Lifestyles 2 (Natsal-2) is the second national survey on sexuality in Britain. The first Natsal took place in the 1990-1991, the second Natsal-2 in 1999-2001 and Natsal-3 in 2010-2012. The second study Natsal-2 is modelled on the first and similar to the third. The survey is directed by the same team of researchers.

The aim of the Natsal-2 is to interview a representative sample of adults (aged 16-44) living in private households in Britain. To enable analysis of rare populations as ethnic minorities, the design includes a boosted sample of Black and Asian adults. Furthermore, in the “core” sample only, adults resident in London are oversampled¹¹⁴. In terms of sample size, the aim of the study is to interview a “core” general population sample of 12,000 adults, and a boosted sample of 735 ethnic minority boost sample.

The two samples are independently designed. The “core” sample is collected using a multi-stage stratified probability design. During the first stage postcode sectors are selected as the Primary Sampling Unit (PSUs). During the second stage, addresses within the sampling unit are selected, and during the third stage one eligible adult within the household is randomly selected¹¹⁵.

Also the ethnic minority “boost” sample is collected using a multi-stage stratified probability design. 15,000 addresses are initially selected from the Postcode Address File (PAF). Addresses are screened (using screening and focus enumeration) to determine whether at least one member in the household is aged 16-44 and belongs to one of the following ethnic groups: Black African, Black Caribbean, Indian and Pakistani.

8.2 QUESTIONNAIRE PRE-TEST AND PILOT

The questionnaire design follows the Natsal-1 questionnaire design, in order to allow comparisons across these two studies, and Natsal-3 is also based on the content of the

¹¹⁴ The reason for oversampling adults in greater London is that Natsal-1 showed higher prevalence of “HIV” risk behaviours in this area. Thus, this population has been oversampled in order to have sufficient sample size for conducting further analysis on this group (Erens *et al.*, 2001).

¹¹⁵ The random selection is conducted using a Kish grid technique. The analysis presented in this thesis uses weights to compensate for this sub-selection of eligible adults.

previous studies for comparability reasons. Natsal-2 includes more questions in comparison with Natsal-1, on: number of new sexual partners in the last year, use of condoms in short-term and long-term relationships, sexual partners outside the UK and/with visitors to the UK, previous diagnoses of STD, sexual dysfunction and use of family planning/contraception services. Similarly, some Natsal-1 questions have been dropped for the sake of maintaining an adequate questionnaire length. For the ethnic minorities boost sample, questions on country of origin and languages spoken are added in comparison with the Natsal-1 sample (Erens *et al.*, 2001).

This is a multi-mode survey: the interview is conducted with CAPI¹¹⁶ with a self-completion CASI part. The CAPI section included questions about: general health; learning about sex; first sexual experience; attitudes to HIV and different types of personal relationships; and socio-demographic characteristics. The CASI section included the most sensitive items: experience of different types of sexual practices (vaginal, oral and anal intercourse); sex in the last 4 weeks and condom use; number of partners in a lifetime, last 5 years, last year and last 3 months; homosexual experience; details of most recent partners; having sex with people from other countries; STD diagnosis and clinic attendance; infertility; abortion; and sexual dysfunction. Questions on paying for sex were included in this section (Erens *et al.*, 2001).

The questionnaire has been subject to three different tests. The questions added in Natsal-2 have been initially tested in small scale piloting with cognitive interviewing. Subsequently, a feasibility study with 900 respondents was carried out in 1997. The aims of this work were: i. to develop and pilot of CAPI and CASI questionnaires; ii. to test the desirability of using CASI for Natsal-2; iii. to test the impact of advance letters on response rates; iv. to test the feasibility and potential benefits of using audio CASI (ACASI)¹¹⁷; v. to assess the feasibility of collecting urine samples to test for *Chlamydia trachomatis*; vi. to explore the respondents' comfort in using CASI.

In order to answer this research question the Natsal team undertook a range of experiments. Firstly, response rates were analysed comparing results obtained from

¹¹⁶ While Natsal-1 data are collected using a combination of face-to-face interviews and self-completion interviews.

¹¹⁷ Audio ACASI is a mode of data collection where respondents listen to questions being read out to them through headphones and give their answers on the computer (Erens *et al.*, 2001).

respondents using CASI and respondents using a paper and pencil self completed interview (PAPI). This experiment is aimed at estimating non response, data quality and mode-effects on sensitive behaviours. Analysing this experiment, Johnson *et al.* (2001a) show that CASI have no effect on response rates or on interview length. However, CASI provides higher quality data (more consistent data and lower item non-response). The authors do not find significant differences in reporting the analysed sensitive behaviours.

Secondly, the impact of advance letters on response rate has been tested with a randomized split sample experiment. In this experiment half of sampled addresses received a letter in advance of the interviewer's visit, while to the other half of the sample a letter was given by the interviewer at the doorstep.

Finally, the respondent's comfort in using CASI has been assessed with follow-up in depth interviews with a subsample of respondents.

After this feasibility study, a final piloting was performed. The goal of this further piloting was the test of the final CAPI and CASI questionnaire programs, the test of the interview length and the test of protocols for collecting/delivering urine samples to the analysis laboratory. The pilot was conducted on a quota sample of 59 respondents in their home. The CASI section was also piloted with an additional sample of 35 men and women at GUM clinics in London.

8.3 THE QUESTIONNAIRE SECTIONS AND MODES

The questionnaire is composed of a face-to-face part (CAPI) and a self-completion component (CASI). The self-completion part is in the middle of the interview, preceded and followed by the CAPI component.

Firstly, the questionnaire includes a section on health, family and learning about sex. The section asks first about respondents' general health, then about height, weight, smoking and drinking behaviour; subsequently it moves to family background and respondents' parenthood. The section ends with questions on learning about sex when growing up. Questions included in this first section are considered by the Natsal-2 team as neutral items; they are supposed to help the interviewer in creating a trust relationship with the respondent. However, it should be noted that some of these questions may be considered sensitive, at least for some subgroups of the population. For example, height and weight are generally

considered sensitive questions, and the literature (Bostöm and Diderichsen 1997; Spencer, *et al.*, 2002) finds evidence that self reported height and weight are biased towards cultural beauty standards, with overestimation of height and underestimation of weight in the self-reported figures. Also, questions on drinking and smoking are sensitive (Beebe *et al.*, 1998; Tourangeau, Smith, and Rasinski, 1997; Tourangeau and Yan, 2007), in particular for younger respondents when the interview is conducted at home and the interview setting has a low level of privacy (e.g. the possibility of being overheard by parents).

The second questionnaire section deals with first sexual experiences, use of contraception and sexual lifestyle. For example, respondents are asked to recall their first sexual heterosexual intercourse reporting their age, type of relation with the partner and type of contraception used on that occasion. Subsequently, they are asked about types of contraception used (ever and in the last year), use of family planning services, sexual lifestyles (as opposite-sex and same-sex attraction). This section was asked in a face-to-face interview (CAPI), but if the interviewer felt the respondents' embarrassment and/or inhibition from answering the questions then the interviewer had the option to propose a self-completion mode. This is a short paper self-administered questionnaire containing questions on first heterosexual intercourse. This option was adopted by 2% of interviewers.

Even though the level of sensitivity of these questions is lower compared with items included in other sections, according to the definition of "sensitive questions" given in this work, these questions are sensitive. The technical report (Erens *et al.*, 2001) states that the questions are asked in the face to face section for two reasons: i. for comparison with questions asked in the self-completion section and ii. to determine who was eligible for the self-completion section. It should be noticed that even if this section included explicit sexual questions, respondents were never asked to verbalize any sexually explicit term, as those questions made use of show cards. More specifically, questions that used show cards are: learning about sex, aspects of the sexual experience that the respondent would have wanted to know more about at first sexual experience; age at first sexual intercourse; age at first experience of a sexual kind - for example, kissing, cuddling, petting; contraception at first sexual experience; type of relation with the sexual partner at first sexual experience; feelings

at first sexual experience; contraception their lifetime, in the last year and nowadays; use (and preferred) services for advise on contraception¹¹⁸.

The third section asks about sexual behaviour. The module begins with questions on heterosexual and homosexual practices (e.g. when last had vaginal, oral and anal intercourse), and number of sexual partners in different time spans (e.g. last 3 months, last year, 5 years and lifespan)¹¹⁹. The questionnaire continues with questions on having sex with people from other countries, while in the UK or while travelling abroad¹²⁰. Subsequently, detailed information regarding the three most recent sexual partners in the last 5 years are recorded. Then, men were asked on paying for sex¹²¹¹²²: this set of questions includes a screening question on whether the respondent has ever paid a woman for sex in his lifetime; a question on when was the last occasion for paying for sex and a question on the number of women paid for sex in their lifetime. Subsequently, the same set of questions are asked for homosexual paid sex. These questions and response categories are shown in TABLE 8.1 below. The section continues with a set of questions about infertility, sexually transmitted diseases and sexual dysfunction. The section ends with questions on HIV testing and injecting drug use¹²³.

¹¹⁸ Show cards are also used in the last face-to-face section of the survey to elicit: same sex sexual attraction and behaviour; preferred frequency of sex; enjoyment of sex; ease in talking about sex; optimal marital status; optimal marital status in five years time ; type of change in sexual lifestyle driven by fear of contracting the HIV virus; assessment of personal risk of HIV; assessment of risk of other people, reason for ending cohabitation with a partner.

¹¹⁹ In this section the question on unsafe heterosexual and homosexual sex is asked. From this question I derive the variable on unsafe sex used, which is one of the three risky behaviours used in the analysis.

¹²⁰ The latter is the question from which the variable on the risky behaviour of having a new sexual partner out of the UK is derived.

¹²¹ This is the set of questions from which I derive the variables on paying for sex in the last 5 years and in a lifetime.

¹²² Women are not asked about paying for sex in Natsal-1 and Natsal-2; while they are asked about paying for sex in Natsal-3. In Natsal-2, in its place in the questionnaire, women are asked about miscarriage and abortion.

¹²³ The two questions on injection drug use are the basis for deriving the variable on injecting not prescribed drugs, which is one of the variables of interest for this research.

TABLE 8.1: Questions on paid sex in Natsal-2

Questionnaire wording on paying for sex

“Have you ever paid for sex with a woman?”	“Yes”
	“No”
<i>(If “Have you ever paid for sex with a woman?” “Yes”)</i>	“In the last 7 days”
	“Between 7 days and 4 weeks ago”
When was the last time you paid money for sex with a woman?	“Between 4 weeks and 1 year ago”
	“Between 1 year ago and 5 years ago”
	“Longer than 5 years ago”
<i>(If “Have you ever paid for sex with a woman?” “Yes”)</i>	
“In your lifetime, to about how many different women, altogether, have you paid money for sex?”	
<i>(If the previously recorded “number of heterosexual partners in the a/your lifetime” is larger than “number of paid partners in your the lifetime”)</i>	“Yes, included”
	“No, not included”
“Previously you said you had sex with ... woman/women in your life. Does this include the woman/women you paid for sex?”	
“Have you ever paid for sex with a man?”	“Yes”
	“No”
<i>(If “Have you ever paid for sex with a man?” “Yes”)</i>	“In the last 7 days”
	“Between 7 days and 4 weeks ago”
	“Between 4 weeks and 1 year ago”
“When was the last time you paid money for sex with a man?”	“Between 1 year ago and 5 years ago”
	“Longer than 5 years ago”

(If “Have you ever paid for sex with a man?” “Yes”)

“In your lifetime, to about how many different men, altogether, have you paid money for sex?”

(If the previously recorded “number of heterosexual partners in your the lifetime” is larger than the number of paid partners in the your lifetime)

“Yes, included”

“No, not included”

“Previously you said you had sex with ... man/men in your life. Does this include the man/men you paid for sex?”

Source: The National Survey of Sexual attitudes and Lifestyle questionnaire

This part of the questionnaire is administered only to a subsample of respondents: those who have had at least one heterosexual or homosexual experience or to those aged 16-17 who have had a heterosexual experience. Regarding the mode of data collection, given the sensitivity of these questions, this section was self-completed (CASI or paper self-completion) to prevent embarrassment and reassure respondents of confidentiality. More specifically, respondents were invited to complete the questionnaire directly on the laptop computer given by the interviewer, in a computer assisted self interview (CASI). Respondents refusing the CASI were offered a paper version of the questionnaire. This differed slightly from the CASI version, as it was shorter and didn't include consistency checks. Indeed, the CASI questionnaire includes complex filtering that was not practical in the paper self-completion questionnaire. For this reason a number of questions were not included in the paper booklet¹²⁴. Moreover, Natsal-2 team advise that data from CASI are better quality as built in checks prompt respondents to check for inconsistent answers, while this is not possible in the paper booklet¹²⁵. According to the Natsal-2 team, other reasons for considering data derived from CASI as being of better quality compared with the paper booklet are: respondents can't accidentally skip the questions and out of range answers are detected by the system in the CASI questionnaire.

¹²⁴ Items on risky behaviours (unsafe sex, injected un-prescribed drugs, new sexual partners out of the UK) and paying for sex are included in the paper booklet.

¹²⁵ For example, the programme checked that the number of sexual partners in the last year was not higher than the number reported in a larger time span (as in the last 5 years).

Response rates in the self-completion questionnaire for eligible men in the core and ethnic minority boost sample are reported in the TABLE 8.2 below. Reasons provided by respondents for refusing the CASI in the core sample are: no desire to use the laptop, objections to the subject matter, lack of time, eyesight problems and literacy problems or problems in reading English. The prevalence of refusing to take part in the CASI section among males in the ethnic minority boost sample (6.4%) is more than 5 times higher than the prevalence in the general population sample (1.2%). Also, questions were read out by the interviewers to more males in the ethnic minority boost sample (6.1%) compared to those in the core sample (3.8%).

Respondents with literacy problems, language difficulties or eyesight complications were proposed to have the questions in the self-completion part read out to them by the interviewer. As shown in TABLE 8.2 below, this option was chosen by 0.4 % of male respondents in the core sample and 1.6% in the ethnic minority boost sample¹²⁶.

TABLE 8.2: Response rate in self-completion questionnaire and urine specimen by sample type, men only

Response rate in self-completion questionnaire, men only				
	Core sample men		Ethnic minority men	
	N	%	N	%
Eligible for self-completion questionnaire	4569	100	375	100
Completed using CASI				
without assistance	3711	81.2	238	63.5
with assistance	601	13.2	79	21.1
partially completed	13	0.3	5	1.3
Completed paper booklet	16	0.4	6	1.6
Questions read out by interviewer	173	3.8	23	6.1
Refused to complete	55	1.2	24	6.4
Response rate for providing a urine specimen				
Eligible for urine specimen	2198	100		n. a.
Provided urine specimen	1510	69		n. a.
Refused to provide	688	31		n. a.

Source: Analysis on Erens *et al.* (2001)

Regarding the comprehension of the questions in the self-completion, respondents completing the questionnaire with CASI were taken through a few simple practice questions

¹²⁶ For non English speaking respondents who speak Punjabi and Urdu, the self-completion part could be completed in a self-completion paper and pencil questionnaire.

to demonstrate the use of the system. In order to ensure that respondents consistently interpreted the questions, at the beginning of the CASI, a number of key concepts were defined (e.g. “sexual intercourse”)¹²⁷. Finally, interviewers stayed in the room with respondents throughout the completion to provide assistance in case respondents needed help in understanding the questions. Interviewers recorded that 18% of respondents in the core sample and 32% in the ethnic minority boost sample needed assistance.

The fourth questionnaire section is about attitudes to marriage and sexual relationships. In order to avoid conditioning the respondent by asking him/her to think about moral judgements before reporting their own behaviours, this section is asked face-to-face (CAPI) and some of these questions make use of show cards.

The last questionnaire section collects socio-demographic information (e.g. marriage, cohabitation, socio-economic background and socio-economic status, family structure, household characteristics, and religious beliefs). TABLE 8.3 below summarizes the whole questionnaire structure and modes of data collection.

¹²⁷ Interviewers emphasized the importance of reading the definitions, and these were available for consultation throughout the interview, pressing a key on the laptop.

TABLE 8.3: Questionnaire structure

Questionnaire topic	Mode	Variables used in the analyses
Health, family and learning about sex	CAPI	Smoking and drinking: these are risky behaviours identified by Dalla Giusta <i>et al.</i> (2014). In this analysis we don't consider these behaviours as sensitive.
First sexual experiences, use of contraception and sexual lifestyle	CAPI	/
Sexual behaviour	CASI	"Pay for sex", risky behaviours: "unsafe sex", "sex with a new partner while abroad", "injected not prescribed drug"; other variables on sexual behaviours.
	ACASI – with interviewers reading the questions in English (Respondents with literacy problems, language difficulties or eyesight complications)	
	ACASI – with interviewers reading the questions in Punjabi or Urdu (Non English speakers respondents who understand Punjabi or Urdu)	
	Paper and pencil self-completion (Non English speakers respondents who understand Punjabi or Urdu)	
Attitudes towards sexual behaviour	CAPI	/
Socio-demographic questions	CAPI	Socio-demographic variables
Respondent embarrassment, etc.	Paradata	Respondent embarrassment, <i>etc.</i>

Source: Natsal-2 questionnaire

Questions about paying for sex are in the self-completion part, together with other questions on sexual behaviours. Also questions on unsafe sex, and sex while abroad, that will be analyzed in this study are positioned in the self-completion part. As can be seen from the table above, this section was asked in different modes of data collection for different

respondents. In the analysis sections I will show how this difference changes the reporting behaviour.

Finally, given the sensitivity of the questionnaire, other members of the household were never used as interpreters for respondents who could not speak English sufficiently well to be interviewed. Non English speaking respondents that understood Punjabi or Urdu were assigned to interviewers that spoke those languages – in addition to English. These respondents had the possibility to complete a translated paper and pencil self-completion questionnaire.

8.4 FIELDWORK AND ADVANCE LETTERS

Fieldwork took longer than expected (22 months instead of the 12 months planned) in an attempt to maximize response rate¹²⁸. Different protocols in terms of communication with the sample members were applied to the general population sample and the ethnic minority boost sample. An advance letter was sent to every address in the general population sample. This communication described the survey and stated that an interviewer would be calling to arrange an interview. Conversely, in the ethnic minority boost sample, letters were not sent out. Addresses were checked for eligibility and interviewers handed the interlocutory letter directly to the randomly selected respondent. Screeners could give a copy of the letter at the screening phase if further information on the survey were asked at that stage.

The protocol varies depending on the sample type (general population *versus* ethnic minority boost sample)¹²⁹.

In the general population sample the interviewer established the number of residents aged 16-44 in each household: if no resident was aged 16-44 the household was ineligible; if there was one person in age group 16-44 that person was included in the sample; if there was more than one person, one was selected at random.

¹²⁸ Response rates are discussed in detail in the next section. It should be noticed here that besides an overall trend of declining unit response, Erens *et al.* (2001) argue that the response rate has been lower than Natsal-1 because of the oversampling of London, as in metropolitan areas response rates tend to be lower.

¹²⁹ The description provided here focuses mainly on the interaction of sample members with members of the fieldwork agency (e.g. interviewers and screeners). Please see Erens *et al.* (2001) for a more detailed description of the protocol (e.g. the strategy for choosing the household to include in the sample within the selected address, screening procedure for different ethnic minority groups, *etc.*).

In the ethnic minority boost sample, screeners have the duty to identify which addresses contain one eligible resident. In this phase the survey was not yet fully introduced to respondents (screeners only mentioned that the household was selected to take part in a study funded by the Medical Research Council). All addresses where there was at least an eligible person, and refusing/non contact households were issued to the interviewers. In every screened address, interviewers confirmed eligibility asking the screening questions again and randomly selecting the person to interview – if more than one person in the household was in the age group 16-44. It should be noted that interviewing only one person in the household is a guarantee of confidentiality for respondents.

Regarding incentives, in the first general population fieldwork phase, a split experiment was run to measure the different impact on response rate of a £5 gift voucher compared with a £5 charity donation: response rate resulted slightly higher when a gift voucher was offered compared with a charity donation. Thus for the remaining phases of the fieldwork a £5 gift voucher was offered to all the “core” sample, while sample members of the ethnic minority boost sample received a gift voucher of £10.

At the end of the interview, a random sample of ½ of men and woman aged 18-44 who have had any sexual experience were asked to provide a urine specimen to test for *Chlamydia trachomatis*. The urine test is explained both verbally and described in a leaflet given to all eligible respondents. Feedbacks about the results were given by letter to all respondents resulting positive to the bacterium.

8.5 RESPONSE RATES (UNIT NON RESPONSE)

In the general population sample, response rate (weighted for the oversampling of inner and outer London) is 63.9%. This is slightly below the 64.7% achieved in Natsal-1 sample. The response rate estimated using the method adopted by the Council of American Survey Research Organizations (CASRO), which excludes respondents who are ill, away from home or non English speakers, is calculated at 65.4%. This rate is slightly below the response rate of Natsal-1 calculated with CASRO rules (66.8%). In the ethnic minority boost sample the response rate is 59.0%, and 62.9% when calculated with the CASRO method¹³⁰.

¹³⁰ Here respondents ill, away from home and unable to speak one of the languages available for interview (English, Urdu and Punjabi) are classed as ineligible.

The subsequent 2010 cross-section Natsal-3 (reference population aged 16-74) had a lower overall response rate (57.7%) compared with the two preceding cross sections Natsal-1 and Natsal-2¹³¹.

TABLE 8.4: Response rate, general population sample

	General population sample		CASRO method	
	N	%	N	%
Total issued	40523	100		
Out of scope addresses:				
Vacant/derelict	2174	5.4		
Non-residential	767	1.9		
Not traced/built/other	966	2.4		
No eligible (aged 16-44) residents	17648	43.6		
<i>Ill, away, no English</i>			545	1.3
Total known ineligible	21555	53.2	22100	54.5
Unknown eligibility:				
No-contact	471			
All information refused	954			
Total unknown eligibility	1425			
Estimated ineligible	697		727	
Estimated eligible addresses	18271	100	17696	100
No interview because:				
No contact with selected person	504	2.8	504	2.8
Refused (including proxy refusals)	4909	26.9	4909	27.7
<i>Ill/away/no English</i>	545	3.0		
Other reason	424	2.3	424	2.4
No information about address	728	4	728	3.9
Total unproductive	7110	38.9	7110	36.9
Completed interviews	11161	61.1	11161	63.1
Weighted response rate		63.9		65.4

Source: Analysis on Erens *et al.* 2001

¹³¹ Reasons for this drop are identified by Erens *et al.* (2013) in: i. a general decline in response rates over the last decade 2000-2010; ii. changes in the standards for calculating response, resulting in different estimations of ineligible; iii. The different reference population of Natsal-3 compared with Natsal-1 and Natsal-2: more specifically, the extension of age from 16-44 to 16-74 years old.

TABLE 8.5: Response rate, ethnic minority boost sample

	Ethnic boost sample		CASRO method	
	N	%	N	%
Total issued	15041	100		
Out of scope addresses:				
Non-residential/unproductive	1021	6.8		
No eligible residents	12298	81.8		
<i>Ill, away, language</i>			100	0.7
Total known ineligibles	13319	88.6	13419	89.2
Unknown eligibility:				
No-contact	75			
All information refused	54			
Total unknown eligibility	129			
Estimated eligible among households not screened	16			
Screened	1539		1493	
Estimated eligible addresses	1609	100	1509	100
No interview because:				
No contact with selected person	129	7.6		8.2
Refused (including proxy refusals)	382	23.7		25.3
<i>Ill/away/no English</i>	100	6.2		
Other reason	39	2.4		2.6
No information about address	16	0.9		1.1
Total unproductive	660	41	560	37.2
Completed interviews	949	59.0		62.9

Source: Analysis on Erens *et al.* 2001

To reduce potential embarrassment that the respondent may feel and to increase reporting of sensitive behaviours great emphasis was placed on briefing interviewers on the importance of conducting the interview in a private setting, and avoiding the presence of other people. Interviewers reported whether paradata on whether anyone was present during the interview.

8.6 WEIGHTING

In the general population sample, data are weighted for unequal selection probabilities and for non response. Regarding unequal selection probability, firstly, London was oversampled; thus, adults living in London had higher probabilities of being included in the sample. Secondly, in multiple occupancy addresses with 4 or more households, only 3 were randomly selected; thus households at addresses with up to three households have a higher probability of being selected compared with households at addresses with 4 or more households, and the higher the number of households in the address the lower the likelihood of inclusion. Finally, in households with 2 or more eligible adults, only one was selected; thus the lower number of household members corresponds to a higher probability of inclusion in the sample.

The TABLE 8.6 below shows the demographic variables of the Natsal-2 sample, in column 2 after selection weighting and in column 4 after non response weighting. In column three population estimates from the 1998 Health Survey for England are shown. Estimates presented in the analysis section use both selection and non response weighting.

TABLE 8.6: A comparison of Natsal-2 sample and the general population sample from the Health Survey for England 1998

	Natsal-2 after selection weighting	Population estimates	Natsal-2 after non response weighting
	%	%	%
Age			
16-19	13.6	12.2	12.1
20-24	14.3	14.5	14.6
25-29	15.6	17.6	17.6
30-34	19.6	19.8	20
35-39	18.6	19.4	19.3
40-44	18.2	16.4	16.5
Government Office Region			
North East	5.7	4.3	4.4
North West	11.4	11.7	11.7
Yorkshire & Humberside	9.2	8.7	8.8
East Midlands	7.8	7.1	7.1
West Midlands	8.7	9	9.1
South West	9	7.8	7.9
Eastern	8	9.2	9.1
Inner London	4.7	6.1	5.9
Outer London	7.1	8.5	8.5
South East	14.1	13.9	14
Wales	5	4.8	4.6
Scotland	9.3	8.9	8.9
Marital status			
Single	39.5	38.8	39.3
Married	40.1	42.4	39.8
Separated	1.5	1.9	1.6
Divorced	2.8	2.6	2.8
Widowed	0.1	0.1	0.1
Cohabiting	16	14.1	16.5
Social Class			
Professional	7.2	6.2	7.5
Managerial and technical	28.8	26.2	29.2
Skilled non-manual	13.2	14.5	13.3
Skilled manual	30.9	30	30.5
Partly skilled manual	15	17.1	14.7
Unskilled manual	4.8	6	4.9
% in household			
With no children	46.1	51.4	48.2
With children	53.9	48.6	51.8

Source: Analysis on Erens *et al.* 2001

TABLE 8.8: Descriptive statistics

MEN	weighted %	Complex SE	95% Low CI	95% High CI
Age				
16-17	6.6%	0.4%	5.8%	7.3%
18-19	5.5%	0.3%	4.9%	6.1%
20-24	14.6%	0.5%	13.5%	15.6%
25-34	37.6%	0.6%	36.4%	38.7%
35-44	35.8%	0.5%	34.8%	36.9%
Marital Status				
Married	39.9%	0.8%	38.3%	41.4%
Co-habiting: opposite sex partner	15.7%	0.6%	14.5%	16.9%
Co-habiting: same sex partner	0.8%	0.1%	0.5%	1.1%
Divorced	4.4%	0.3%	3.9%	4.9%
Single	39.3%	0.7%	37.9%	40.7%
Social class				
I Professional	7.5%	0.5%	6.6%	8.4%
II Managerial	29.2%	0.8%	27.7%	30.7%
IIINM Skilled non-manual	13.3%	0.6%	12.1%	14.4%
IIIM Skilled manual	30.5%	0.8%	28.9%	32.1%
IV Partly skilled	14.7%	0.6%	13.5%	15.8%
V Unskilled	4.8%	0.4%	4.1%	5.6%
Religion				
None	60.0%	0.8%	58.5%	61.6%
Church of England	16.1%	0.6%	15.0%	17.3%
Roman Catholic	8.3%	0.4%	7.4%	9.1%
Other Christian	11.2%	0.5%	10.2%	12.2%
Muslim	2.1%	0.2%	1.7%	2.6%
Hindu	0.9%	0.2%	0.6%	1.2%
Other non-Christian	1.4%	0.2%	1.0%	1.8%
Exams				
A-level or above	38.0%	0.9%	36.3%	39.7%
O-levels/GCSE	44.1%	0.9%	42.4%	45.8%
None/other	17.9%	0.7%	16.6%	19.2%
Age at first intercourse				
First sex before age 16	27.4%	0.7%	26.0%	28.9%
Opposite sex partners-ever				
0	7.2%	0.4%	6.4%	8.0%
1	11.0%	0.5%	9.9%	12.0%
2	7.5%	0.4%	6.6%	8.3%
3 to 4	14.6%	0.6%	13.4%	15.7%

5 to 9	25.2%	0.7%	23.8%	26.6%
10+	34.6%	0.8%	33.1%	36.1%
Opposite sex partners-last 5 years				
0	9.0%	0.5%	8.1%	9.9%
1	42.4%	0.8%	40.9%	43.9%
2	12.1%	0.5%	11.0%	13.1%
3 to 4	15.1%	0.6%	14.0%	16.3%
5 to 9	12.9%	0.6%	11.8%	14.0%
10+	8.4%	0.4%	7.6%	9.3%
Opposite sex partners-last year				
0	12.6%	0.5%	11.5%	13.6%
1	65.1%	0.8%	63.5%	66.6%
2	10.0%	0.5%	9.0%	10.9%
3 to 4	7.5%	0.4%	6.7%	8.3%
5+	5.0%	0.4%	4.3%	5.6%
Opposite sex partners-last 3 months				
0	19.7%	0.6%	18.5%	21.0%
1	70.5%	0.7%	69.1%	72.0%
2+	9.7%	0.5%	8.7%	10.8%
Homosexual sex-ever				
Experience with same sex partner	8.4%	0.4%	7.5%	9.2%
Genital contact with same sex partner	6.3%	0.4%	5.6%	7.0%
Heterosexual anal sex				
Never	73.8%	0.7%	72.4%	75.2%
In last 5 years	21.1%	0.7%	19.8%	22.3%
In last year	12.3%	0.5%	11.2%	13.3%
Mostly/Always wrong				
Sex before marriage	5.1%	0.4%	4.3%	5.8%
Sex outside marriage	84.4%	0.6%	83.3%	85.6%
One-night stands	35.0%	0.8%	33.4%	36.6%
Sex between 2 men	48.5%	0.9%	46.8%	50.2%
Sex between 2 women	38.0%	0.8%	36.4%	39.7%
Abortion	34.3%	0.8%	32.7%	35.9%
Self perceived risk of HIV infection				
Greatly at risk	4.9%	0.3%	4.2%	5.5%
Not very much at risk	32.7%	0.8%	31.2%	34.2%
Not at all at risk	62.4%	0.8%	60.9%	63.9%
Contraception used in the last year				
Pill	38.2%	0.9%	36.5%	39.8%
IUD	4.0%	0.3%	3.3%	4.7%
Condom	51.3%	0.9%	49.7%	53.0%
Female sterilization	4.5%	0.4%	3.7%	5.2%
Vasectomy	8.7%	0.5%	7.7%	9.6%

Natural method	10.9%	0.6%	9.8%	12.0%
Injections	2.4%	0.3%	1.8%	2.9%
Other methods	4.0%	0.4%	3.3%	4.7%
None	11.0%	0.6%	9.9%	12.1%
Abstinence	1.3%	0.2%	1.0%	1.7%
Source: Erens <i>et al.</i> 2001				

CHAPTER 9 – DESCRIPTIVE STATISTICS AND ANALYSIS

In this chapter I show the empirical analysis that leads to testing the research hypothesis. Firstly, in section 9.1, I show the prevalence of item missing data in paying for sex and risky behaviours; Since I expect the prevalence to vary according to the respondents' embarrassment, I show joint frequencies of item missing data by level of embarrassment; furthermore, through descriptive statistics, I show frequencies of the privacy of the interview situation and the respondents' willingness to participate in the survey, as these factors too are expected to influence item non response in paying for sex and risky behaviours.

In section 9.2, I test the first hypothesis on whether item missing data in paying for sex and risky behaviours is higher compared to other survey questions: i.e. socio-demographic questions, and sensitive questions about behaviours.

Section 9.3 is devoted to test the missing completely at random hypothesis. Firstly, I check whether item missing data are missing completely at random in terms of socio-demographic characteristics; secondly, I test whether the data are missing completely at random in terms of ease of talking about sex, respondents' embarrassment, privacy of the interview situation, and respondent commitment to the survey; these factors are tested conditionally on observed socio-demographic characteristics.

Besides testing the missing completely at random hypothesis; this analysis is relevant for: i. targeting purposes, as it shows which socio-demographic factors are more highly associated with item non response in the behaviours under study; and, ii. prescriptions for data

collectors, as it identifies which paradata are more informative of item non response in the behaviours under study.

In section 9.4, I display graphically and discuss the missing data patterns.

Section 9.5 shows the results of the imputation. In this section, I firstly describe the model by Della Giusta *et al.* (2014); as recalled in the methodological section, I propose some modifications to this model. I test empirically the results of each proposed modification to check how these change in comparison with the original model.

Secondly, I assess the convergence of the imputation model. Thirdly, I show the prevalence of paying for sex and risky behaviours among imputed values and compare this prevalence with observed values. Finally, two models are estimated, the first one handling missing data with *listwise* deletion, the second one handling missing data with multiple imputation

In section 9.6, I use the strategy proposed by Manski (1995) of estimating estimate bounds computing the extreme cases of all missing values set to either 1 or 0. 16 different models are estimated and compared.

9.1 MISSING DATA IN PAYING FOR SEX AND RISKY BEHAVIOURS

In this section, I show descriptive statistics on item missing data in paying for sex and risky behaviours. As item non response may also be due to the sample member refusing to take part in the whole self completion section of the questionnaire, reasons for refusing self-completion are described.

Secondly, as item non response may be due to respondents' embarrassment, I show joint frequencies of item non response and two measures of respondents' embarrassment (including interviewer evaluation of respondents' embarrassment and embarrassment as a reason for refusing to provide a urine sample).

Thirdly, besides embarrassment, also the privacy of the interview situation and the respondents' commitment to the survey are expected to be associated with item non response. Thus, using descriptive statistics, I show how frequently interviews were conducted in presence of someone else who may possibly overhear and how frequently the sample member was difficult to convince to participate in the survey.

9.1.1 DESCRIPTIVE STATISTICS ON PAYING FOR SEX AND RISKY BEHAVIOURS

The prevalence of item missing data in paying for sex and risky behaviours is investigated in two different subsamples. Firstly, I consider the whole population of males that are eligible for the self completion section of the questionnaire. Secondly, I consider the sample selection adopted by Della Giusta *et al.* (2104): employed males aged 26-44, having had at least one heterosexual experience in a lifetime.

More specifically, questions on paying for sex, overseas partner acquisition, unsafe sex and injected drug use are not queried of the whole sample; instead, these questions are asked only of the subsample of individuals who in the face to face interview reported having had at least one heterosexual or homosexual experience or of those aged 16-17 that reported having had a heterosexual experience. This is the subsample that is invited to take part in the self completion questionnaire. Sample members not eligible for the self completion section – i.e. adults reporting not having ever had a heterosexual or homosexual experience – are assigned, prior to the data release, to the value “not being a sex worker client¹³²”, “not having had unsafe heterosexual sex in the last year¹³³”, and “no overseas partner acquisition¹³⁴”. While, sample members refusing to take part in the self completion section of the questionnaire are assigned to a missing value for the item “injected drug use” as there is no other information on drug use in the questionnaire to deductively impute a valid value. Thus, I conduct the analysis on this subsample of sexually active males, in order to analyse non

¹³² Specifically, the variable used here is “ever paid money for heterosexual or homosexual sex”. It is derived from the two variables “ever paid money for heterosexual sex” and “ever paid money for homosexual sex”. The latter is filtered by a variable measuring whether the respondent ever had a homosexual experience. “Ever paid money for heterosexual sex” is derived from other variables measuring whether the respondent “ever had a heterosexual sexual contact” and “ever had a heterosexual sexual experience”.

¹³³ Specifically, the variable of interest is: “Had unsafe heterosexual sex in last year”; meaning having had 2 or more heterosexual partners in the last year and no condom use. This is derived from two different variables: 1. Contraception use in the last year, and 2. number of heterosexual sexual partners in the last year – which is itself filtered by two variables that determine eligibility to self completion: “age at first sexual intercourse” and “heterosexual/homosexual sexual experiences”.

¹³⁴ Specifically, the variable of interest is: “Any new sex partners while outside UK, last 5 years”. This is filtered by the variables “travelled outside of UK, last 5 years”, “number of heterosexual sexual partners, last 5 years” and “number of homosexual sexual partners, last 5 years”. The latter two variables are themselves filtered by other variables eliciting heterosexual and homosexual sexual experiences. Also, the overseas partner acquisition is included in the self completion section of the questionnaire and thus filtered by the two variables that determine eligibility to self completion: “age at first sexual intercourse” and “heterosexual/homosexual sexual experiences”.

response only among sample members that are effectively asked the survey question. It should be noted that Natsal-2 is administered to the British population in the age range 16-44; thus, the subsample considered is composed of sexually active males aged 16-44 living in Britain.

Moreover, I also use a different subsample; this is the sample selection adopted by Della Giusta *et al.* (2014). The authors' analysis runs on a subsample of the population. Firstly, they limited the age range to respondents aged 26-44¹³⁵; secondly, they considered only employed sample members¹³⁶; thirdly, they excluded sample members that have never had a heterosexual sexual experience¹³⁷. Among three criteria for sample selection, only one is theoretically motivated by the authors: this is the restriction of the analysis to sample members aged 26-44, due to the consideration that “young men could still be studying which could introduce some bias in the estimates of the education and professional variables” (Della Giusta *et al.*, 2014:14).

In terms of terminology, from now on, the label “sexually active males” is used to refer to the sample selection of adults eligible for self completion; while the expression “males aged 26-44, hetero-sexually active and employed” is used to refer to the sample selected by Della Giusta *et al.* (2014).

As shown in TABLE 9.1, among sexually active males, those reporting ever paying for sex are 9.2% (95% C.I. 8.3 – 10.1%), and those reporting paying for sex in the last 5 years are 4.4% (95% C.I. 3.9 – 5.1); thus sex workers' clients are a moderately rare population. Also, item missing data is very rare, i.e. 1.4% (95% C.I. 1.0 – 1.8%). Moreover, item missing data is mainly due to the respondents' not taking part in the self completion section of the questionnaire (1.1%, 95% C.I. 0.8 – 1.5), while only a tiny minority of respondents (0.2%, 95% C.I. 0.1 – 0.4) skipped the survey question.

¹³⁵ This choice is justified by the consideration that “young men could still be studying which could introduce some bias in the estimates of the education and professional variables” (Della Giusta *et al.*, 2014:14).

¹³⁶ This is because the analysis model includes a set of variables measuring different types of employment: These are a set of dummy variables, namely: professional/managerial, technical/managerial; skilled manual or non manual; partly skilled; and, as a reference category, (including unclassifiable, army and other). The reference category in the analysis model is unskilled (including unclassifiable, army and other). Unemployed respondents are not included in the analysis.

¹³⁷ This is because in the analysis model the authors included the variable age at first sexual intercourse; excluding the category of respondents who had not had any heterosexual intercourse yet and respondents who had heterosexual intercourse before age 13 only.

TABLE 9.1: Prevalence of paying for sex, sexually active males

	Ever paid money for sex (heterosexual and/or homosexual)			Paid for sex in the last 5 years (heterosexual and/or homosexual)		
	N	%	95% C.I.	N	%	95% C.I.
Yes	523	9.17	[8.3 – 10.1]	277	4.43	[3.9 – 5.1]
No	4,328	89.47	[88.5 – 90.4]	4,574	94.21	[93.5 – 94.9]
Missing	93	1.36	[1.0 – 1.8]	93	1.36	[1.0 – 1.8]
of which:						
<i>ref. CASI</i>	75	1.11	[0.8 – 1.5]	75	1.11	[0.8 – 1.5]
<i>miss.</i>	18	0.24	[0.1 – 0.4]	18	0.24	[0.1 – 0.4]
Total	4,944	100		4,944	100	

Source: Analysis on Natsal-2 data. Data are weighted to take into account the complex survey design. 95% confidence interval.

Considering the restricted sample of hetero-sexually active males aged 26-44 and employed, the prevalence of paying for sex in a lifetime is 11.2% (95% C.I. 10.0 – 12.4) and prevalence for paying for sex in the last 5 years is 4.7% (95% C.I. 4.0 – 5.5%), see TABLE 9.2. Also in this restricted subsample, item missing data in both ever paid for sex and paying paid for sex in the last 5 years is rare: 1.3% (95% C.I. 0.9 – 1.9%). Moreover, consistently with the larger sample selection, item missing data is mainly due to sample members not participating in the self completion section of the questionnaire, rather than to sample members skipping the survey question. Specifically, 1.0% (95% C.I. 0.7 – 1.6%) of eligible sample members refused to complete the entire CASI section, and only 0.3% (95% C.I. 0.2 – 0.6%,) skipped the survey question on paying for sex while completing the CASI section.

TABLE 9.2: Prevalence of paying for sex, heterosexually active males aged 26-44 employed

	Ever paid money for sex (heterosexual and/or homosexual)			Paid for sex in the last 5 years (heterosexual and/or homosexual)		
	N	%	95% C.I.	N	%	95% C.I.
Yes	441	11.16	[10.0 – 12.4]	209	4.72	[4.0 – 5.5]
No	2943	87.5	[86.2 – 88.7]	3175	93.95	[93.0 – 94.8]
Missings	61	1.33	[0.9 – 1.9]	61	1.33	[0.9 – 1.9]
of which:						
<i>refusing</i>						
<i>CASI</i>	47	1.04	[0.7 – 1.6]	47	1.04	[0.7 – 1.6]
<i>Missings</i>	14	0.3	[0.2 – 0.6]	14	0.3	[0.2 – 0.6]
Total	3445	100		3445	100	

Source: Analysis on Natsal-2 data. Data are weighted to take into account the complex survey design. 95% confidence interval.

The final aim of this work is to re-estimate the correlation of paying for sex and risky behaviours found by Della Giusta *et al.* (2014) after imputing values for item missing data in paying for sex and risky behaviours. Thus, I also analyse item non response in both paying for sex and three risky behaviours: overseas partner acquisition, injected drug use, and unsafe sex¹³⁸.

For all risky behaviours under study, the reported prevalence of the socially undesirable behaviours are moderately rare, though the level varies across items. Among hetero-sexually active males aged 26-44, 10.9% (95% C.I. 9.8-12.1%) declared overseas partner acquisition, 6.3% (95% C.I. 5.5 – 7.3) admitted having had unsafe sex in the last year and 3.1% (95% C.I. 2.5 – 3.8) reported injected drug use. Item missing data is rare along all considered behaviours; it ranges from 2.9% (95% C.I. 2.2 – 3.8) for overseas partner acquisition to 1.3% (95% C.I. 0.9 – 1.9) for injected drug use.

As in paying for sex, also for the variable injected drug use, the item non response is mainly due to the sample members refusing to participate in the CASI questionnaire (1.0%, 95% C.I. 0.7 – 1.6%), rather than skipping the survey question (0.3%, 95% C.I. 0.1 – 0.5%),

¹³⁸ It should be noted that also alcohol consumption and smoking behaviour are considered among the risky behaviours under study. However, I assume that questions eliciting these items are less sensitive; I expect item missing data to be lower for these items. Indeed, both variables have item non response lower than 0.25%: thus they are not included in the extensive analysis of item missing data. Also, data are collected with a different data collection mode; in fact, questions on smoking and alcohol consumption are elicited face to face (CAPI), while questions on paying for sex, overseas partner acquisition and injected drug use are elicited in self-completion (CASI).

see TABLE 9.5. No statistically significant difference is found among these two reasons for skipping the survey questions in overseas partner acquisition – 1.0% (95% C.I. 0.7 – 1.6) *versus* 1.9% (95% C.I. 1.4 – 2.5) – and in unsafe sex – 1.0% (95% C.I. 0.7 – 1.6) *versus* 1.0% (95% C.I. 0.7 – 1.4), see TABLE 9.3 and TABLE 9.4. The same conclusions apply if we consider the larger sample of sexually active males (results not shown).

TABLE 9.3: Prevalence of overseas partner acquisition, heterosexually active males aged 26-44 employed

	N	%	95% C.I.
Yes	474	10.9	[9.8 – 12.1]
No	2855	86.2	[84.8 – 87.5]
Missings	116	2.9	[2.2 – 3.8]
of which:			
<i>refusing CASI</i>	47	1.04	[0.7 – 1.6]
<i>Missings</i>	69	1.86	[1.4 – 2.5]
Total	3445	100	

Source: Analysis on Natsal-2 data. Data are weighted to take into account the complex survey design. 95% confidence interval.

TABLE 9.4: Prevalence of unsafe sex among sexually active males, heterosexually active males aged 26-44 employed

	N	%	95% C.I.
Yes	236	6.34	[5.5 – 7.3]
No	3131	91.69	[90.6 – 92.7]
Missings	78	1.96	[1.5 – 2.6]
of which:			
<i>refusing CASI</i>	42	1.0	[0.7 – 1.6]
<i>Missings</i>	36	0.96	[0.7 – 1.4]
Total	3445	100	

Source: Analysis on Natsal-2 data. Data are weighted to take into account the complex survey design. 95% confidence interval.

TABLE 9.5: Prevalence of injected drug use among heterosexually active males aged 26-44 employed

	N	%	95% C.I.
Yes	113	3.05	[2.5 – 3.8]
No	3272	95.65	[94.8 – 96.4]
Missings	60	1.30	[0.9 – 1.9]
of which:			
<i>refusing CASI</i>	47	1.04	[0.7 – 1.6]
<i>Missings</i>	13	0.26	[0.1 – 0.5]
Total	3445	100	

Source: Analysis on Natsal-2 data. Data are weighted to take into account the complex survey design. 95% confidence interval.

The injected drug use¹³⁹ survey question is sensitive in two ways: it queries health (use of prescribed drugs) as well as a deviant behaviour (the use of injected non-prescribed drugs – e.g. heroine). The question is worded as follows: “Have you ever injected yourself with any drugs or other substances, medical or otherwise?”; thus the reference to both illicit injected drugs as well as to medical drugs is made explicit to the survey respondent. Those that reported injected drug use are asked in a subsequent question whether they injected non-prescribed drugs: thus, injected drug use is a filter question for a following question on non-prescribed injected drug use.

As I show in TABLE 9.6, item non response occurs only in the filter question on drug injection, either prescribed or non-prescribed. Among adults that completed the CASI questionnaire, those not willing to report their non-prescribed drug use may have decided to skip the general question on drug use: thus, it is not possible to disentangle between item non response when the sensitivity of the questions is due to the “health” factor or to the “deviant behaviour.

¹³⁹ Questions on drug use are asked in the self completion part of the questionnaire. This section is administered only to sexually active respondents. This choice is consistent with the survey focus on sexuality and with its aims. Given the survey structure, injected drug use is labelled as missing for non sexually active respondents.

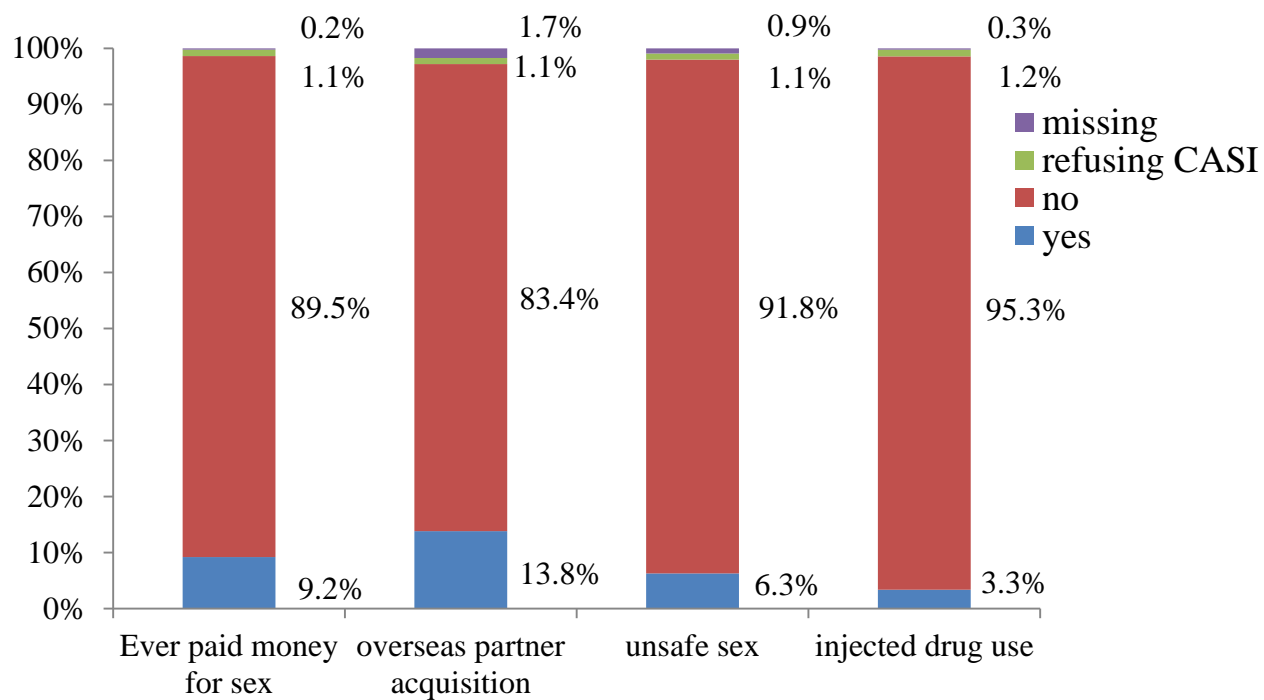
TABLE 9.6: Prevalence of non-prescribed injected drug use among employed heterosexually active males aged 26-44

	N	%	95% C.I.
Yes	67	1.84	[1.4 – 2.4]
No	3318	96.86	[96.1 – 97.5]
Missings	60	1.30	[0.9 – 1.9]
of which:			
<i>refusing CASI</i>	47	1.04	[0.7 – 1.6]
<i>Missings</i>	13	0.26	[0.1 – 0.5]
Total	3445	100	

Source: Analysis on Natsal-2 data. Data are weighted to take into account the complex survey design. 95% confidence interval.

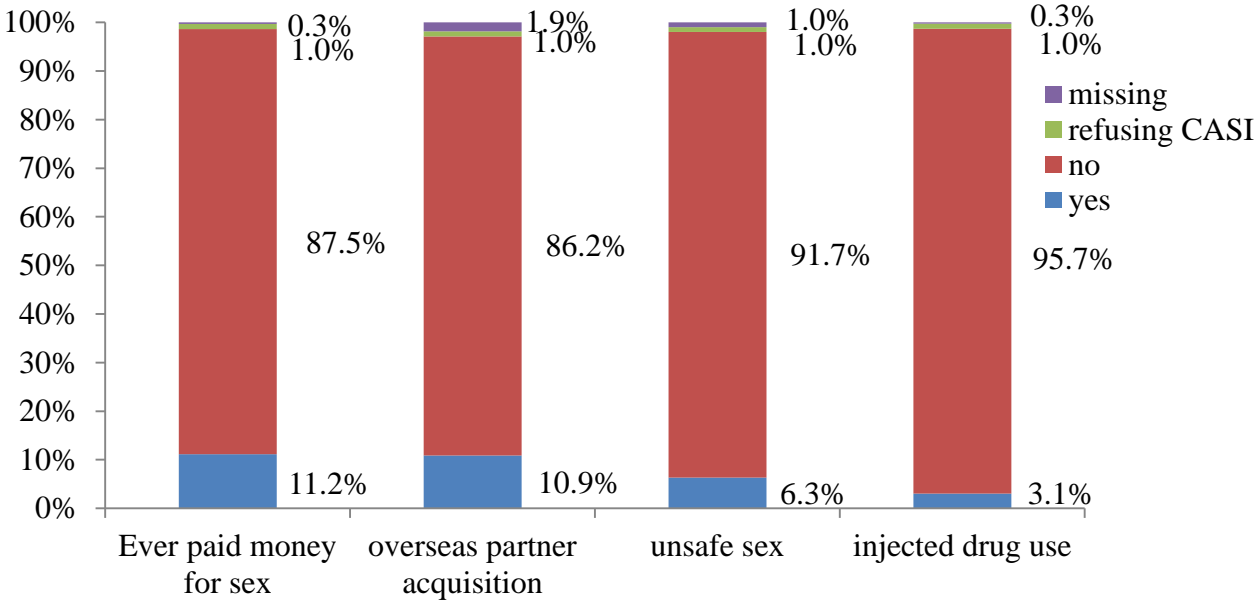
The following graphs (FIGURE 9.1 and 9.2) visually describe the evidence discussed so far, on the sample of sexually active males and the sample of employed hetero-sexually active males aged 26-44.

FIGURE 9.1: Paying for sex and risky behaviours, sexually active males



Source: Analysis on Natsal-2 data; data are weighted to take into account the complex survey design.

FIGURE 9.2: Paying for sex and risky behaviours, hetero-sexually active males aged 26-44 employed



Source: Analysis on Natsal-2 data; data are weighted to take into account the complex survey design.

Respondents who refused to participate in the self-completion section were asked to provide a reason for refusal (see TABLE 9.7 and TABLE 9.8). Both in the sample of hetero-sexually active employed males aged 26-44 and among sexually active males, “object to the subject” is among the first reasons for refusing to take part in the self completion section of the questionnaire. Indeed, after answering the first survey questions, respondents may have a clearer idea of the survey topic and their decision to participate or not in the survey may be better informed. However, overall, this reason for refusing self completion is chosen by less than a quarter of sample members not participating in the self completion section of the questionnaire.

TABLE 9.7: Reasons for refusing to take part in the self completion section of the questionnaire (hetero-sexually active employed males aged 26-44)

	N	%	95% C.I.
“Other reason”	18	23.75	[13.5 – 38.4]
“Objected to subject”	14	21.68	[11.6 – 36.8]
“Ran out of time”	10	19.94	[10.3 – 35.1]
“Didn't like computers”	10	17.27	[8.2 – 32.8]
“Could not read/write”	4	7.71	[2.5 – 21.6]
“Language problems”	4	5.58	[1.6 – 18.0]
“Worried about confidentiality”	2	2.0	[0.5 – 8.5]
“Eyesight problems”	1	1.63	[0.2 – 11.6]
“Couldn't be bothered”	1	0.4	[0.0 – 3.1]

Source: Analysis on Natsal-2 data. Data are weighted to take into account the complex survey design. 95% confidence interval.

TABLE 9.8: Reasons for refusing to take part in the self completion section of the questionnaire (all sexually active males)

	N	%	95% C.I.
“other reason”	31	31.30	[20.68 – 44.33]
“didn't like computers”	17	18.08	[10.83 – 28.62]
“ran out of time”	17	19.07	[11.45 – 30.05]
“objected to subject”	16	14.33	[7.55 – 25.52]
“could not read/write”	6	6.94	[2.83 – 16.02]
“language problems”	5	4.94	[1.69 – 13.56]
“couldn't be bothered”	4	2.11	[0.59 – 7.2]
“worried about confidentiality”	3	1.92	[0.61 – 5.88]
“eyesight problems”	2	1.31	[0.25 – 6.62]

Source: Analysis on Natsal-2 data. Data are weighted to take into account the complex survey design. 95% confidence interval.

9.1.2 ITEM NON RESPONSE AND RESPONDENT'S EMBARRASSMENT

In the previous section we have shown that item missing data is rarer than expected in paying for sex and risky behaviours. In this section we investigate the reasons for refusing to answer the survey questions. In particular, we describe the joint frequency of item missing data in paying for sex and risky behaviours by level of respondent embarrassment.

Indeed, there are several reasons why some sample members decide to answer a survey question while others do not (Groves *et al.* 2009). Among sample members that take

part in the survey, some may skip the survey question for reasons including not understanding the question, not knowing the requested information or unwillingness to answer the question (Groves *et al.* 2009). The lack of motivation in answering sensitive questions may be due to privacy concerns, fear of disclosure to third parties, embarrassment in admitting a socially undesirable behaviour, unwillingness to recall a negative experience, and also response burden and fatigue.

Natsal-2 data offer different measures of respondents' embarrassment as well as on other factors that may lead to embarrassment (e.g. presence of someone else during the interview). I will now describe the correlation of item non response in paying for sex with paradata of respondents' embarrassment.

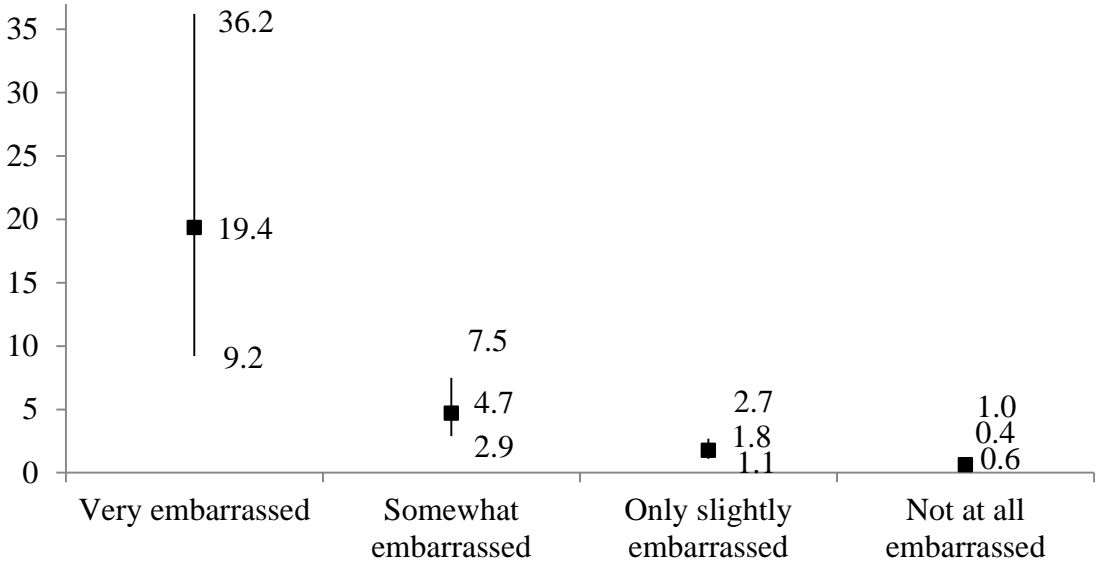
At the end of the interview, the interviewer codes how much the respondent appeared embarrassed on a 4 points scale: "very embarrassed", "somewhat embarrassed" "only slightly embarrassed" and "not at all embarrassed". The interviewers' evaluation refers to the whole interview, rather than to the single survey questions.

It is expected that item non response varies across different level of embarrassment and the higher the respondent embarrassment the higher the item non response to the survey questions considered here.

For the whole sample of sexually active males, we find support for this hypothesis. While, for the subsample of hetero-sexually active employed males aged 26-44, we do not find a difference in the level of item non response by all different levels of embarrassment. However, we do find that respondents labelled as at least slightly embarrassed (only slightly embarrassed, somewhat embarrassed and very embarrassed) are more likely to have item non response compared to respondents labelled as "not at all embarrassed".

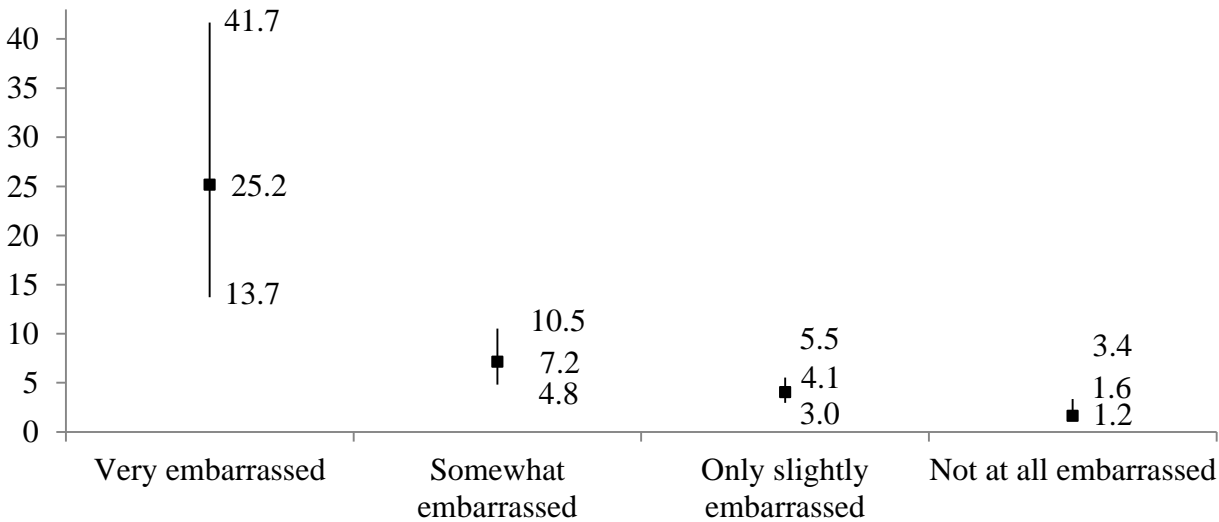
More specifically, considering the whole sample of sexually active males, the paradata on respondent's embarrassment is informative of item missing data in the considered variables (see FIGURES 9.3-9.6). The level of item missing data is significantly different across all different levels of respondent's embarrassment. Also, the higher the level of embarrassment the higher the prevalence of item missing data.

FIGURE 9.3: Item non response in ever paid for sex by level of respondents' embarrassment (%), all sexually active males



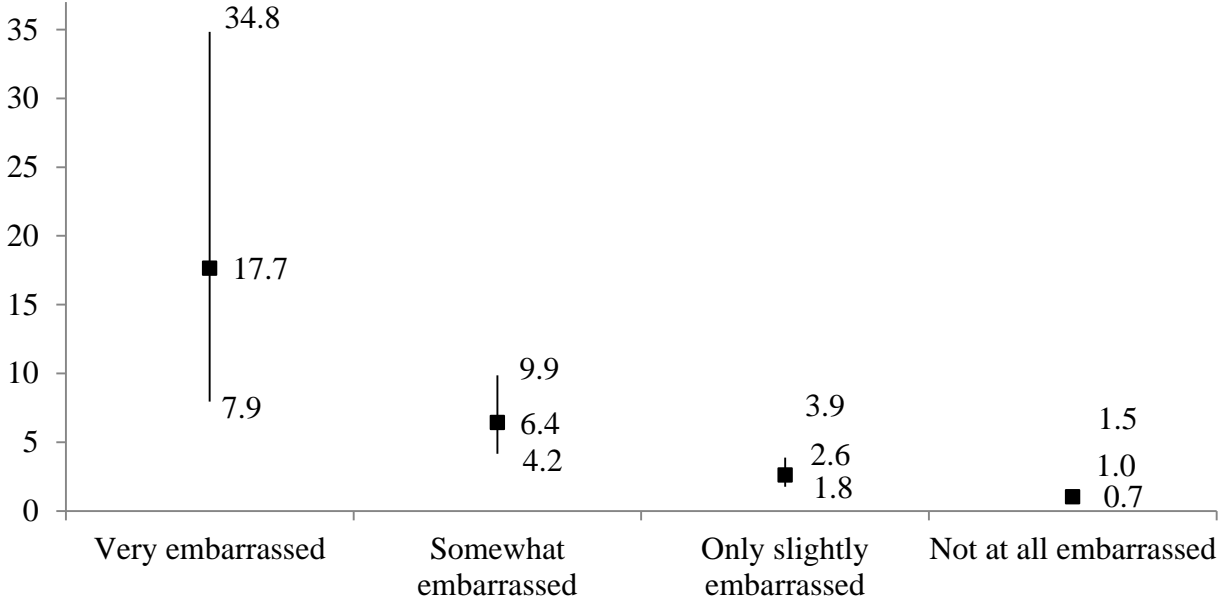
Source: Analysis on Natsal-2 data. 95% confidence interval. Data are weighted to take into account of the complex survey design.

FIGURE 9.4: Item non response in overseas partner acquisition by level of respondents' embarrassment (%), all sexually active males



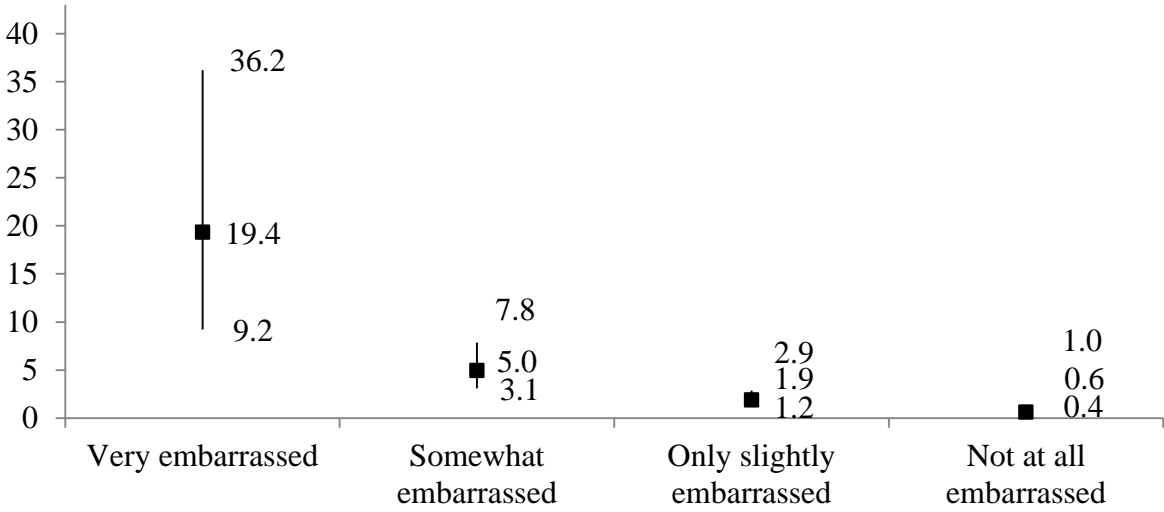
Source: Analysis on Natsal-2 data. 95% confidence interval. Data are weighted to take into account of the complex survey design.

FIGURE 9.5: Item non response in unsafe sex by level of respondents' embarrassment (%), sexually active males



Source: Analysis on Natsal-2 data. 95% confidence interval. Data are weighted to take into account of the complex survey design.

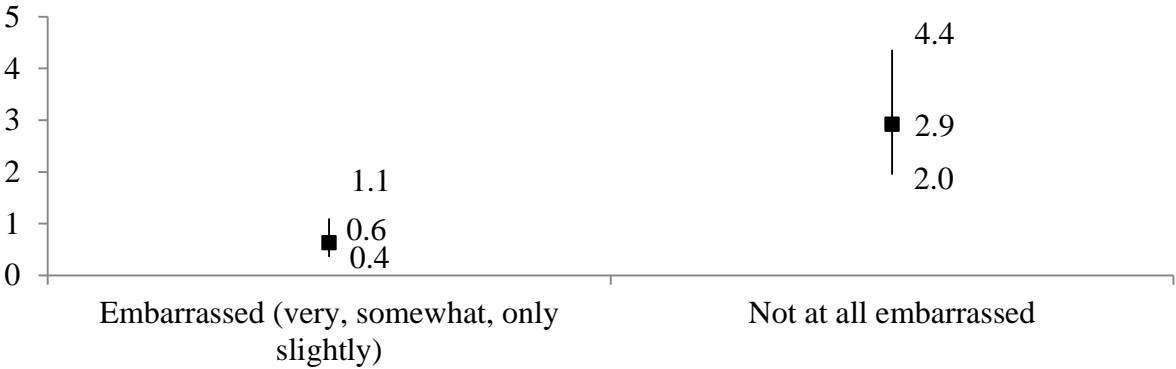
FIGURE 9.6: Item non response in injected drug use by level of respondents' embarrassment (%), sexually active males



Source: Analysis on Natsal-2 data. 95% confidence interval. Data are weighted to take into account of the complex survey design.

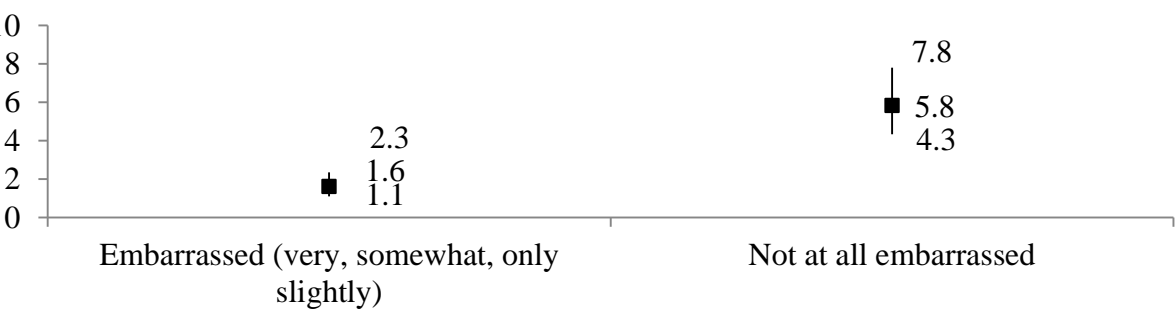
For the subsample of employed males aged 26-44, different level of respondents embarrassment are not statistically significantly different in terms of item missing data, when we consider the variable “embarrassment” as a four category variable. If we model the concept of respondents’ embarrassment using a two category variable: i.e. embarrassment (very embarrassed, somewhat embarrassed and only slightly embarrassed) and not embarrassment (not at all embarrassed) we do find a statistically significant association. The prevalence of item missing data in all variables considered is higher among respondents that are at least slightly embarrassed compared to respondents labelled as “not at all embarrassed” (FIGURES 8.7-8.10). The result holds for all sensitive behaviours analysed.

FIGURE 9.7: Item non response in ever paid for sex by level of respondents’ embarrassment (%), hetero-sexually active employed males aged 26-44



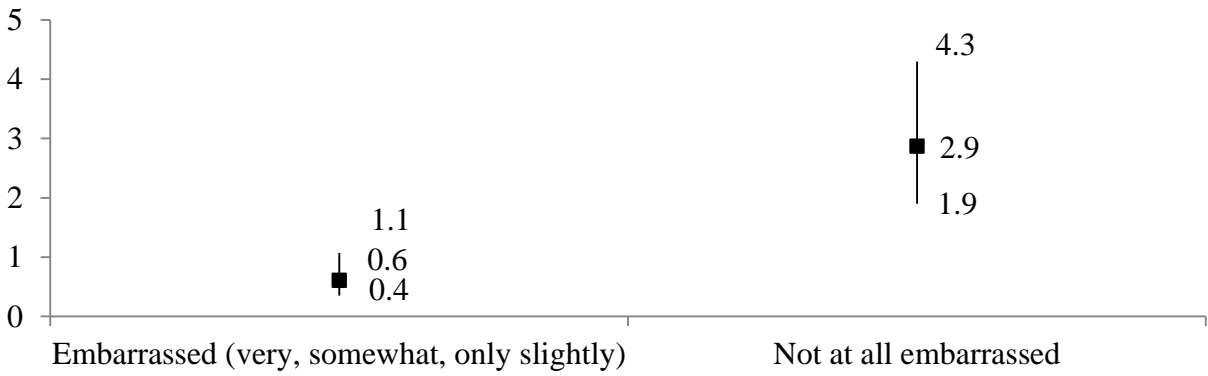
Source: Analysis on Natsal-2 data. 95% confidence interval. Data are weighted to take into account of the complex survey design.

FIGURE 9.8: Item non response in overseas partner acquisition by level of respondents’ embarrassment (%),hetero-sexually active employed males aged 26-44



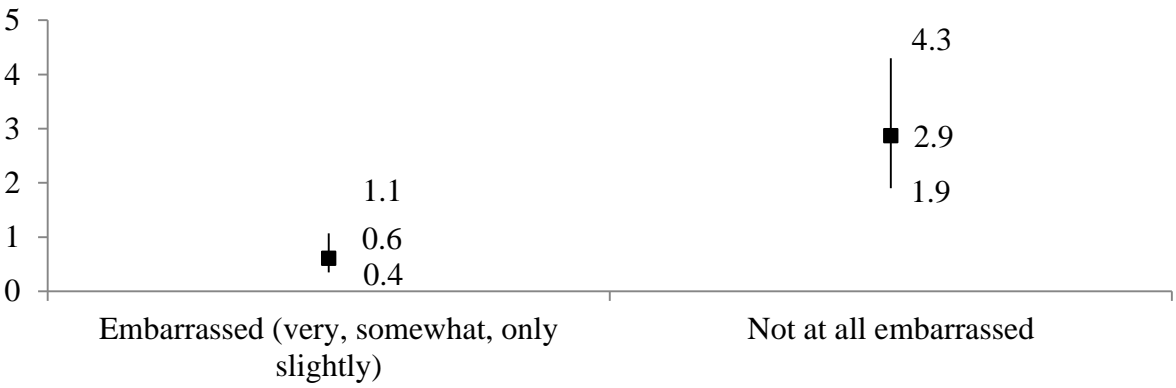
Source: Analysis on Natsal-2 data. 95% confidence interval. Data are weighted to take into account of the complex survey design.

FIGURE 9.9: Item non response in unsafe sex by level of respondents' embarrassment (%),hetero-sexually active employed males aged 26-44



Source: Analysis on Natsal-2 data. 95% confidence interval. Data are weighted to take into account of the complex survey design.

FIGURE 9.10: Item non response in injected drug use by level of respondents' embarrassment (%), hetero-sexually active employed males aged 26-44



Source: Analysis on Natsal-2 data. 95% confidence interval. Data are weighted to take into account of the complex survey design.

Besides interviewers' evaluation, I here use another proxy for respondents' embarrassment: this is embarrassment as a reason for refusing the provision of the urine sample. More specifically, the protocol for collecting the urine specimen prescribed that respondents in the core sample were eligible for the urine survey if: i. they were aged over 18 years old, ii. they have had some sexual experience, and iii. their address is a urine sample

point¹⁴⁰. Respondents from the ethnic minority boost sample were not eligible for the urine survey.

Among respondents that refused taking part in the urine survey, reason for refusing was recorded. One of these reasons was considering the provision of the urine sample as “too personal/embarrassed”¹⁴¹. Embarrassment is one of the reason stated more often for refusing to provide a urine sample. This option is chose by 12.3% (C.I. 9.6 – 15.6%) of sexually active males and by 11% (C.I. 8 – 15%) of heterosexually active employed males aged 26-44 (see TABLE 9.9). In the next paragraphs, I compare item missing data in paying for sex and risky behaviours by reasons for not providing a urine sample.

It should be noticed that as for embarrassment, also “worried about confidentiality” is one of the response categories for the question eliciting reasons for not providing a urine sample. Literature on sensitive question argue that respondents’ confidentiality concerns is a factor influencing reporting sensitive behaviours (Tourangeau, Rips and Rasinski, 2000)¹⁴². However, I don’t use this variable as a proxy for the concept of confidentiality to compare item missing data in paying for sex ad risky behaviours, as this option is selected by a negligible amount of respondents (4 sample members among all sexually active males, and 2 sample members among hetero-sexually active employed males aged 26-44).

¹⁴⁰ Source: Natsal-2 questionnaire.

¹⁴¹ Other reasons for not providing a urine sample: “no reason for test (e.g. with present life-style)”, “worried about confidentiality”, “worried about effect on insurance”, “already been tested for Chlamydia”, “on medication/health problems”, “felt unable to pass urine”, “did not want to know the test result”, “no time”, “should not be part of the survey”, “would not participate in this kind of test”, “no reason given (incl. just didn’t want to)”, “other reason given”, “not answered”. Responses are mutually exclusive (source: Natsal-2 codebook).

¹⁴² See discussion on sensitive questions in CHAPTER 5.

TABLE 9.9: Reason for not providing a urine sample (answers are sorted by frequency)

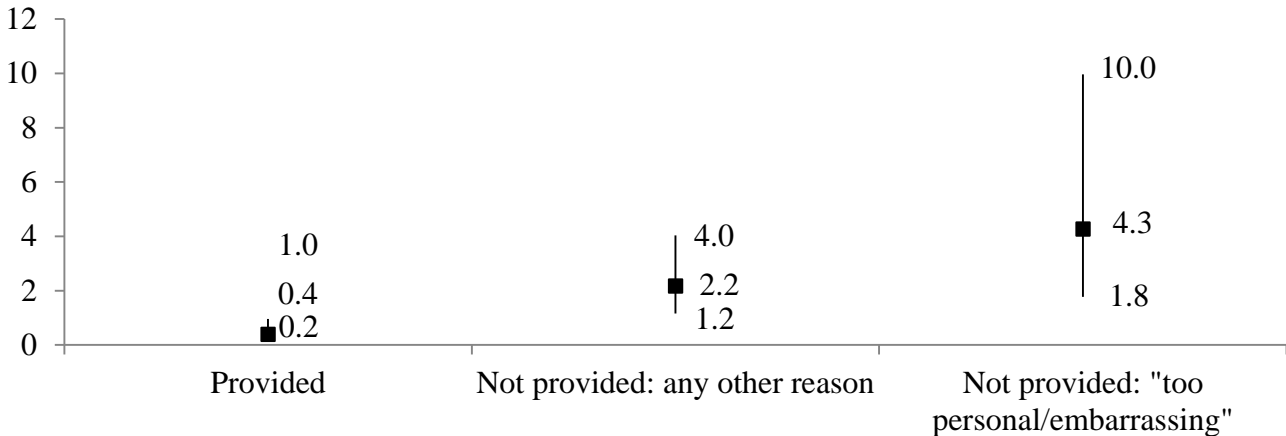
Sexually active males			
	N	%	C.I.
No reason given (incl. just didn't want to do)	234	35.85	[31.36 – 40.61]
Too personal/embarrassed	83	12.26	[9.57 – 15.58]
No reason for test (e.g. with present life – style)	66	10.32	[7.88 – 13.41]
Other reason given	60	9.96	[7.56 – 13.01]
Felt unable to pass urine	49	7.54	[5.24 – 10.72]
Already been tested for Chlamydia	32	4.41	[3.01 – 6.41]
No time	31	4.21	[2.67 – 6.58]
Should not be part of the survey	30	3.99	[2.54 – 6.21]
<i>Not answered</i>	28	3.63	[2.29 – 5.71]
Would not participate in this kind of test	23	2.89	[1.79 – 4.63]
Did not want to know the test result	13	1.88	[1.03 – 3.38]
On medication/health problems	11	1.87	[0.94 – 3.7]
Worried about confidentiality	4	0.74	[0.26 – 2.07]
Worried about effect on insurance	2	0.46	[0.11 – 1.82]
Hetero – sexually active employed males aged 26 – 44			
	N	%	C.I.
No reason given (incl. just didn't want to do)	160	12.65	[9.41 – 16.78]
No reason for test (e.g. with present life – style)	56	34.6	[29.72 – 39.83]
Too personal/embarrassed	49	11.02	[7.99 – 15.01]
Other reason given	40	8.76	[6.29 – 12.06]
Felt unable to pass urine	38	8.1	[5.31 – 12.18]
Should not be part of the survey	26	5.37	[3.4 – 8.4]
No time	24	4.58	[2.67 – 7.77]
Already been tested for Chlamydia	21	3.82	[2.34 – 6.18]
<i>Not answered</i>	19	3.32	[1.9 – 5.73]
Would not participate in this kind of test	16	2.95	[1.7 – 5.07]
On medication/health problems	10	2.19	[1.0 – 4.57]
Did not want to know the test result	9	1.8	[0.87 – 3.69]
Worried about effect on insurance	2	0.6	[0.16 – 2.53]
Worried about confidentiality	1	0.2	[0.03 – 1.32]

Source: analysis on Natsal-2 data. 95% confidence interval. Data are weighted to take into account of the complex survey design.

I study embarrassment – measured as a reason for not providing a urine sample – as a predictor for item non response in paying for sex and risky behaviours. Firstly, I analyse the sample of sexually active males (FIGURES 9.11 – 9.14). In this group, the prevalence of item

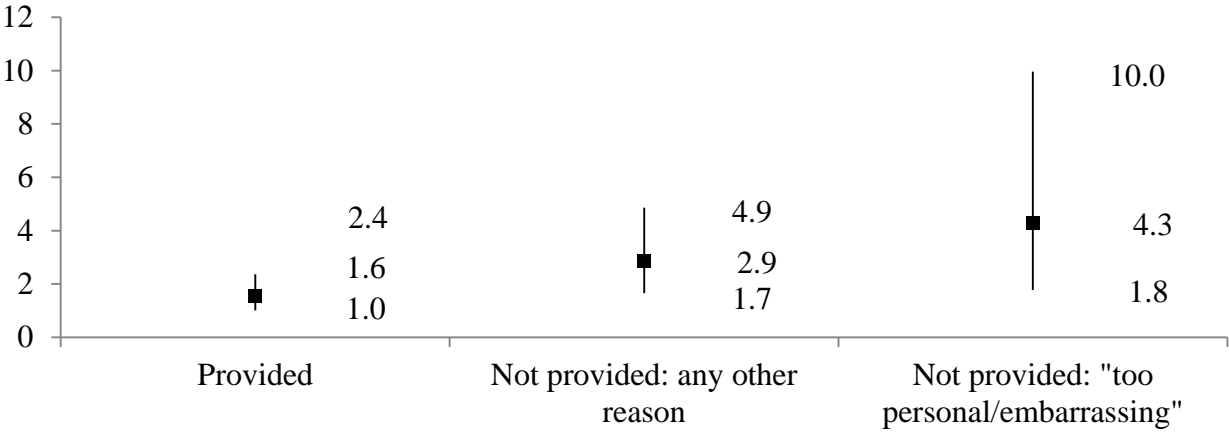
non response in all behaviours considered with the exception of overseas partner acquisition is higher among respondents that did not provide a urine sample (regardless of the reported reason) compared with sample members providing a urine sample; also, sample members motivating the refusal to provide a urine sample with “too personal/embarrassed” show higher missing data than sample members that do provide the requested urine sample. However, comparing different motivations for refusing the provision of the urine sample the prevalence of item non response is not statistically significantly different among sample members reporting embarrassment as a reason for not providing the urine sample compared with any other reason given (FIGURES 8.11, 8.13 8.14). Finally, item non response in overseas partner acquisition is not statistically different across the different motivations provided for refusing to provide a urine sample (FIGURES 8.12).

FIGURE 9.11: Item non response in ever paid for sex by reason for not providing an urine sample, all sexually active males



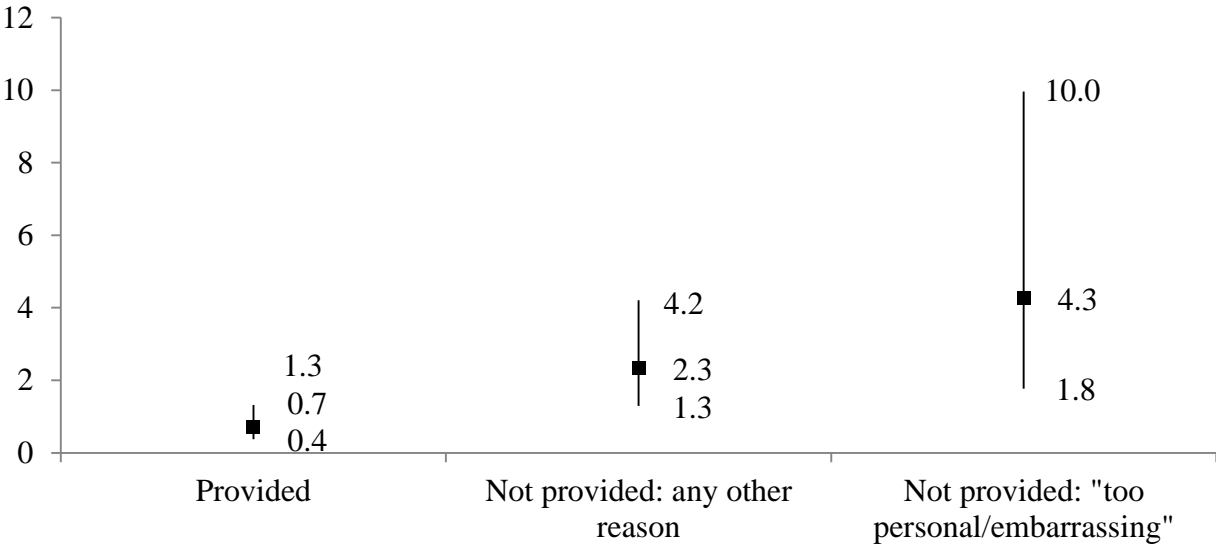
Source: Analysis on Natsal-2 data. 95% confidence interval. Data are weighted to take into account of the complex survey design.

FIGURE 9.12: Item missing data in overseas partner acquisition by reason for not providing an urine sample, all sexually active males



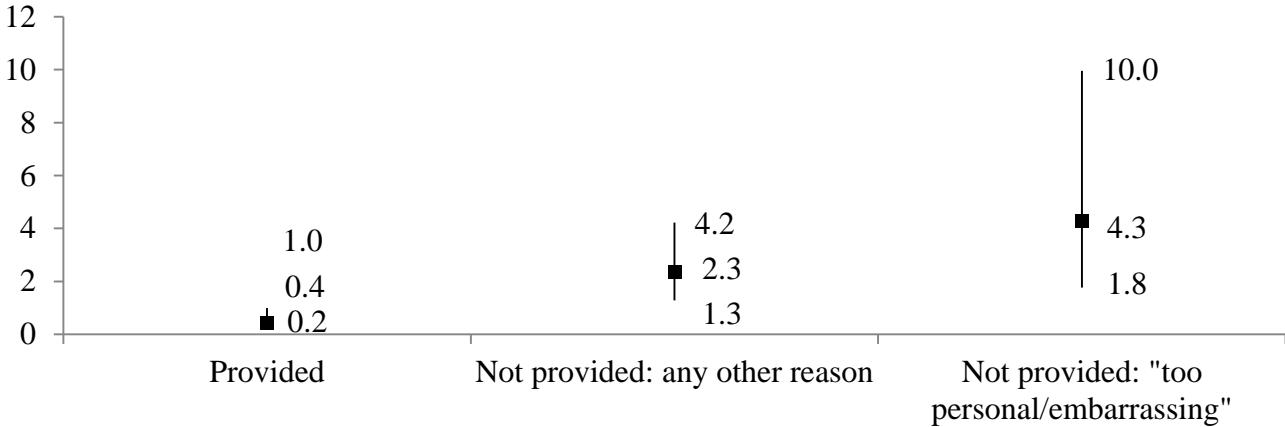
Source: Analysis on Natsal-2 data. 95% confidence interval. Data are weighted to take into account of the complex survey design.

FIGURE 9.13: Item missing data in unsafe sex by reason for not providing an urine sample, all sexually active males



Source: Analysis on Natsal-2 data. 95% confidence interval. Data are weighted to take into account of the complex survey design.

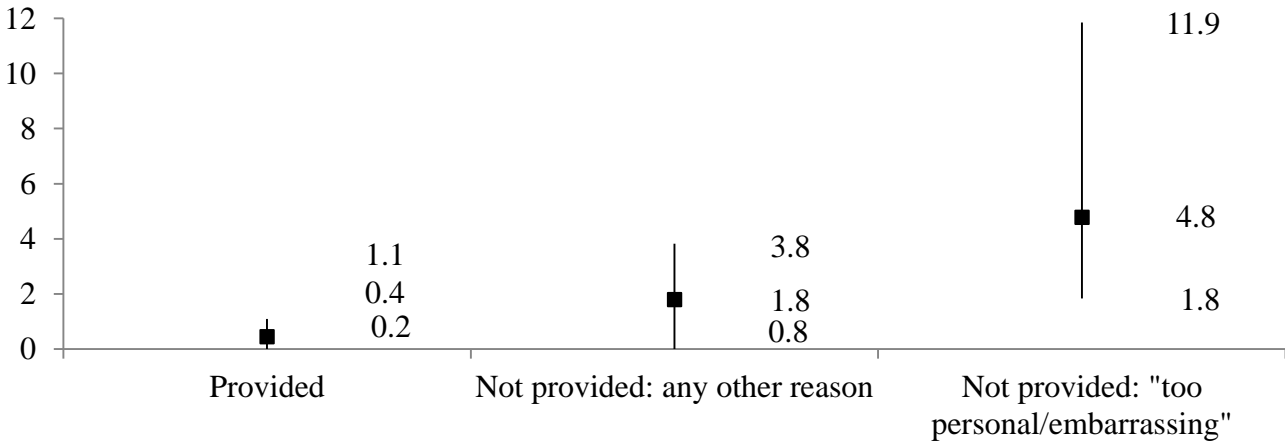
FIGURE 9.14: Item missing data in injected drug use by reason for not providing an urine sample, all sexually active males



Source: Analysis on Natsal-2 data. 95% confidence interval. Data are weighted to take into account of the complex survey design.

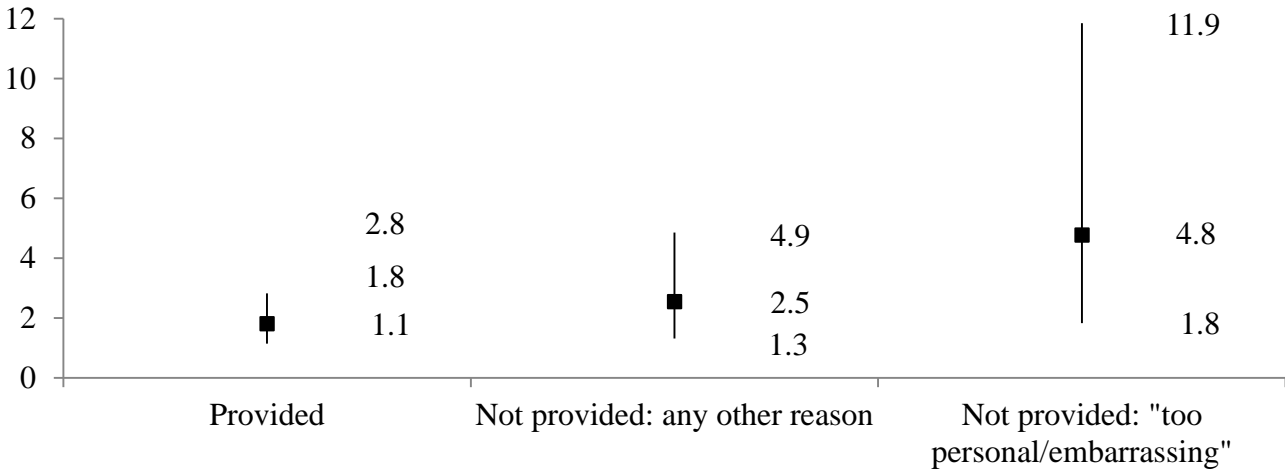
Restricting the analysis to the subsample of hetero-sexually active males aged 26-44, I do not find any statistically significant difference in terms of item non response across the different groups – i.e. provision of urine sample, no provision motivated by embarrassment, no provision motivated with any other reason (FIGURES 9.15 – 9.17).

FIGURE 9.15: Item non response in ever paid for sex by reason for not providing an urine sample, sexually active employed males aged 26-44 only



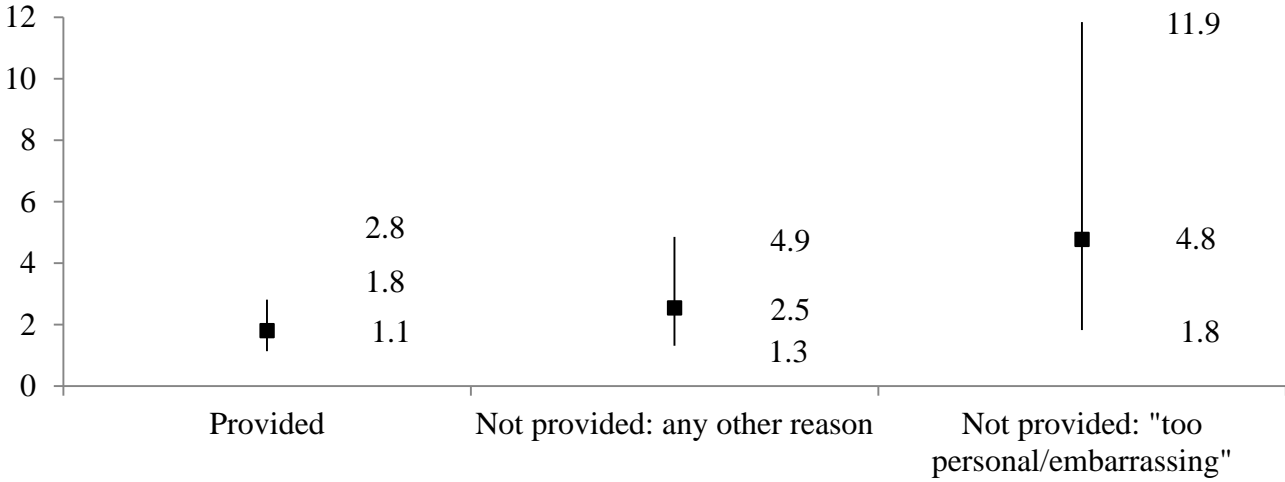
Source: Analysis on Natsal-2 data. 95% confidence interval. Data are weighted to take into account of the complex survey design.

FIGURE 9.16: Item missing data in unsafe sex by reason for not providing an urine sample, sexually active employed males aged 26-44 only



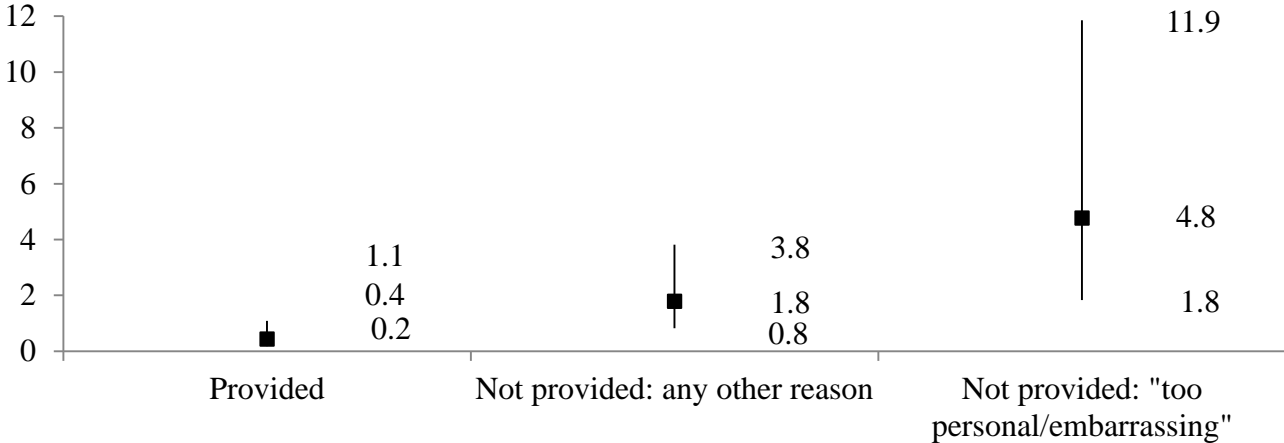
Source: Analysis on Natsal-2 data. 95% confidence interval. Data are weighted to take into account of the complex survey design.

FIGURE 9.17: Item missing data in unsafe sex for sex by reason for not providing an urine sample, sexually active employed males aged 26-44 only



Source: Analysis on Natsal-2 data. 95% confidence interval. Data are weighted to take into account of the complex survey design.

FIGURE 9.18: Item missing data in injected drug use by reason for not providing an urine sample, sexually active employed males aged 26-44 only



Source: Analysis on Natsal-2 data. 95% confidence interval. Data are weighted to take into account of the complex survey design.

9.1.3 PRIVACY OF THE INTERVIEW SITUATION

In the previous section we found support that level of respondents’ embarrassment is associated with item non response in paying for sex and risky behaviours. One potential reason for embarrassment when reporting sensitive behaviour is the presence of someone else (apart from the interviewer) during the interview. Thus, in this section, I show descriptive statistics on how frequently the interview is conducted in presence of someone else.

Indeed, other people presence may be also a reason for misreporting and item non response, even in self-completion sections of the questionnaires. More specifically, presence of someone else during the interview may increase the fear of disclosure to third parties, where the “third party” is the person present during the interview. Presence of someone else may also increase the embarrassment, and this may lead to both higher item non response and higher misreporting.

In our subsample, more than half interviews (58.4%, C.I. 56.3 – 60.5) are conducted with someone else at home during the interview, and in 29% of cases (27.3 – 31.5), the interviewer evaluated this/these other person/people in the household could overhear (see TABLE 9.10). Proportions are similar for the whole sample of sexually active males, as shown in TABLE 9.11.

TABLE 9.10: Presence of anyone else during the interview, hetero-sexually active employed males aged 26-44 only

	%	95% C.I.
Yes	58.4	[56.3 – 60.5]
<i>and possible able to overhear</i>	29.0	[27.3 – 31.5]
<i>and not possible able to overhear</i>	29.4	[27.1 – 31]
No	40.5	[38.5 – 42.7]
Interview conducted elsewhere: e.g. car, garage	1.1	[0.8 – 1.6]
Total	100	
N	3,445	

Source: Natsal-2. Data are weighted to take into account of the complex survey design. 95% Confidence interval in brackets.

TABLE 9.11: Presence of anyone else during the interview, sexually active males

	%	C.I.
Yes	58.4	[56.5 – 60.2]
<i>and possible able to overhear</i>	27.4	[25.7 – 29.2]
<i>and not possible able to overhear</i>	30.9	[29.2 – 32.7]
No	40.6	[38.7 – 42.4]
Interview conducted elsewhere: e.g. car, garage	1.1	[0.8 – 1.5]
Total	100	
N	4,943	

Source: Natsal-2. Data are weighted to take into account of the complex survey design. 95% Confidence interval in brackets.

9.1.4 RESPONDENT'S COMMITMENT TO THE SURVEY

Another factor that influence reporting in general (both sensitive and non sensitive behaviours) is how the survey is considered salient by the respondent¹⁴³. I measure these concepts with paradata on interviewer evaluation of the difficulty of convincing the respondent to take part in the survey. Low willingness to take part in the survey can be interpreted as signs of absence of commitment, lack of trust relationship, lack of salience of the survey for the respondent. These factors may influence negatively data quality not only in sensitive items, but also in “not-sensitive” questions. They are expected to be correlated with item non response in paying for sex, and other risky behaviours. As we see from TABLE 9.12, interviewers found not difficult at all to convince the majority of respondents (60.7%) to take part in the survey. Results hold when we consider the larger sample of all sexually active males (TABLE 9.13).

TABLE 9.12: Interviewer evaluation of the difficulty to convince the respondent to take part in the survey, hetero-sexually active employed males aged 26-44

	N	%	C.I.
Not at all difficult	2035	60.7	[58.4 – 63.0]
not very difficult	950	27.3	[25.3 – 29.3]
Fairly difficult	370	9.7	[8.6 – 10.9]
Very difficult	87	2.4	[1.9 – 3.0]
N	3,442	100	

Source: Analysis on Natsal-2 data. Data are weighted to take into account of the complex survey design.

TABLE 9.13: Interviewer evaluation of the difficulty to convince the respondent to take part in the survey, all males

	N	%	C.I.
Not at all difficult	2947	61.2	[59.1 – 63.2]
not very difficult	1344	27.2	[25.5 – 29.0]
Fairly difficult	528	9.5	[8.5 – 10.5]
Very difficult	120	2.1	[1.7 – 2.7]
N	4,939	100	

Source: Analysis on Natsal-2 data. Data are weighted to take into account of the complex survey design.

¹⁴³ See discussion on the leverage saliency theory in CHAPTER 5.

9.2 COMPARING THE LEVEL OF ITEM MISSING DATA IN PAYING FOR SEX AND RISKY BEHAVIOURS WITH OTHER SURVEY QUESTIONS

In this section, I compare the share of item missing data in paying for sex and injected drug use with item missing data in other items. Through this comparison I test the second part of HYPOTHESIS 1: Paying for sex and risky behaviours have higher missing data than other non sensitive items. . As already discussed in the previous section, paying for sex and risky behaviours are characterized by item missing data; but, item missing data is rare and mainly due to the sample member refusing to take part at all in the self completion section of the questionnaire.

In this section I check whether the level of item missing data is different in the sensitive items analysed compared with non sensitive items; Ideally, I would have used a t-test to compare missing data in paying for sex and risky behaviours with missing data in five macro groups:

- i. Socio-demographic questions¹⁴⁴
- ii. Socio-demographic questions including questions about partners' employment and income¹⁴⁵
- iii. Non sensitive questions about behaviours
- iv. Sensitive questions about behaviours
- v. Attitudinal questions

More specifically, given the sensitive nature of the survey, I label as sensitive almost¹⁴⁶ all variables based on questions about behaviour. These are mainly questions about

¹⁴⁴ "Socio-demographic questions" include questions about: age, education, marital status, family type when growing up, employment status.

¹⁴⁵ "Socio-demographic questions including questions about partners' employment and income" include all the socio-demographic questions already incorporated in index (i.) with the addition of items measuring partners' occupation.

¹⁴⁶ The only question that I labelled as a non sensitive question about behaviour is: travelling abroad in the last 5 years; thus, I do not compare item missing data in paying for sex and risky behaviours with item missing data in non sensitive questions about behaviours.

sexual behaviour; other questions about behaviour cover sensitive topics (e.g. health, weight, height, smoking, alcohol consumption).

Moreover, item missing data is not observed in attitudinal questions. Some respondents have chosen the “depends/don’t know” response category. I consider this response option, in this context, as a valid response, and thus I do not treat it as a missing data. Thus, average item missing data is not calculated for attitudinal variables, as all these variables have observed values only.

For each macro group of variables (socio-demographic questions, socio-demographic questions including partners’ employment, and sensitive questions about behaviour), I compute an index on item non response in these variables, measuring the share of item missing data. This is measured as number of item missing data in any survey question within the group asked to the respondent¹⁴⁷ (with the exception of paying for sex, overseas partner acquisition, unsafe sex and injected drug use) divided by the number of questions within the group asked to the respondent. Then, the individual level index of item missing data is averaged to derived a global index.

Using a t-test I compare the prevalence of item missing data in paying for sex and risky behaviours with the global index for the three different macro-groups (socio-demographic questions, socio-demographic questions including partners’ employment, and sensitive questions about behaviour). As expected, paying for sex and risky behaviour have significantly higher missing data compared with socio-demographic questions; the alternative hypothesis of an equal prevalence of item missing data is rejected for variables considered (paying for sex and risky behaviours) with $p\text{-value} < 0.0005$, in favour of accepting the hypothesis of a higher missing data in paying for sex and risky behaviours compared with socio-demographic variables.

However, contrary to our hypothesis, paying for sex and risky behaviours have lower missing data compared with socio-demographic questions, once we include among the socio-demographic variables also partners’ occupation. Thus, we reject the hypothesis of an equal prevalence of item missing data with $p\text{-value} = 0.000$. One possible interpretation of this finding, is that item non response occurs in questions about partners’ occupation and income,

¹⁴⁷ With the exception of paying for sex, overseas partner acquisition, unsafe sex and injected drug use.

since some sample member may genuinely skip the survey question because they are not aware of the partners' income/employment situation, and thus, do not know the answer.

Moreover, item missing data is significantly less in questions on paying for sex, overseas partner acquisition and unsafe sex, compared with all sensitive questions about behaviour¹⁴⁸; again, the alternative hypothesis of an equal prevalence of item missing data in other sensitive variables compared with each of the four variables considered (paying for sex and risky behaviours) is rejected with p-value:0.000, however, in this case, we accept the hypothesis that other sensitive items have a higher item missing data compared with the four behaviours under study. The evidence suggests that, if the missing data mechanism is related to social (un)desirability, questions on paying for sex, overseas partner acquisition, unsafe sex, and injected drug use do not seem the most sensitive within sensitive questions about behaviour.

Finally, it should be noticed that the results outlined here hold for both the subsample of sexually active males as well as for the subsample of hetero-sexually active employed males aged 26-44.

To sum up, the descriptive statistics and the evidence outlined in this section confirmed the hypothesis that paying for sex and risky behaviours are characterized by item missing data. However, we have noticed that item missing data are rare, and rarer than expected; Also, item missing data does not seem mainly related to the nature of the single survey question, but rather by the respondents skipping an entire section of the questionnaire. Thus, this situation resembles a unit non response situation, rather than an item non response problem.

Furthermore, the comparison of item missing data in paying for sex and risky behaviour produce mixed evidence: missing data in these items is higher compared with missing data in socio-demographic questions, but lower than socio-demographic questions including also partners' characteristics. Moreover, item missing data is higher, on average, in other sensitive questions about behaviours compared with item missing data in paying for sex and risky behaviours.

¹⁴⁸ Also, compared to all the sensitive questions about behaviour that are asked in Computer Administer Self-interview, questions on paying for sex and risky behaviour have lower item missing data.

9.3 TESTING THE MCAR HYPOTHESIS FOR PAYING FOR SEX AND RISKY BEHAVIOURS

In this section I test the HYPOTHESIS 2 that item missing data in the variables paying for sex, injected drug use, unsafe sex and overseas partner acquisition are not Missing Completely at Random. . More specifically, I test that: 1. Item non response in paying for sex and risky behaviours are correlated with respondents' socio-demographic factors (see section 9.3.1); and 2. Item non response in paying for sex and risky behaviours are correlated with other factors such as: ease in discussing sexual matters (see section 9.3.2), the privacy of the interview settings (see section 9.3.3), respondents' commitment to the survey (see section 9.3.4) and respondents' embarrassment . Finally, I discuss which the most informative paradata for item non response in this context are (section 9.3.5) and I conclude with final remarks on the missing completely at random hypothesis for paying for sex and risky behaviours (section 9.3.6).

9.3.1 MISSING COMPLETELY AT RANDOM IN TERMS OF SOCIO-DEMOGRAPHIC CHARACTERISTICS

In the descriptive statistics we observed that item non response is mainly related to the respondent refusing to take part in the entire self-completion section of the questionnaire. Thus, I firstly test whether participating or not in the self completion questionnaire is associated with socio-demographic characteristics. Subsequently, I perform the same analysis for paying for sex and risky behaviours.

In order to perform this analysis, I run a set of logistic regression models regressing not participating in the self completion section of the questionnaire, missing data in paying for sex and risky behaviours on socio-demographic factors. Results are shown both for the subsample of sexually active males, as well as for the subsample of hetero-sexually active employed males aged 26-44.

As described in TABLE .8.14, refusing to participate in the CASI section of the questionnaire is not completely at random in terms of socio-demographic characteristics. In the group of heterosexually active employed males aged 26-44, participating in the self-completion section of the questionnaire is correlated with education and number of children. More specifically, compared with respondents with no education, sample members with either

a degree level education, an A-level education or an O-level education have a significantly lower likelihood to take part in the self completion section of the survey. The effect is particularly strong (odds ratio are very small).

Moreover, number of children is positively associated with refusing to take part in the self completion section. Results are consistent when we analyse the larger sample of all sexually active males.

As recalled item non response in paying for sex and risky behaviours is mainly due to the respondent refusing to participate in the self completion section of the survey; thus, we expect factors associated with refusing to take part in the self completion section, to be also associated with item non-response in paying for sex and risky behaviours.

Indeed, education is correlated not only with the refusal to participation in the self completions section of the questionnaire but also with item non response in paying for sex and all the risky behaviours considered; this evidence applies for both subsamples analysed (see TABLES 8.15 – 8.18). More specifically, respondents with a degree, an A-level and an O-level education have a higher likelihood of having item missing data in paying for sex, overseas partner acquisition, unsafe sex, and injected drug use.

Moreover, also the respondents' number of children is not only indicator of refusal to take part in the self completion section of the questionnaire, but it is also positively associated with item missing data for some of the variables considered. More specifically, the evidence holds for paying for sex and injected drug use – in both subsamples analysed (see TABLES 8.15 and 8.18) – and for unsafe sex, when we consider the larger sample of all sexually active males (TABLES 8.17)

In the subsample of sexually active males, respondents living in London are more likely to have missing data in all sensitive behaviours analysed (TABLES 8.15 – 8.18); this evidence also hold in the restricted subsample of hetero-sexually active employed males aged 26-44 for the behaviours: ever paid for sex, overseas partner acquisition and injected drug use.

Finally, professional status is associated with item missing data in unsafe sex: respondents with a professional status labelled as “professional/managerial” or “technical/managerial” have a lower likelihood to provide a valid answer to the question on unsafe sex (TABLES 8.17).

Thus, we accept Hypothesis 2.1, stating that item non response in paying for sex and risky behaviours is not Missing Completely at Random. Moreover, unit non response in the self completion section of the questionnaire, is also not completely at random in terms of socio-demographic characteristics.

TABLE 9.14: Socio-demographic factors associated with not participating in the CASI section of the survey.

Logistic regression model

Dependent variable:

Participating in CASI =1 if item missing data
=0 otherwise

	all sexually active males		hetero-sexually active, employed, males aged 26-44 only	
	Odds ratio	Std.	Odds ratio	Std.
Age	0.974	0.030	0.980	0.194
Education				0.164
Degree	0.260 **	0.156	0.279 *	0.128
A-level	0.127 ***	0.088	0.213 **	
O-level	0.334 ***	0.107	0.346 ***	0.355
Professional status				0.360
Professional/managerial	0.273	0.269	0.336	0.689
Technical/managerial	0.444	0.293	0.483	0.537
Skilled	0.988	0.543	1.029	
Partly skilled	1.068	0.612	0.711	0.386
Marital status				0.755
married & living with spouse	0.695	0.297	0.765	0.813
cohabitation (opposite sex & same sex)	0.885	0.461	1.151	0.180
previously married (widowed, divorced,	0.790	0.561	1.118	0.142
Number of children	1.430 ***	0.194	1.350 **	0.637
Household size	0.937	0.126	0.986	0.060
Living in London	1.625	0.596	1.398	0.194
Constant	0.062 **	0.075	0.039 **	0.164
Number of Obs.	4512		3378	

* p<0.1, ** p<0.05, *** p<0.01

Base categories: No education, Unskilled/unclassifiable/army/other, single and never been married.

Note: Data are weighted to take into account of the complex survey design.

Source: Analysis on Natsal-2 data.

TABLE 9.15: The association of item non response in ever paying for sex and socio-demographic characteristics

Logistic regression model

Dependent variable:

Item missing data in paying for sex = 1 if item missing data
= 0 otherwise

	all sexually active males		hetero-sexually active, employed, males aged 26-44 only	
	Odds ratio	Std.	Odds ratio	Std.
Age	0.965	0.029	0.972	0.034
Education				
Degree	0.219 ***	0.119	0.282 **	0.163
A-level	0.174 ***	0.102	0.277 **	0.172
O-level	0.381 ***	0.121	0.351 ***	0.123
Professional status				
Professional/managerial	0.688	0.593	0.578	0.527
Technical/managerial	0.719	0.464	0.605	0.426
Skilled	1.348	0.795	1.185	0.783
Partly skilled	1.445	0.878	0.854	0.621
Marital status				
married & living with spouse	0.856	0.349	0.747	0.337
cohabitation (opposite sex & same sex)	0.939	0.469	0.978	0.587
previously married (widowed, divorced,	0.871	0.574	1.055	0.678
Number of children	1.492 ***	0.187	1.358 ***	0.135
Household size	0.908	0.117	1.000	0.057
Living in London	2.049 **	0.702	2.099 *	0.832
Constant	0.056 **	0.067	0.047 **	0.063
Number of Obs.	4512		3378	

* p<0.1, ** p<0.05, *** p<0.01

Base categories: No education, Unskilled/unclassifiable/army/other, single and never been married.

Note: Data are weighted to take into account of the complex survey design.

Source: Analysis on Natsal-2 data.

TABLE 9.16: The association of item non response in overseas partner acquisition and socio-demographic characteristics

Logistic regression model

Dependent variable:

Item missing data in overseas partner acquisition =1 if item missing data

	=0 otherwise			
	all sexually active males		hetero-sexually active, employed, males aged 26-44 only	
	Odds ratio	Std.	Odds ratio	Std.
Age	1.013	0.019	1.028	0.029
Education				
Degree	0.315 ***	0.113	0.362 **	0.147
A-level	0.243 ***	0.088	0.308 ***	0.122
O-level	0.295 ***	0.072	0.245 ***	0.073
Professional status				
Professional/managerial	0.712	0.420	0.568	0.371
Technical/managerial	0.676	0.307	0.526	0.272
Skilled	1.109	0.471	0.949	0.453
Partly skilled	1.181	0.514	0.892	0.481
Marital status				
married & living with spouse	1.039	0.299	1.198	0.502
cohabitation (opposite sex & same sex)	1.064	0.395	1.135	0.548
previously married (widowed, divorced,	0.886	0.411	0.883	0.377
Number of children	1.163	0.142	1.205	0.139
Household size	0.969	0.110	0.900	0.111
Living in London	1.563 *	0.403	1.638 *	0.484
Constant	0.037 ***	0.029	0.027 ***	0.032
Number of Obs.	4512		3378	

* p<0.1, ** p<0.05, *** p<0.01

Base categories: No education, Unskilled/unclassifiable/army/other, single and never been married.

Note: Data are weighted to take into account of the complex survey design.

Source: Analysis on Natsal-2 data.

TABLE 9.17: The association of item non response in unsafe sex and socio-demographic characteristics.

Logistic regression model

Dependent variable:

Item missing data in unsafe sex =1 if item missing data
=0 otherwise

	all sexually active males		hetero-sexually active, employed, males aged 26-44 only	
	Odds ratio	Std.	Odds ratio	Std.
Age	1.004	0.023	1.017	0.033
Education				
Degree	0.323 ***	0.127	0.369 **	0.159
A-level	0.271 ***	0.128	0.282 ***	0.136
O-level	0.279 ***	0.082	0.261 ***	0.088
Professional status				
Professional/managerial	0.235 *	0.182	0.200 **	0.158
Technical/managerial	0.461 *	0.213	0.356 **	0.174
Skilled	0.787	0.349	0.626	0.299
Partly skilled	0.680	0.337	0.410	0.236
Marital status				
married & living with spouse	0.670	0.242	0.584	0.248
cohabitation (opposite sex & same sex)	0.728	0.313	0.696	0.371
previously married (widowed, divorced,	0.767	0.368	0.870	0.427
Number of children	1.286 **	0.150	1.171	0.129
Household size	0.896	0.090	0.988	0.074
Living in London	1.771 *	0.534	1.708	0.599
Constant	0.068 ***	0.059	0.051 **	0.062
Number of Obs.	4512		3378	

* p<0.1, ** p<0.05, *** p<0.01

Base categories: No education, Unskilled/unclassifiable/army/other, single and never been married.

Note: Data are weighted to take into account of the complex survey design.

Source: Analysis on Natsal-2 data.

TABLE 9.18: The association of item non response in injected drug use and socio-demographic characteristics.

Logistic regression model

Dependent variable:

Item missing data in injected drug use =1 if item missing data
=0 otherwise

	all sexually active males		hetero-sexually active, employed, males aged 26-44 only	
	Odds ratio	Std.	Odds ratio	Std.
Age	0.967	0.029	0.971	0.035
Education				
Degree	0.264 **	0.139	0.287 **	0.170
A-level	0.163 ***	0.094	0.280 **	0.174
O-level	0.342 ***	0.107	0.334 ***	0.119
Professional status				
Professional/managerial	0.264	0.255	0.315	0.326
Technical/managerial	0.551	0.338	0.601	0.425
Skilled	1.119	0.605	1.154	0.765
Partly skilled	1.145	0.647	0.854	0.623
Marital status				
married & living with spouse	0.763	0.309	0.856	0.399
cohabitation (opposite sex & same sex)	0.856	0.422	1.126	0.687
previously married (widowed, divorced,	0.825	0.534	1.200	0.793
Number of children	1.452 ***	0.183	1.360 ***	0.150
Household size	0.929	0.116	0.991	0.092
Living in London	2.045 **	0.684	2.084 *	0.845
Constant	0.070 **	0.081	0.046 **	0.065
Number of Obs.	4512			

* p<0.1, ** p<0.05, *** p<0.01

Base categories: No education, Unskilled/unclassifiable/army/other, single and never been married.

Note: Data are weighted to take into account of the complex survey design.

Source: Analysis on Natsal-2 data.

9.3.2 MISSING COMPLETELY AT RANDOM AND EASE IN TALKING ABOUT SEX

In the previous paragraphs we have shown that item non response in paying for sex and risky behaviours is correlated with socio-demographic characteristics. In this section we test whether item non response is correlated with other respondents' characteristics, such as the easiness in talking about sex. Firstly, I test these conditional associations on the whole sample of sexually active males, subsequently I restrict the analysis to hetero-sexually active employed males aged 26-44.

Respondents may be more prone to disclose information about their sexual lifestyle if they were used to discussing sexual matters at home when growing up. Ease in talking about sex in youth may persist in later life; sample members reporting an ease in discussing sexual matters at age 14 may be less uneasy, in later life, to disclose information about sexuality in a survey. Thus, they may feel less embarrassed in answering the first questionnaire items about sexuality and more likely to accept compiling the self-interviewing section. Also, they may be more likely, once filling in the survey, to give a valid answer to questions on paying for sex and risky behaviours.

TABLE 9.24 shows that sample members that found it difficult to talk about sex when growing up are more likely to have item missing data in paying for sex and all risky behaviours compared with the respondents who found it easy to discuss sexual matters with one or both parents. Also, respondents who did not discuss sexual matters at all with parents, are less likely to provide a valid answer to questions on paying for sex, unsafe sex and injected drug use compared with sample members who discussed sexual matters easily at home. However, it should be noted that both these effects may be driven by unobserved heterogeneity, as sample members who discussed sexual matters at home (or who found it easy to discuss sexual matters at home) may come from families with different characteristics compared with sample members who did not discuss sexual matters at home when growing up.

Finally, sample members who did not live to age 16 with both natural parents are more likely to have item non response in the survey question of overseas partner acquisition compared with sample members who lived with both natural parents and found it easy to discuss sexual matters at home. However, I interpret this effect as being driven by different unobserved characteristics of the sample members not living continuously with both parents

compared with sample members living with both parents.

TABLE 9.24: The association of item non response and difficulty to talk about sex with parents around age 14, controlling for socio-demographic factors, all sexually active males.

Logistic regression model: Odds ratios

Ease with which discussed sex with parents around age 14	Item missing data for ever paid money for sex	Item missing data for overseas partner acquisition	Item missing data for unsafe sex	Item missing data for injected drug use
Difficult	10.490** (8.529)	2.580* (1.471)	5.633** (3.681)	10.490** (8.526)
Did not discuss sex with parents	4.434** (3.246)	1.707 (0.778)	2.694* (1.458)	4.600** (3.364)
Varied/depended on topic	1	3.271 (2.749)	4.446 (4.847)	1
Did not live more or less continuously to age 16 with both natural parents	2.801 (3.194)	3.137** (1.768)	1.610 (1.371)	2.785 (3.177)
Constant	0.016** (0.022)	0.021*** (0.016)	0.0311*** (0.030)	0.0190** (0.026)
N	4466	4536	4536	4466

Base category: Easy with one parent or both

Controls: Age, education, professional status, marital status, number of children, household size and residence in London.

Note: Standard error in parenthesis. Data are weighted to take into account the complex survey design.

Source: Analysis on Natsal-2.

9.3.3 MISSING COMPLETELY AT RANDOM AND RESPONDENT'S EMBARRASSMENT

In section 9.1.2, we have shown that item missing data is associated with respondents' embarrassment, with higher item missing data corresponding to a higher level of respondents' embarrassment. In this section we test the conditional association of respondents' embarrassment and item non response in paying for sex and risky behaviours, after controlling for other socio-demographic factors.

As shown in TABLE 9.25, this association holds for all behaviours under study after controlling for socio-demographic factors. Compared with respondents who are not at all

embarrassed, sample members who are very embarrassed, somewhat embarrassed and only slightly embarrassed have a higher probability of having an item non response in all the behaviours under study. Also, the likelihood of providing a valid answer increases with the increasing level of embarrassment. The effect is strong and highly statistically significant.

From this evidence we conclude that the interviewers' evaluation of respondents' embarrassment is a useful predictor of item non response in the variables considered. In the next model we test the association of another measure of respondents' embarrassment that may predict item non response.

TABLE 9.25: The association of item non response and level of respondents' embarrassment, controlling for socio-demographic factors, all sexually active males.

Logistic regression model: Odds ratios				
Level of respondent embarrassment	Item missing data for ever paid money for sex	Item missing data for overseas partner acquisition	Item missing data for unsafe sex	Item missing data for injected drug use
Very embarrassed	34.170*** (21.510)	16.760*** (8.531)	14.810*** (10.230)	35.680*** (22.330)
Somewhat embarrassed	6.687*** (2.775)	3.984*** (1.186)	5.703*** (2.023)	7.318*** (2.982)
Only slightly embarrassed	3.061** (1.086)	2.768*** (0.687)	2.780*** (0.845)	3.304*** (1.166)
Constant	0.033** (0.043)	0.023*** (0.020)	0.040*** (0.037)	0.040** (0.050)
N	4535	4535	4535	4535

* p<0.1, ** p<0.05, *** p<0.01

Base category: Not at all embarrassed.

Controls: Age, education, professional status, marital status, number of children, household size and residence in London.

Note: Standard error in parenthesis. Data are weighted to take into account the complex survey design.

Source: Analysis on Natsal-2.

In TABLE 9.26 I analyse the effect of the presence of someone else during the interview on item non response in paying for sex and risky behaviours. The presence of someone else is expected to increase the respondent's embarrassment leading to higher item non response in the considered behaviours. Confirming this expectation, compared with the situation where no-one else is present during the interview, the presence of someone who may overhear is associated with higher item non response in paying for sex and injected drug use,

after controlling for other socio-demographic factors; the effect is marginally significant for ever paid for sex and significant at the 5% level for injected drug use. No effect is found for the other behaviours under study and for the other interview situations (i.e. presence of someone else who could not possibly overhear and interview conducted elsewhere).

It should be noted that when the three categories of interviewers' evaluation of respondent embarrassment are included as controls, the significant association of the presence of someone during the interview and item non response is eroded (results not shown).

As a recommendation to survey agencies/social researchers, when it is possible to choose which indicator to collect, interviewer evaluation of respondents' embarrassment is more informative of item non response than the presence of someone else during the interview; while, if this latter is the only available measure of respondents' embarrassment, then, this is still informative of item missing data in paying for sex and overseas partner acquisition.

TABLE 9.26: The association of item non response and the presence of someone else during the interview, controlling for socio-demographic factors, all sexually active males.

Logistic regression model: Odds ratios				
Privacy of the interview setting	Item missing data for ever paid money for sex	Item missing data for overseas partner acquisition	Item missing data for unsafe sex	Item missing data for injected drug use
Presence of someone else during the interview and possible overheard	2.073* (0.818)	1.504 (0.424)	1.670 (0.591)	2.179** (0.857)
Presence of someone else during the interview and not possible overheard	1.143 (0.477)	1.038 (0.295)	1.162 (0.439)	1.243 (0.509)
Interview conducted elsewhere (e.g. car, garage)	1.853 (2.046)	3.519 (3.176)	1.139 (1.238)	1.875 (2.077)
Constant	0.038** (0.045)	0.029*** (0.023)	0.051*** (0.042)	0.047** (0.052)
N	4536	4536	4536	4536

* p<0.1, ** p<0.05, *** p<0.01

Base category: No one present during the interview.

Controls: Age, education, professional status, marital status, number of children, household size and residence in London.

Note: Standard error in parenthesis. Data are weighted to take into account the complex survey design.

Source: Analysis on Natsal-2.

As already argued, alternative measures of “embarrassment” may be used. In particular, embarrassment is stated by some respondents as a reason for not providing a urine sample. After controlling for socio-demographic factors, compared with respondents that gave any other reason for not providing a urine sample, we do not observe a different propensity to respond to the survey questions considered among sample members who reported embarrassment as the reason for not providing the urine sample (see TABLE 9.27).

As expected, compared to respondents who did report any reason but embarrassment for refusing to provide the urine sample, respondents who provided a urine sample have a lower propensity to have item missing data in all behaviours considered. I interpret this as the effect of a higher commitment to the survey, that leads both to the provision of the urine

sample, and to: a. the participation in the self completion section of the questionnaire, and b. answering the survey questions on paying for sex and risky behaviours (see TABLE 9.27).

TABLE 9.27: The association of item non response and provision of a urine sample, controlling for socio-demographic factors, all sexually active males.

Logistic regression model: Odds ratios				
Provision of the urine sample	Item missing data for ever paid money for sex	Item missing data for overseas partner acquisition	Item missing data for unsafe sex	Item missing data for injected drug use
Provided	0.101** (0.073)	0.361* (0.191)	0.161** (0.091)	0.112** (0.077)
Reason for not providing a urine sample: all but “embarrassment”	0.463 (0.292)	0.586 (0.337)	0.438 (0.263)	0.491 (0.299)
Constant	0.103 (0.219)	0.041* (0.073)	0.051 (0.097)	0.162 (0.321)
N	1964	1964	1964	1964

* p<0.1, ** p<0.05, *** p<0.01

Base category: Reason for not providing the urine sample: “embarrassment”.

Controls: Age, education, professional status, marital status, number of children, household size and residence in London.

Note: Standard error in parenthesis. Data are weighted to take into account the complex survey design.

Source: Analysis on Natsa-2.

9.3.4 MISSING COMPLETELY AT RANDOM AND RESPONDENT’S WILLINGNESS TO PARTICIPATE IN THE SURVEY

In the previous section we have tested the conditional association of respondents’ embarrassment with item non response in paying for sex and risky behaviours. Another factor that is expected to impact the propensity to give valid answers on the behaviours under study is the respondent’s commitment to the survey. In this section, we explore this further factor.

As recalled in section 9.3.3, the provision of a urine sample may be used as a proxy for respondent’s commitment to the survey. A more direct way to measure the respondents’ commitment to the survey is the interviewers’ opinion on the easiness to convince the respondent to take part in the survey. We now analyse the correlation of this factor with item non response on the behaviours under study (see TABLE 9.28).

After controlling for socio-demographic factors, compared with respondents that are “not at all difficult” to convince them to take part in the survey, those who are “fairly difficult” and “very difficult” to convince have a higher likelihood of item non response in all behaviours under study. For the behaviours paying for sex, unsafe sex and injected drug use, also respondents who are “not very difficult” to convince have a higher propensity of item non response compared with respondents who are “not at all difficult” to convince; while, for overseas partner acquisition, the effect is at the margin of the significance level for respondents labelled as “not very difficult” (p-value: 0.100). Also, for all behaviours under study, the likelihood of item non response increases at increasing levels of difficulty to convince the respondent to take part in the survey. To sum up, after controlling for socio-demographic factors, willingness to take part in the survey is informative of item non response in paying for sex and risky behaviours.

TABLE 9.28: The association of item non response and difficulty to convince the respondent to take part in the survey, controlling for socio-demographic factors, all sexually active males.

Logistic regression model: Odds ratios				
Difficulty in convincing the respondent to take part in the survey	Item missing data for ever paid money for sex	Item missing data for overseas partner acquisition	Item missing data for unsafe sex	Item missing data for injected drug use
Very difficult	6.629** (3.947)	3.090** (1.401)	5.502*** (2.748)	6.092** (3.591)
Fairly difficult	6.278*** (2.258)	2.280** (0.628)	2.905** (0.967)	5.545*** (1.95)
Not very difficult	2.868** (1.059)	1.525 (0.391)	2.352** (0.699)	2.539** (0.912)
Constant	0.026** (0.035)	0.025*** (0.021)	0.038*** (0.035)	0.035** (0.045)
N	4533	4533	4533	4533

* p<0.1, ** p<0.05, *** p<0.01

Base category: Not at all difficult.

Controls: Age, education, professional status, marital status, number of children, household size and residence in London.

Note: Standard error in parenthesis. Data are weighted to take into account the complex survey design.

Source: Analysis on Natsa-2.

9.3.5 SELECTING THE MOST INFORMATIVE PARADATA FOR ITEM NON RESPONSE

In the previous section we have shown that paradata on the respondents' embarrassment, willingness to take part in the survey and presence of other people (that may overhear) during the interview are associated to item non response, in some, if not all, of the behaviours under study. Thus, the collection of these paradata is recommendable as these factors are predictors of item non response. In this section, we assess which are the most informative factors for item non response in paying for sex and risky behaviours.

In fact, in some circumstances, the researcher may not be able to collect all the paradata presented here due to time and/or budget constraints. Moreover, these factors may measure the same underlying concepts; for example, the concept "embarrassment" may be measured by the "interviewer evaluation of the respondent's embarrassment", but also with the indicator of embarrassment as a reason for not providing a urine sample; moreover, the difficulty to convince the respondent to take part in the survey may be motivated not only by a low commitment to the survey but also by embarrassment, as the respondent may be reluctant to fill in the survey knowing that he will be asked questions about sexuality.

Identifying which, among these indicators, is the most informative of item non response may guide the social researcher/survey agency in choosing which the most appropriate paradata to be collected are, given the budget and time constraints. Thus, I test simultaneously for the association of different paradata with item non response in paying for sex and risky behaviours. After controlling for socio-demographic factors and for other measures of respondent's embarrassment, the interviewer evaluation of respondent embarrassment remains significantly associated with item non response in paying for sex and risky behaviours. Also, the higher the level of embarrassment, the higher the association with item non response. The effect is large and highly statistically significant.

Regarding the privacy of the interview situation, the presence of someone else who may overhear is marginally significantly associated with item non response in injected drug use, while the effect is eroded for the other factors once we control for other measures of the respondent's embarrassment.

Regarding the respondent's willingness to take part in the survey, the evidence is mixed. Once we control for other factors measuring embarrassment, the effect is eroded for

overseas partner acquisition. For the variables paying for sex and unsafe sex, compared to respondents who are not at all difficult to convince to participate in the survey, those who are very difficult to convince show a marginally significant higher likelihood of item non response. Also, for the variables paying for sex and risky behaviours respondents who were fairly difficult to convince have a significantly higher propensity to have item missing data.

Overall, embarrassment as a reason for refusing to take part in the survey is the indicator that is more highly and significantly associated with item non response in paying for sex and risky behaviours. Thus, in studying item non response in paying for sex and risky behaviours, it seems advisable to collect this indicator, if only one indicator can be collected due to time and budget constraints.

TABLE 9.29: The association of item non response and difficulty to convince the respondent to take part in the survey, controlling for socio-demographic factors, all sexually active males.

Logistic regression model: Odds ratios

	Item missing data for ever paid money for sex	Item missing data for overseas partner acquisition	Item missing data for unsafe sex	Item missing data for injected drug use
Level of respondent embarrassment				
Very embarrassed	17.770*** (10.52)	14.310*** (7.121)	10.290*** (6.682)	20.430*** (12.07)
Somewhat embarrassed	3.579** (1.622)	3.595*** (1.243)	4.139*** (1.654)	4.319** (1.961)
Only slightly embarrassed	2.325** (0.848)	2.726*** (0.675)	2.363** (0.743)	2.677** (0.983)
Privacy of the interview setting				
Presence of someone else and possible overheard	1.868 (0.762)	1.370 (0.396)	1.558 (0.565)	1.987* (0.816)
Presence of someone else and not possible overheard	1.133 (0.485)	1.025 (0.297)	1.156 (0.442)	1.236 (0.523)
Interview conducted elsewhere	1.574 (1.567)	3.509 (3.391)	0.969 (0.968)	1.637 (1.629)
Difficulty in convincing the respondent to take part in the survey				
Very difficult	2.791* (1.552)	1.304 (0.606)	2.419* (1.177)	2.364 (1.308)
Fairly difficult	3.221** (1.239)	1.180 (0.367)	1.513 (0.552)	2.638** (1.013)
Not very difficult	1.989* (0.770)	1.004 (0.288)	1.625 (0.501)	1.674 (0.635)
Constant	0.0186** (0.025)	0.0198*** (0.016)	0.0279*** (0.025)	0.0234** (0.030)
N	4532	4532	4532	4532

Base category: Not at all embarrassed; No one present during the interview; Not at all difficult. Controls: Age, education, professional status, marital status, number of children, household size and residence in London. Note: Standard error in parenthesis. Data are weighted to take into account the complex survey design. Source: Analysis on Natsa-2.

Once we restrict the analysis to hetero-sexually active employed members aged 26-44, we observe similar results in the conditional association of easiness to talk about sex and item non response in the behaviours under study (see TABLE 9.30). Also, results hold in this smaller subsample for the interviewer evaluation of the respondent's embarrassment, of the willingness to participate in the survey and the provision of a urine sample (see TABLE 9.31, 9.33, 9.34). However, the privacy of the interview situation is no longer statistically significant when associated with any of the behaviours under study (see TABLE 9.32). Finally, as in the larger subsample, comparing different paradata, the interviewer's evaluation of the respondent's embarrassment is the most significantly associated with item non response in all behaviours under study (see TABLE 9.35).

TABLE 9.30: The association of item non response and difficulty in talking about sex with parents around age 14, controlling for socio-demographic factors, hetero-sexually active employed males aged 26-44.

Logistic regression model: Odds ratios				
Ease with which sex was discussed with parents around age 14	Item missing data for ever money for sex	Item missing data for overseas partner acquisition	Item missing data for unsafe sex	Item missing data for injected drug use
Difficult	10.510** (11.810)	4.707** (3.489)	7.562** (6.636)	10.740** (12.090)
Did not discuss sex with parents	6.419* (6.495)	3.276* (2.036)	3.713* (2.831)	6.159* (6.244)
Varied/depended on topic		4.762 (5.280)	7.602* (9.139)	
Did not live more or less continuously to age 16 with both natural parents	5.767 (7.497)	7.152** (5.209)	2.196 (2.442)	5.665 (7.373)
Constant	0.009** (0.016)	0.009*** (0.012)	0.018** (0.024)	0.009** (0.017)
N	3342	3395	3395	3342

Base category: Easy with one parent or both

Controls: Age, education, professional status, marital status, number of children, household size and residence in London.

Note: Standard error in parenthesis. Data are weighted to take into account the complex survey design.

Source: Analysis on Natsa-2.

TABLE 9.31: The association of item non response and level of respondents' embarrassment, controlling for socio-demographic factors, hetero-sexually active employed males aged 26-44.

Logistic regression model: Odds ratios

Level of respondent embarrassment	Item missing data for ever paid money for sex	Item missing data for overseas partner acquisition	Item missing data for unsafe sex	Item missing data for injected drug use
Very embarrassed	41.890*** (27.780)	20.700*** (12.040)	15.910*** (11.87)	46.450*** (31.180)
Somewhat embarrassed	6.280*** (3.164)	3.717*** (1.255)	4.268*** (1.768)	6.637*** (3.369)
Only slightly embarrassed	3.469** (1.460)	3.055*** (0.858)	2.746** (0.932)	3.494** (1.508)
Constant	0.021** (0.037)	0.016*** (0.019)	0.031** (0.040)	0.022** (0.039)
N	3398	3398	3398	3398

* p<0.1, ** p<0.05, *** p<0.01

Base category: Not at all embarrassed.

Controls: Age, education, professional status, marital status, number of children, household size and residence in London.

Note: Standard error in parenthesis. Data are weighted to take into account the complex survey design.

Source: Analysis on Natsa-2.

TABLE 9.32: The association of item non response and presence of someone else during the interview, controlling for socio-demographic factors, hetero-sexually active employed males aged 26-44.

Logistic regression model: Odds ratios				
Privacy of the interview setting	Item missing data for ever paid money for sex	Item missing data for overseas partner acquisition	Item missing data for unsafe sex	Item missing data for injected drug use
Presence of someone else during the interview and possible overheard	1.978 (0.954)	1.574 (0.525)	1.680 (0.712)	1.870 (0.911)
Presence of someone else during the interview and not possible overheard	1.038 (0.522)	1.095 (0.374)	1.283 (0.578)	0.921 (0.481)
Interview conducted elsewhere (e.g. car, garage)	2.352 (2.669)	0.826 (0.905)	1.419 (1.585)	2.400 (2.734)
Constant	0.032** (0.043)	0.021*** (0.024)	0.038** (0.044)	0.032** (0.045)
N	3399	3399	3399	3399

* p<0.1, ** p<0.05, *** p<0.01

Base category: No one present during the interview.

Controls: Age, education, professional status, marital status, number of children, household size and residence in London.

Note: Standard error in parenthesis. Data are weighted to take into account the complex survey design.

Source: Analysis on Natsa-2.

TABLE 9.33: The association of item non response and provision of a urine sample, controlling for socio-demographic factors, hetero-sexually active employed males aged 26-44.

Logistic regression model: Odds ratios				
Provision of the urine sample	Item missing data for ever paid money for sex	Item missing data for overseas partner acquisition	Item missing data for unsafe sex	Item missing data for injected drug use
Provided	0.102** (0.071)	0.411 (0.237)	0.177** (0.105)	0.102** (0.071)
Reason for not providing a urine sample: all but “embarrassment”	0.415 (0.300)	0.585 (0.366)	0.405 (0.272)	0.415 (0.300)
Constant	0.146 (0.344)	0.021* (0.046)	0.050 (0.110)	0.146 (0.344)
N	1495	1495	1495	1495

* p<0.1, ** p<0.05, *** p<0.01

Base category: Reason for not providing the urine sample: “embarrassment”.

Controls: Age, education, professional status, marital status, number of children, household size and residence in London.

Note: Standard error in parenthesis. Data are weighted to take into account the complex survey design.

Source: Analysis on Natsa-2.

TABLE 9.34: The association of item non response and difficulty to convince the respondent to take part in the survey, controlling for socio-demographic factors, hetero-sexually active employed males aged 26-44.

Logistic regression model: Odds ratios				
Difficulty in convincing the respondent to take part in the survey	Item missing data for ever paid money for sex	Item missing data for overseas partner acquisition	Item missing data for unsafe sex	Item missing data for injected drug use
Very difficult	9.674*** (6.136)	3.743** (1.815)	7.230*** (3.763)	9.577*** (6.099)
Fairly difficult	7.876*** (3.349)	2.657** (0.822)	3.355** (1.250)	7.866*** (3.350)
Not very difficult	3.788** (1.623)	1.664* (0.502)	2.420** (0.811)	3.498** (1.528)
Constant	0.014** (0.022)	0.017*** (0.020)	0.024** (0.030)	0.014** (0.024)
N	3396	3396	3396	3396

* p<0.1, ** p<0.05, *** p<0.01

Base category: Not at all difficult.

Controls: Age, education, professional status, marital status, number of children, household size and residence in London.

Note: Standard error in parenthesis. Data are weighted to take into account the complex survey design.

Source: Analysis on Natsa-2.

TABLE 9.35: The association of item non response and difficulty to convince the respondent to take part in the survey, controlling for socio-demographic factors, hetero-sexually active employed males aged 26-44.

Logistic regression model: Odds ratios				
	Item missing data for ever paid money for sex	Item missing data for overseas partner acquisition	Item missing data for unsafe sex	Item missing data for injected drug use
Level of respondent's embarrassment				
Very embarrassed	19.130*** (11.990)	15.480*** (8.720)	9.128** (6.245)	21.660*** (13.790)
Somewhat embarrassed	3.022** (1.654)	2.965** (1.216)	2.638** (1.201)	3.231** (1.797)
Only slightly embarrassed	2.421** (1.048)	2.842*** (0.816)	2.189** (0.773)	2.480** (1.098)
Privacy of the interview setting				
Presence of someone else and possible overheard	1.715 (0.854)	1.386 (0.475)	1.568 (0.685)	1.606 (0.807)
Presence of someone else and not possible overheard	1.004 (0.527)	1.053 (0.371)	1.268 (0.588)	0.876 (0.475)
Interview conducted elsewhere	1.814 (1.737)	0.722 (0.742)	1.115 (1.076)	1.908 (1.848)
Difficulty in convincing the respondent to take part in the survey				
Very difficult	4.055** (2.492)	1.708 (0.863)	3.716** (1.887)	3.850** (2.375)
Fairly difficult	4.020** (1.835)	1.445 (0.512)	2.034* (0.809)	3.907** (1.799)
Not very difficult	2.659** (1.209)	1.130 (0.386)	1.810* (0.645)	2.427* (1.124)
Constant	0.011** (0.019)	0.012*** (0.015)	0.019** (0.024)	0.011** (0.021)
N	3395	3395	3395	3395

Base category: Not at all embarrassed; No one present during the interview; Not at all difficult.

Controls: Age, education, professional status, marital status, number of children, household size and residence in London. Note: Standard error in parenthesis. Data are weighted to take into account the complex survey design. Source: Analysis on Natsa-2.

9.3.6 FINAL REMARKS: THE MISSING COMPLETELY AT RANDOM HYPOTHESIS FOR PAYING FOR SEX AND RISKY BEHAVIOURS

In this section, I sum up the evidence described in the previous pages and derive the conclusion. In the methodological section, we have hypothesized that item non response in paying for sex and risky behaviours are correlated with: 1. respondents' socio-demographic factors (HYPOTHESIS 2.1) and 2. with respondents' embarrassment, privacy of the interview situation, and respondents' commitment to the survey (HYPOTHESIS 2.2). In this section, we found support for both hypotheses, for the subsample of sexually active males. While for the subsample of hetero-sexually active males we did find a conditional association of respondent's socio-demographic characteristics, respondent's embarrassment and commitment to the survey with item non response in paying for sex and risky behaviours, but we did not find an association between the privacy of the interview situation and item missing data in all behaviours under study.

Overall, item missing data is not Missing Completely At Random for any of the behaviours under study. We conclude that item missing data is either Missing At Random or Missing Not At Random, and we acknowledge the impossibility of testing empirically which of these two missing data types applies to this situation.

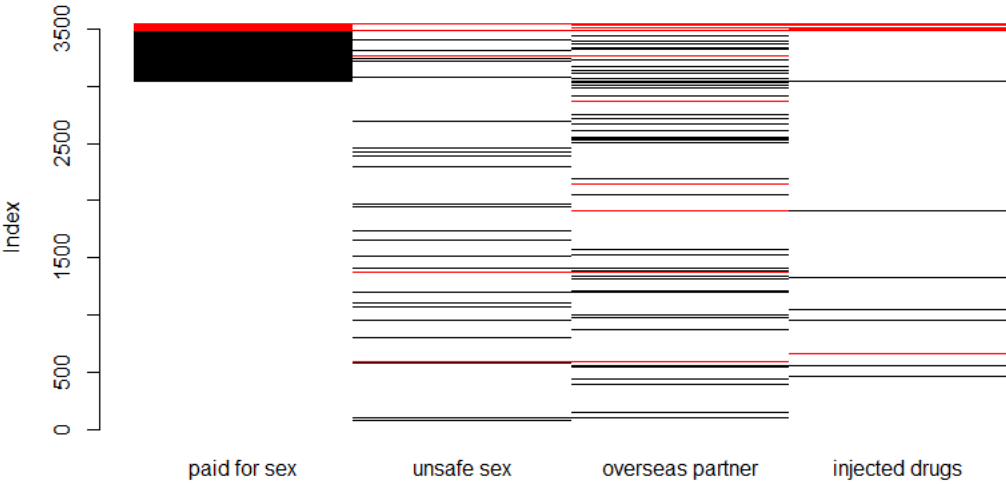
9.4 THE MISSING DATA PATTERN

In this section I test HYPOTHESIS 3, i.e. the propensity to produce valid answers varies across the variables considered: paying for sex, unsafe sex, overseas partner acquisition, and injected drug use. In order to test this hypothesis, I explore the missing data patterns. More specifically, the distribution of the incomplete information, the structure of the missing values and the relation of missing values with available information are explored using visualization techniques, as suggested in the literature (see Templ, Alfons, and Filzmoser, 2011). More specifically, I adopt the histogram, spinogram and matrix plot for missing data in the MIV R package.

The FIGURE 9.19 shows the missing data pattern for paying for sex and risky behaviours sorted by paying for sex. All variables shown are dummy variables taking values 1 or 0. The red lines represent missing values, the black lines represent a 1 answer (the respondent engaging in the socially undesirable behaviours) and the white lines represent a 0 (the respondents reporting they did not engaged in the socially undesirable behaviour). The observations are sorted according to the value assumed in the variable paying for sex: i.e. the first group of observations have value missing on paying for sex, the second group of observations has value 1 for the variable paying for sex and the third group has value 0 for the variable paying for sex. The sorting is equal for all the variables considered. Thus, for example, the first row represents observation 1 for all variables, the second observation 2 for all variables, *etc.*

As we can see from the FIGURE 9.19, most item missing data are common to the four variables. In fact, the red area is similar in most variables. Some of these observations are sample members that did not take part in the self completion section of the questionnaire. Regarding the relation of missing values with available information, none of the respondents having a missing value in paying for sex reported a socially undesirable behaviour in the other items.

FIGURE 9.19: missing data in paying for sex and risky behaviours



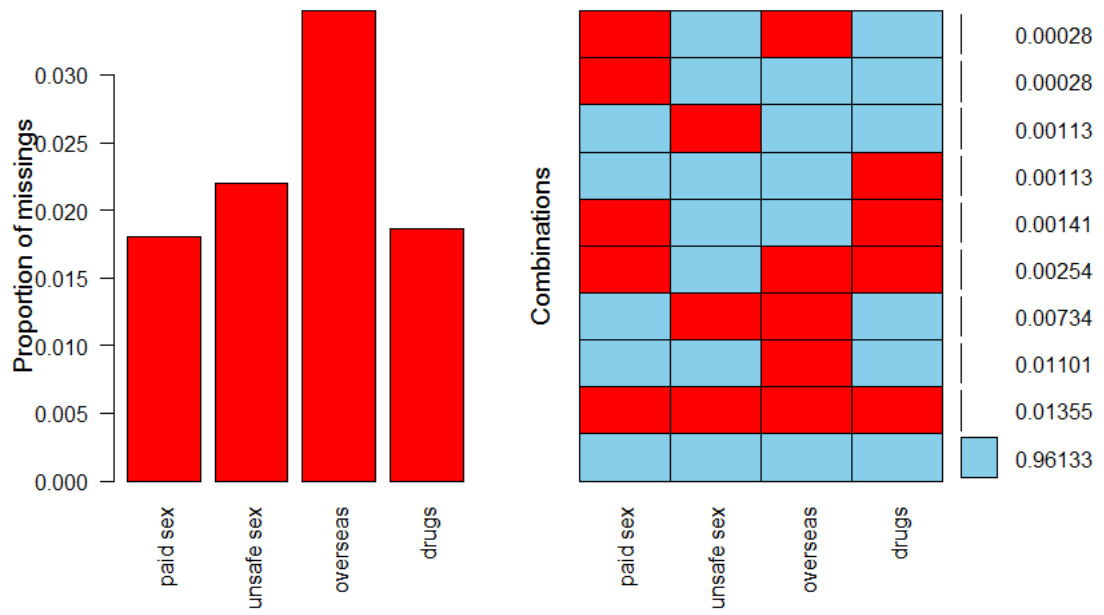
Source: Analysis on Natsal-2 data

FIGURE 9.20 (left side) shows the prevalence of missing data in the four behaviours under study. As previously recalled, the higher missing data is overseas partner acquisition, followed by unsafe sex, injected drug use, and lastly by paying for sex.

The right part of FIGURE 9.20 shows the missing data pattern; the light blue squares represent observed data, while the red squares represent missing data. The squares on the extreme right indicate the proportion of each pattern.

Starting from the bottom, the most frequent missing data pattern is a situation where values are observed for all variables; this situation happens in 96.13% of cases; the second most frequent data pattern is characterized by all variables reporting missing data (i.e. 1.36% of cases); this situation is likely to be driven by those respondents skipping the self completion section of the questionnaire. Finally, the third most common pattern (1.10%) is characterized by overseas partner acquisition as the only missing value: indeed, this variable has the higher fraction of item missing data compared to the other variables in the analysis.

FIGURE 9.20: missing data pattern, paying for sex and risky behaviours



Source: Analysis on Natsal-2 data

9.5 COMPARING MULTIPLE IMPUTATION AND *LISTWISE* DELETION

In this section I test the fourth hypothesis (HYPOTHESIS 4)¹⁴⁹ imputing item missing data and re-estimating the model from Della Giusta *et al.* (2014).

In this section, firstly, I describe the original model by Della Giusta *et al.* (2014) and show whether the proposed modifications – presented in the methodological chapter – change the empirical results (section 9.5.1). Secondly, I assess the convergence of the imputation model (section 9.5.2). Thirdly, I compare imputed and observed values in order to test research HYPOTHESIS 4 (section 9.5.3). Fourthly, I compare the models' estimates using *listwise* deletion versus multiple imputation, and test research HYPOTHESIS 5 (section 9.5.4).

9.5.1 THE PROPOSED MODIFICATIONS TO THE MODEL BY DELLA GIUSTA *ET AL.* (2014)

As recalled in the methods section, I propose some modification to the model. Firstly, I modify the definition of the set of dummy variables “unskilled”.¹⁵⁰ This is because the inclusion of respondents with a socio-economic status “unclassifiable, army and other” in the reference category “unskilled” may have driven the results of the socio-economic status variables.

More specifically, the group of respondents labelled as “unskilled, unclassifiable, army, other” is composed for the 85% by “unskilled” respondents and for the 15% (21 observations) by respondents labelled as “unclassifiable, army, other”¹⁵¹. The prevalence of paying for sex within the group “unclassifiable, army and other” is 47.3% (95% C.I.: 28.9 – 66.4); this is significantly higher from the prevalence in the group of “unskilled” respondents, i.e. 8.9% (95% C.I.: 5.4 – 14.2) and from the whole subsample under analysis, i.e. 11.3% (95% C.I. 10.2 – 12.5)¹⁵².

¹⁴⁹ Hypothesis 4: The prevalence of paying for sex and risky behaviours is higher among the respondents with item missing values compared with the prevalence among the observed values.

¹⁵⁰ In Della Giusta *et al.* (2014) the reference category for socio-economic status is “unskilled, unclassifiable, army, other”. Indeed, in the paper the broader term “unskilled” is used to define the reference category (but it actually includes also unclassifiable, army and other). Also, the sample selection includes only employed males (i.e. unemployed and inactive males are out of the analysis.).

¹⁵¹ Percentages are weighted to take into account of the complex survey design.

¹⁵² All percentages are weighted to take into account of the complex survey design.

To understand whether the inclusion of respondents in the unskilled reference category influences the results, I run the model under two different specifications. Firstly, I use “unskilled” only as a reference category, excluding from the analysis the category “unclassifiable/army/other” – with a loss of sample size of 21 cases. In this scenario the dummy variables for socio-economic status are not anymore significant at standard significance levels ($p\text{-value} < 0.10$). Result from the original model by Della Giusta *et al.* (2014) and this different specification are presented in TABLE 9.34 and 9.35¹⁵³.

Secondly, I run the model using “unskilled” as a reference category and including the category “unclassifiable/army/other” as a covariate: in this scenario, having a socio-economic status labelled as “unclassifiable/army/other” increases the probability to pay for sex of 16% compared to unskilled respondents ($p\text{-value} 0.008$), while higher socio-economic status do not have a significantly different propensity to pay for sex compared to the base category of unskilled respondents (see TABLE 9.36).

To sum up, the evidence that higher socio-economic status is correlated with lower paying for sex as a consequence of stigma is not robust to changes in the reference category. On the contrary it is driven by the strong positive correlation of the category “unclassifiable, army, other” with paying for sex, which was included in the base category.

From a substantive point of view, this result shows that paying for sex is highly reported in the category “unclassifiable, army, other”. Data are not available to further disentangle the three groups; from a substantive point of view, a higher prevalence of paying for sex among males enrolled in the army would be consistent with the anecdotal idea that the unavailability of “free” sex may drive the demand for paid sex (Holzman and Pines, 1982 as reported in Serughetti, 2013). Further research may investigate in samples larger in size and more detailed on economic status whether the share of paying for sex is higher within the army. Such research may be useful in guiding targeted interventions addressed to this group.

¹⁵³ Consistently with Della Giusta *et al.* (2014) results are reported as coefficients as well as marginal effects. Marginal effects represent how much the (conditional) probability of paying for sex changes changing the value of a regressor, holding all other regressors constant.

TABLE 9.34: The correlation of paying for sex with risky behaviours, Della Giusta *et al.* (2014)

Probit model				
Dependent variable: ever paid for sex	Coeff.	Std. Err.	Marginal Effect	Std. Err.
Age	0.025***	0.007	0.005***	0.001
Number of children	-0.077**	0.031	-0.014**	0.006
Education (base category: no education)				
Degree	0.398***	0.117	0.083***	0.027
A-level	0.451***	0.121	0.104***	0.033
O-level	0.226**	0.095	0.043**	0.019
Professional status (b.c.: unskilled, unclassifiable army other)				
Professional/managerial	-0.484***	0.175	-0.071***	0.019
Technical/managerial	-0.385***	0.143	-0.067***	0.023
Skilled manual or non-manual	-0.324**	0.134	-0.059**	0.024
Partly skilled	-0.216	0.152	-0.037	0.023
Risky behaviors				
Partner outside UK in the last 5 years	0.655***	0.078	0.160***	0.023
Unsafe het. sex in last year	0.320***	0.106	0.071***	0.027
Currently a smoker	0.114*	0.065	0.022*	0.013
Ever injected drugs or other substances	0.323**	0.147	0.072*	0.038
High or medium alcohol consumption	0.197**	0.082	0.040**	0.018
Free sex				
Number of occasions of het. sex in last 4 weeks	-0.012**	0.005	-0.002**	0.001
Number of new het. sex partners, last year	0.054***	0.013	0.010***	0.003
Married or cohabiting or previously married	-0.081	-0.081	-0.081	-0.081
Conservative opinions/religion				
Belongs to any religion now	0.083	0.063	0.016	0.012
Sex before marriage always, mostly or sometimes wrong ¹⁵⁴	-0.009	0.097	-0.002	0.018
Sex between 2 men always, mostly or sometimes wrong ¹⁵⁵	0.035	0.066	0.007	0.012
Abortion always or mostly wrong ¹⁵⁶	-0.032	0.072	-0.006	0.013
Age at first het. Intercourse (b. c.: 16-17)				
Aged 13-15	0.266***	0.077	0.054***	0.017
Aged 18-19	0.025	0.087	0.005	0.017
Aged 20+	0.039	0.097	0.007	0.019
Constant	-2.170***	0.281		
Number of Obs.	3084			
Pseudo R squared	0.096			
LR Chi2(24)	228.5			

* p<0.1, ** p<0.05, *** p<0.01; Source: Dalla Giusta *et al.* (2014)¹⁵⁴ Versus rarely wrong, not wrong at all, depends/don't know¹⁵⁵ Versus rarely wrong, not wrong at all, depends/don't know¹⁵⁶ Versus sometimes wrong, rarely wrong, not wrong at all, depends/don't know

TABLE 9.35: The correlation of paying for sex with risky behaviours, excluding sample members with socio-economic status labelled as: “unclassifiable, army, other”

Probit model				
Dependent variable: ever paid for sex	Coeff.	Std. Err.	Marginal Effect	Std. Err.
Age	0.025***	0.007	0.005***	0.001
Number of children	-0.079**	0.031	-0.015**	0.006
Education (base category: no education)				
Degree	0.373***	0.117	0.070***	0.022
A-level	0.406***	0.122	0.076***	0.023
O-level	0.202**	0.096	0.038**	0.018
Professional status (b.c.: “unskilled”)				
Professional/managerial	-0.308	0.190	-0.058	0.036
Technical/managerial	-0.208	0.161	-0.039	0.030
Skilled manual or non-manual	-0.152	0.153	-0.029	0.029
Partly skilled	-0.051	0.169	-0.010	0.032
Risky behaviors				
Partner outside UK in the last 5 years	0.635***	0.079	0.120***	0.015
Unsafe het. sex in last year	0.350***	0.106	0.066***	0.020
Currently a smoker	0.116*	0.065	0.022*	0.012
Ever injected drugs or other substances	0.307**	0.148	0.058*	0.028
High or medium alcohol consumption	0.194**	0.082	0.036**	0.015
Free sex				
Number of occasions of het. sex in last 4 weeks	-0.011**	0.005	-0.002**	0.001
Number of new het. sex partners, last year	0.055***	0.013	0.010***	0.003
Married or cohabiting or previously married	-0.101	0.079	-0.019	0.015
Conservative opinions/religion				
Belongs to any religion now	0.080	0.064	0.015	0.012
Sex before marriage always, mostly or sometimes wrong	-0.012	0.097	-0.002	0.018
Sex between 2 men always, mostly or sometimes wrong	0.022	0.067	0.004	0.013
Abortion always or mostly wrong	-0.008	0.072	-0.001	0.014
Age at first het. Intercourse (b. c.: 16-17)				
Aged 13-15	0.261***	0.078	0.049***	0.015
Aged 18-19	0.027	0.087	0.005	0.016
Aged 20+	0.030	0.097	0.006	0.018
Constant	-2.307***	0.289		
Number of Obs.	3063			
Pseudo R squared	0.094			
LR Chi2(24)	219.81			

* p<0.1, ** p<0.05, *** p<0.01

TABLE 9.36: The correlation of paying for sex with risky behaviours, including the covariate socio economic status: “Unclassifiable, army, other”

Probit model				
Dependent variable: ever paid for sex	Coeff.	Std. Err.	Marginal Effect	Std. Err.
Age	0.025***	0.007	0.005***	0.001
Number of children	-0.073**	0.031	-0.014**	0.006
Education (base category: no education)				
Degree	0.379***	0.117	0.072***	0.022
A-level	0.422***	0.121	0.080***	0.023
O-level	0.202**	0.096	0.038**	0.018
Professional status (b.c.: unskilled)				
Professional/managerial	-0.312	0.190	-0.059	0.036
Technical/managerial	-0.211	0.161	-0.040	0.031
Skilled manual or non-manual	-0.153	0.153	-0.029	0.029
Partly skilled	-0.049	0.169	-0.009	0.032
Unclassifiable, army, other	0.860***	0.323	0.163***	0.061
Risky behaviors				
Partner outside UK in the last 5 years	0.642***	0.078	0.122***	0.015
Unsafe het. sex in last year	0.322***	0.106	0.061***	0.020
Currently a smoker	0.121*	0.065	0.023*	0.012
Ever injected drugs or other substances	0.319**	0.147	0.060**	0.028
High or medium alcohol consumption	0.204**	0.082	0.039**	0.015
Free sex				
Number of occasions of het. sex in last 4 weeks	-0.013**	0.005	-0.002**	0.001
Number of new het. sex partners, last year	0.054***	0.013	0.010***	0.003
Married or cohabiting or previously married	-0.098	0.078	-0.019	0.015
Conservative opinions/religion				
Belongs to any religion now	0.083	0.063	0.016	0.012
Sex before marriage always, mostly or sometimes wrong	-0.013	0.097	-0.003	0.018
Sex between 2 men always, mostly or sometimes wrong	0.030	0.066	0.006	0.013
Abortion always or mostly wrong	-0.020	0.072	-0.004	0.014
Age at first het. Intercourse (b. c.: 16-17)				
Aged 13-15	0.261***	0.077	0.049***	0.015
Aged 18-19	0.029	0.087	0.006	0.016
Aged 20+	0.042	0.097	0.008	0.018
Constant	-2.301	0.288		
Number of Obs.	3084			
Pseudo R squared	0.0991			
LR Chi2(24)	235.56			

* p<0.1, ** p<0.05, *** p<0.01

As already recalled in previous chapters, the analysis runs only on hetero-sexually active men. Indeed, the authors include in the analysis the variable “age at first heterosexual intercourse”, excluding sample members not having had ever an heterosexual intercourse, and those having had an heterosexual intercourse before age 13 and not ever since. It should be noticed that few of these sample members reported paying for homoerotic sex (i.e. paying for sex a male sex worker). Including this further category in the model, the added category did not resulted statistically significantly associated with paying for sex.

In Della Giusta *et al.* (2014) a minor lapse in coding determined that men with 9 sexual intercourses in the last 4 weeks are excluded from the sample (68 observations, of which 50 in the estimated sample); also men with 9 new heterosexual partners in the last year are not considered in the analysis (13 observations of which only 9 in the estimated sample). Including these observations in the sample, the sample size increases by 56 units. This lapse has minor effects on the estimates, the coefficients change slightly but keep the same sign and approximately the same magnitude. Most p-values remain in the same ranges¹⁵⁷.

Regarding the variable measuring smoking, from this replication study it seems that the variable used in the analysis is “currently being a smoker” (rather than “ever a smoker” as reported in the text). However, when I run the analysis on smokers in the lifetime, I find that coefficients are unchanged until the third decimal and that the significance level is unchanged. As “currently been a smoker” seems to capture better the current risky behaviour, the rest of the analysis is conducted with this variable, consistently with the analysis by Della Giusta *et al.*, 2014.

Regarding drug use, the variable used in the analysis and reported in the text is injected drugs. Injected drug use is a risky behaviour for the diffusion of sexually transmissible diseases, as detailed in the introductory chapters. However, injection of nonprescribed drugs may be a more precise indicator of the use of a propensity toward risk. If this latter variable is used in the analysis, the coefficient is larger (more correlated with paying for sex) and more significant (p-value 0.015 *versus* 0.028).

To sum up, in comparison with the original specification by Della Giusta *et al.* (2014) the modified analysis: i. models respondent’s socio-economic status including “unclassifiable,

¹⁵⁷ With the exception of “age at first sexual intercourse: 13-15” that with the larger sample size has a p-value<0.001 (vs. p-value=0.001 previously estimated).

army, other” as a covariate, together with “professional/managerial”, “technical/managerial”, “skilled, manual or non-manual” and “partly skilled” with base category “unskilled”; ii. model the risky behaviour of injected drug use as “unprescribed” injected drug use; iii. includes respondents with 9 sexual intercourses in the last 4 weeks and with 9 new heterosexual partners in the last year; iv. I adopt weights to control for the complex survey design. Results are shown in TABLE 9.37.

Overall, once all the proposed modifications are taken into account simultaneously, the two models differ in: i. the association of paying for sex with the professional status variables; ii. the association of the educational variables with paying for sex; iii. the association of belonging to any religion with paying for sex; iv. the association of drug use with paying for sex, due to the use of a different measure.

More specifically, firstly, only the professional status “unclassifiable, army, other” is significantly and positively associated with paying for sex in comparison to the reference category “unskilled”.

Secondly, the conditional association of paying for sex and the educational variables (degree and a-level) in comparison with the reference category “no education” is milder – coefficients are smaller and less significant; also, the category “educational level: o-level” is no longer significantly associated with paying for sex, with the different model specification.

Thirdly, in the modified model, belonging to any religion is associated with paying for sex (marginal effect: 0.025, p-value 0.048).

Moreover, the measure “ever injected nonprescribed drugs” – instead of “ever injected drugs or other substances” – is significantly and positively associated with paying for sex (marginal effect:0.091, p-value: 0.011). If, in this modified model, we adopt the measure “ever injected drugs or other substances” the effect is smaller and less significant – marginal effect: 0.062, p-value: 0.043 (result not shown).

TABLE 9.37: The correlation of paying for sex with risky behaviours, modified model

Probit model				
Dependent variable: ever paid for sex	Coeff.	Std. Err.	Marginal Effect	Std. Err.
Age	0.026***	0.008	0.004***	0.001
Number of children	-0.073**	0.034	-0.012**	0.006
Education (base category: no education)				
Degree	0.225*	0.135	0.038*	0.023
A-level	0.334**	0.137	0.057**	0.023
O-level	0.138	0.104	0.023	0.018
Professional status (b.c.: no skilled)				
Professional/managerial	-0.024	0.201	-0.004	0.034
Technical/managerial	0.035	0.172	0.006	0.029
Skilled manual or non-manual	0.036	0.157	0.006	0.027
Partly skilled	0.123	0.174	0.021	0.030
Unclassifiable, army	1.096***	0.278	0.187***	0.047
Risky behaviors				
Partner outside UK in the last 5 years	0.671***	0.093	0.114***	0.016
Unsafe het. sex in last year	0.426***	0.127	0.072***	0.021
Currently a smoker	0.119*	0.072	0.020*	0.012
Ever injected non prescribed drugs	0.535**	0.211	0.091**	0.036
High or medium alcohol consumption	0.194**	0.096	0.033**	0.016
Free sex				
Number of occasions of het. sex in last 4 weeks	-0.012*	0.006	-0.002*	0.001
Number of new het. sex partners, last year	0.055**	0.028	0.009**	0.005
Married or cohabiting or previously married	-0.119	0.089	-0.020	0.015
Conservative opinions/religion				
Belongs to any religion now	0.145**	0.074	0.025**	0.012
Sex before marriage always, mostly or sometimes wrong	-0.079	0.104	-0.013	0.018
Sex between 2 men always, mostly or sometimes wrong	-0.011	0.070	-0.002	0.012
Abortion always or mostly wrong	-0.104	0.085	-0.018	0.015
Age at first het. Intercourse (b. c.: 16-17)				
Aged 13-15	0.238***	0.088	0.040***	0.015
Aged 18-19	-0.054	0.099	-0.009	0.017
Aged 20+	0.037	0.104	0.006	0.018
Constant	-2.462	0.332		
Number of Obs.		3140		

* p<0.1, ** p<0.05, *** p<0.01; Natsal Data; Data are weighted to take into account of the complex survey design

9.5.2 ASSESSING CONVERGENCE OF THE IMPUTATION MODEL

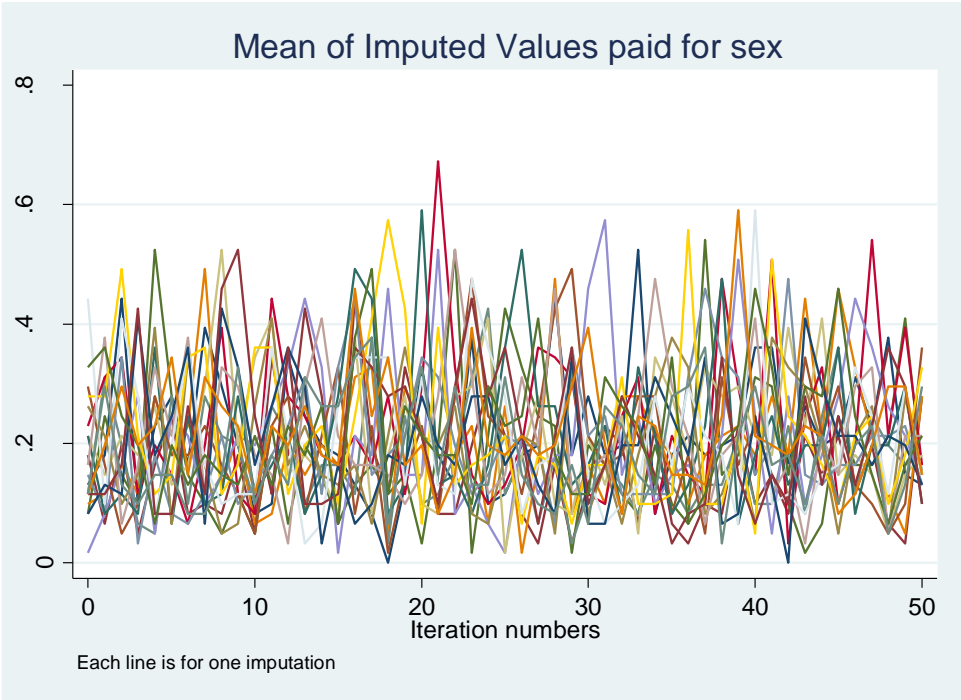
As recalled in the methodological section, I conducted 50 iterations, and generated 20 imputed datasets¹⁵⁸. Numerical variables are imputed with predictive mean matching, while dummy variables are imputed with logistic regression.

Regarding convergence, Van Buuren and Roothuis-Oudshoorn (2011:37) state that “on convergence, the different streams should be freely intermingled with each other, without showing any definite trends”. Also “convergence is diagnosed when the variance between different sequences is no larger than the variance with each individual sequence” (Van Buuren and Roothuis-Oudshoorn, 2011:37).

From FIGURE 9.21 – 9.25, we see that the different streams are intermingled with each other; they do not show any definite trend and the variance between the different sequences do not seem higher than the variance within any sequence. However, the final values after 50 iterations seem as far from each other as the initial values, reflecting the uncertainty of the estimates.

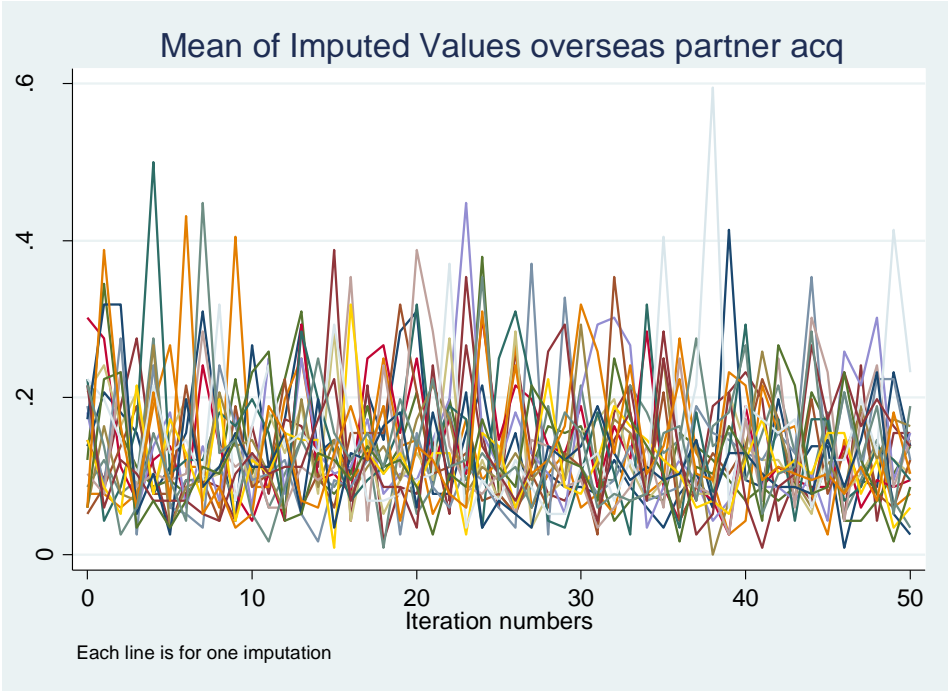
¹⁵⁸ Should the reader want to replicate the results from the analysis, the initial seed is set at 27654.

FIGURE 9.21: Convergence of the imputation model for paying for sex, with 50 iterations, 20 multiply imputed datasets



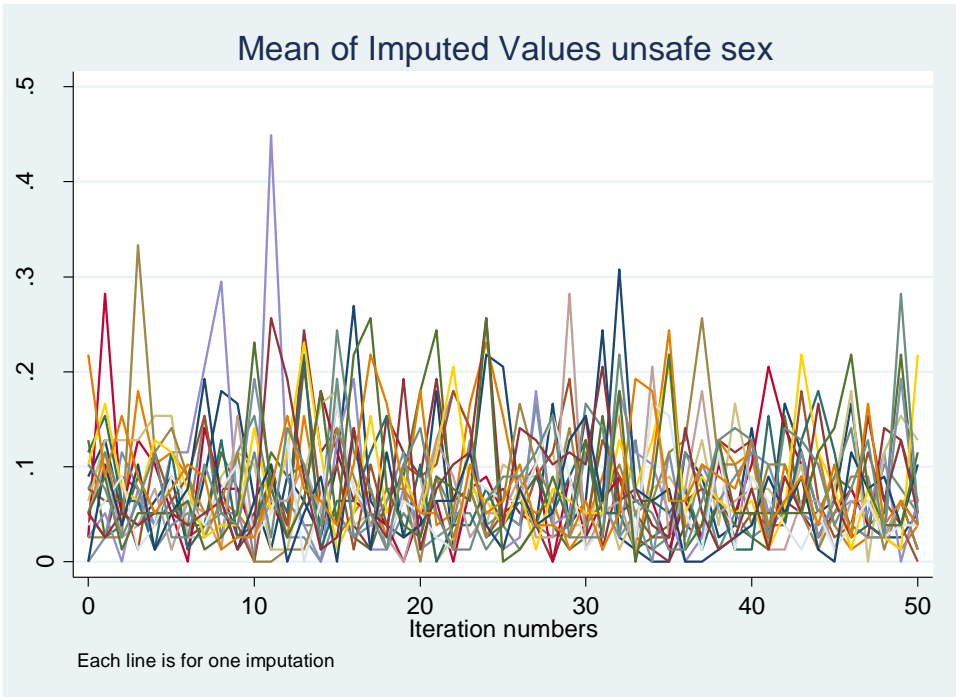
Source: Analysis on Natsal-2 data

FIGURE 9.22: Convergence of the imputation model for overseas partner acquisition, with 50 iterations, 20 multiply imputed datasets



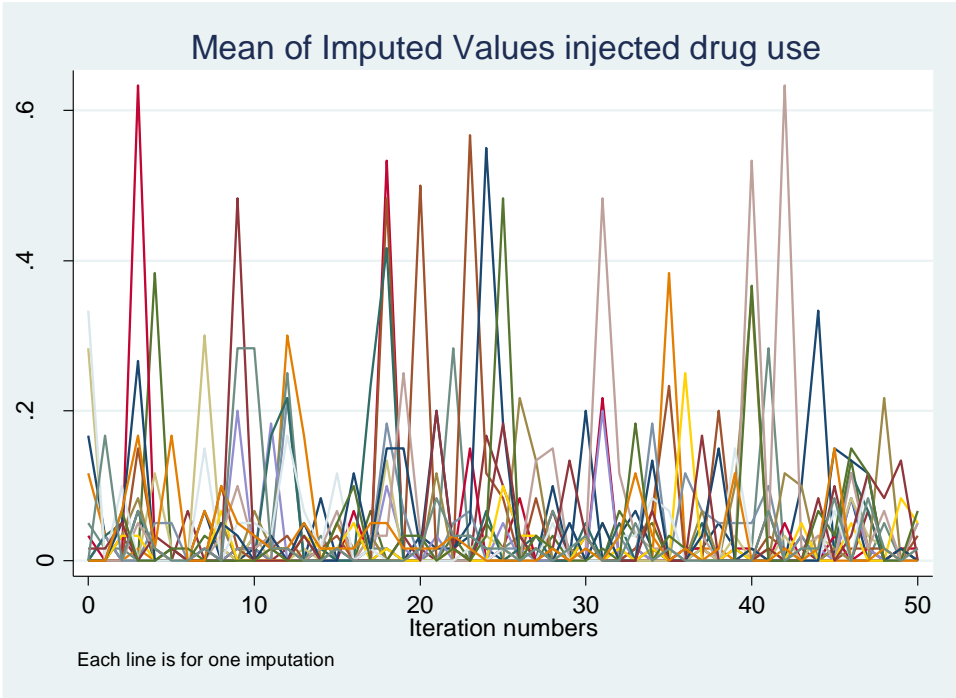
Source: Analysis on Natsal-2 data

FIGURE 9.23: Convergence of the imputation model unsafe sex, with 50 iterations, 20 multiply imputed datasets



Source: Analysis on Natsal-2 data

FIGURE 9.24: Convergence of the imputation model injected drug use, with 50 iterations, 20 multiply imputed datasets



Source: Analysis on Natsal-2 data

9.5.3 COMPARING IMPUTED WITH OBSERVED VALUES

Comparing the distribution of observed values with the distribution of imputed values may give an idea of whether the imputation models produced reasonable values for the missing data (van Buuren and Groothuis-Oudshoorn, 2015). It should be noted that the two distributions are not expected to coincide, as the data are not MCAR. Conversely, if the missing mechanism is due to social (un)desirability, and if the imputation model is correctly specified, I would expect to observe a significantly higher prevalence of socially undesirable behaviours in the imputed values compared with the observed values.

Regarding paying for sex (TABLE 9.42, APPENDIX 1), across different imputations the estimated prevalence of paying for sex in imputed values varies widely, from a maximum of 37.37% (95% C.I. 22.62 – 52.11%) to a minimum of 8.27%. (95% C.I. 1.18 – 15.36%). Also confidence intervals are particularly large. The evidence that the estimated prevalence of paying for sex varies widely across different multiply imputed datasets reinforces the idea that multiple imputation is preferred to single imputation in this context.

Comparing observed and imputed values, in four multiply imputed datasets the imputed values for paying for sex are significantly higher than the observed values. Thus, in all cases in which imputed values are different from observed values, the prevalence of the socially undesirable behaviour is larger in the imputed data, compared with the observed data.

The pooled estimate for the imputed values is 17.15% (95% C.I. -6.58 – 40.87) *versus* 11.31% (95% C.I. 10.13 – 12.49) for the observed values. Thus, the two pooled estimates are not statistically different. Overall, the pooled estimate for the complete data (imputed and observed) of men who pay for sex, among hetero-sexually active employed males is 11.39% (95% C.I. 10.19 – 12.58); see TABLE 9.38.

Regarding overseas partner acquisition (TABLE 9.43, APPENDIX 1), as in the case of paying for sex, we observe that estimates vary widely across different imputations; considering the imputed values only they range from 15.85% (95% C.I. 9.15 – 22.54%.) to 2.29% (95% C.I. -0.42 – 5.00%). In four multiply imputed datasets, the prevalence of overseas partner acquisition is significantly lower compared to the prevalence in the observed data.

The pooled estimate of the prevalence of overseas partner acquisition in multiply imputed values is 9.54% (95% C.I. -1.46 – 20.54) *versus* 11.22% (95% C.I. 10.01– 12.43) in

the observed values; thus, the two estimates are not statistically different. Overall, the pooled prevalence of overseas partner acquisition considering both observed and imputed data is: 11.18% (C.I. 9.96 – 12.39); see TABLE 9.38.

For unsafe sex and injected drug use (TABLE 9.44 – 9.45, APPENDIX 1) some multiply imputed datasets lead to “no” outcomes only (i.e. dummy variable assuming value 0), for all imputed values – meaning not having had unsafe sex and not having had used injected drugs on all imputed values; this happens in one imputation in unsafe sex (i.e. imputation 9), and in most imputations for injected drug use (imputations: 1-5, 10-12, 15-17, and 19). Again, this evidence suggests the need for multiple imputation instead of single imputation, in this context.

For unsafe sex, the estimates in the different datasets range from 19.92% (95% C.I. 10.63 – 29.21) to 0. Thus, also in this case we observe a strong variability across the multiple imputed datasets. Considering only datasets where not all missing values are set to 0, in 5 circumstances, imputed values are statistically different compared with observed values. The evidence is mixed, as for some datasets we observed a higher prevalence of the socially undesirable behaviour in the imputed value, while for others we observed the opposite.

Overall, the pooled estimate of unsafe sex is 5.83% (95% C.I. -16.21 – 27.88) in the multiply imputed data, *versus* 6.47% (95% C.I. 5.55 – 7.40) in the observed data. The two estimates are not statistically different. Also, the estimate of the observed data is very similar to the pooled estimate for complete data: 6.46% (95% C.I. 5.53 – 7.39); see TABLE 9.38.

Finally, the estimate of injected drug use ranges from 6.67 (95% C.I. 13.16 – 0.17) to 0. Among datasets where the imputed values are not all equal to 0, there are three imputed datasets in which the average imputed value is statistically different from the average observed values. In these three datasets, the imputed values are significantly higher compared to the observed values.

Overall the pooled estimate is 1.79% (95% C.I. -6.88 – 10.46) for the imputed values, and 1.87% (C.I. 1.37 – 2.37) for the observed data. The two estimates are not statistically different. The pooled estimate for the complete data is 1.87% (95% C.I. 1.36 – 2.37); see TABLE 9.38.

Given the results here shown, we reject *HYPOTHESIS 4*, since the estimated prevalence of paying for sex and risky behaviours is not higher among respondents with item missing values compared with the prevalence among the observed values.

As discussed above, in some imputations the prevalence for paying for sex was higher in imputed values compared with observed values, but overall we do not find this evidence for the pooled data.

TABLE 9.38: Pooled estimates of paying for sex, overseas partner acquisition, unsafe sex and injected drug use

		% (weighted)	St. Err.	95% C.I.	
Ever paid money for sex	Complete	11.390	0.609	10.192	12.584
	Observed	11.310	0.601	10.132	12.489
	Imputed	17.150	10.646	-6.582	40.873
Overseas partner acquisition	Complete	11.180	0.617	9.964	12.387
	Observed	11.224	0.615	10.017	12.432
	Imputed	9.542	5.232	-1.458	20.543
Unsafe sex	Complete	6.459	0.476	5.525	7.394
	Observed	6.472	0.472	5.546	7.397
	Imputed	5.833	16.869	-16.214	27.880
Injected drug use	Complete	1.867	0.258	1.362	2.373
	Observed	1.868	0.257	1.365	2.372
	Imputed	1.791	6.634	-6.879	10.462

Source: analysis on Natsal-2 data

9.5.4 ESTIMATE THE MODEL FROM DELLA GIUSTA *ET AL.* (2014) USING *LISTWISE* DELETION AND MULTIPLE IMPUTATION BY CHAINED EQUATIONS

In this section I compare the estimates of the modified model discussed above, handling missing data with *listwise* deletion and with multiple imputation. The evidence is shown in TABLE 9.39.

Overall, all regression coefficients are very similar. Most coefficients (and marginal effects) are equal at the first decimal point. Comparing confidence intervals, none of the coefficients is statistically different across the two models.

This evidence seems to suggest the rejection of HYPOTHESIS 5 which states that “due to missing data – that are not missing completely at random – in paying for sex and risky behaviours, the correlation of these two sets of variables is biased”. It should be noted, however, that if the imputation model has not predicted accurately the imputed values the hypothesis may be true but not verified by the data.

TABLE 9.39: The correlation of paying for sex with risky behaviours, modified model

Probit model

Dependent variable: ever paid for sex	(1)				(2)			
	Coeff.	Std. Err.	Marginal Effect	Std. Err.	Coeff.	Std. Err.	Marginal Effect	Std. Err.
Age	0.026***	0.008	0.004***	0.001	0.027***	0.008	0.005***	0.001
Number of children	-0.073**	0.034	-0.012**	0.006	-0.069**	0.032	-0.012**	0.006
Education (base category: no education)								
Degree	0.225*	0.135	0.038*	0.023	0.244*	0.128	0.042*	0.022
A-level	0.334**	0.137	0.057**	0.023	0.347***	0.130	0.060***	0.022
O-level	0.138	0.104	0.023	0.018	0.141	0.100	0.024	0.017
Professional status (b.c.: unskilled)								
Professional/managerial	-0.024	0.201	-0.004	0.034	-0.004	0.193	-0.001	0.034
Technical/managerial	0.035	0.172	0.006	0.029	0.031	0.165	0.005	0.029
Skilled manual or non-manual	0.036	0.157	0.006	0.027	0.055	0.151	0.010	0.026
Partly skilled	0.123	0.174	0.021	0.030	0.161	0.167	0.028	0.029
Unclassifiable, army, other from the analysis	1.096***	0.278	0.187***	0.047	1.114***	0.275	0.194***	0.048
Risky behaviors								
Partner outside UK in the last 5 years	0.671***	0.093	0.114***	0.016	0.654***	0.090	0.114***	0.016
Unsafe het. sex in last year	0.426***	0.127	0.072***	0.021	0.406***	0.124	0.071***	0.021
Ever a smoker	0.119*	0.072	0.020*	0.012	0.107	0.070	0.019	0.012
Ever injected drugs or other substances	0.535**	0.211	0.091**	0.036	0.495**	0.204	0.086**	0.035
High or medium alcohol consumption	0.194**	0.096	0.033**	0.016	0.195**	0.091	0.034**	0.016
Free sex								
Number of occasions of het. sex in last 4 weeks	-0.012*	0.006	-0.002*	0.001	-0.012*	0.006	-0.002*	0.001

Number of new het. sex partners, last year	0.055**	0.028	0.009**	0.005	0.057**	0.027	0.010**	0.005
Married or cohabiting or previously married	-0.119	0.089	-0.020	0.015	-0.119	0.085	-0.021	0.015
Conservative opinions/religion								
Belongs to any religion now	0.145**	0.074	0.025**	0.012	0.169**	0.071	0.029**	0.012
Sex before marriage always, mostly or sometimes wrong	-0.079	0.104	-0.013	0.018	-0.090	0.100	-0.016	0.017
Sex between 2 men always, mostly or sometimes wrong	-0.011	0.070	-0.002	0.012	0.012	0.068	0.002	0.012
Abortion always or mostly wrong	-0.104	0.085	-0.018	0.015	-0.077	0.081	-0.013	0.014
Age at first het. Intercourse (b. c.: 16-17)								
Aged 13-15	0.238***	0.088	0.040***	0.015	0.225***	0.084	0.039***	0.015
Aged 18-19	-0.054	0.099	-0.009	0.017	-0.053	0.096	-0.009	0.017
Aged 20+	0.037	0.104	0.006	0.018	0.026	0.100	0.005	0.017
Constant	-2.462	0.332			-2.505***	0.320		
Number of Obs.		3140						

* p<0.1, ** p<0.05, *** p<0.01; Natsal-2 Data; Data are weighted to take into account of the complex survey design

9.6 ROBUSTNESS CHECK: COMPUTING BOUNDS

In this section I propose a robustness check on the equivalence of regression coefficients across different techniques for handling missing data. More specifically, as a robustness check, I follow the strategy of finding bounds as suggested by Manski (1995); I analyse a set of 16 models representing extreme cases where all missing values of the 4 variables of interest (paying for sex, overseas partner acquisition, unsafe sex, and injected drug use) are set either to 1 or 0. The model specification and results are shown in TABLES 9.40, and 9.41. These set of models estimate the same specification of the model by Della Giusta and her colleagues (2014) presented in TABLES 8.34.

As we can see from TABLES 9.40, and 9.41, results vary only slightly across the different models. As a consequence of this evidence, and of the low level of item missing data, I do not expect the correlation of paying for sex and risky behaviours to be drastically different after multiple imputation.

TABLE 9.40: Probit model. The correlation of paying for sex and risky behaviours

		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
		1111	1110	1101	1100	1011	1010	1001	1000	0111	0110	0101	0100	0011	0010	0001	0000
Dep. Var.: Pay for sex																	
Overs. partner acq.	coeff.	0.666 ***	0.665 ***	0.666 ***	0.665 ***	0.667 ***	0.666 ***	0.667 ***	0.666 ***	0.672 ***	0.671 ***	0.672 ***	0.671 ***	0.672 ***	0.672 ***	0.672 ***	0.672 ***
	mar. eff.	0.114 ***	0.114 ***	0.114 ***	0.114 ***	0.114 ***	0.114 ***	0.114 ***	0.114 ***	0.114 ***	0.114 ***	0.114 ***	0.114 ***	0.114 ***	0.114 ***	0.114 ***	0.114 ***
Unsafe sex	coeff.	0.435 ***	0.440 ***	0.437 ***	0.442 ***	0.435 ***	0.440 ***	0.437 ***	0.441 ***	0.418 ***	0.421 ***	0.420 ***	0.423 ***	0.418 ***	0.421 ***	0.420 ***	0.423 ***
	mar. eff.	0.074 ***	0.075 ***	0.075 ***	0.075 ***	0.074 ***	0.075 ***	0.075 ***	0.075 ***	0.071 ***	0.072 ***	0.071 ***	0.072 ***	0.071 ***	0.072 ***	0.071 ***	0.072 ***
Injected nonprescr. Drugs	coeff.	0.578 ***	0.538 **	0.578 ***	0.538 **	0.582 ***	0.542 ***	0.582 ***	0.542 ***	0.519 **	0.542 **	0.519 **	0.542 **	0.523 **	0.546 ***	0.523 **	0.546 ***
	mar. eff.	0.099 ***	0.092 **	0.099 ***	0.092 **	0.099 ***	0.092 ***	0.099 ***	0.092 ***	0.088 **	0.092 **	0.088 **	0.092 **	0.089 **	0.093 ***	0.089 **	0.093 ***
Constant	coeff.	2.475 ***	2.470 ***	2.472 ***	2.468 ***	2.478 ***	2.473 ***	2.475 ***	2.470 ***	2.466 ***	2.468 ***	2.463 ***	2.463 ***	2.468 ***	2.471 ***	2.466 ***	2.468 ***
Number of Obs.									3148								

Source: Analysis on Natsal-2 Data; * for $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$;

Controls: age, education, professional status, ever a smoker, high or medium alcohol consumption, number of occasions of heterosexual sex in the last four weeks, number of new heterosexual sex partners in the last year; married, cohabiting or previously married; respondent belongs to any religion now; sex before marriage always, mostly, or sometimes wrong; sex between two males always, mostly or sometimes wrong; abortion always, mostly or sometimes wrong; age at first sexual intercourse. Data are weighted to take into account the complex survey design.

TABLE 9.41: Maximum and minimum estimates of the correlation of paying for sex and risky behaviours from TABLE 9.38

		Max	s.e.	Min	s.e.
Dependent variable: Pay for sex					
Overseas partner acquisition	Coeff	0.672	0.093	0.665	0.093
	Marginal effect	0.114	0.016	0.114	0.016
Unsafe sex	Coeff	0.442	0.125	0.418	0.126
	Marginal effect	0.075	0.021	0.071	0.021
Injected nonpresc. drugs	Coeff	0.582	0.201	0.519	0.207
	Marginal effect	0.099	0.034	0.088	0.035

APPENDIX 1

TABLE 9.42: complete, observed and imputed values for ever paid for sex, by imputation

		% (weighted)	St. Err.	95 % C.I.		Min	Max
1	Complete	11.320	0.594	10.154	12.487	0	1
	Observed	11.311	0.601	10.132	12.489	0	1
	Imputed	12.046	4.859	2.286	21.807	0	1
2	Complete	11.513	0.605	10.326	12.701	0	1
	Observed	11.311	0.601	10.132	12.489	0	1
	Imputed	26.544	8.512	9.447	43.640	0	1
3	Complete	11.285	0.595	10.117	12.453	0	1
	Observed	11.311	0.601	10.132	12.489	0	1
	Imputed	9.408	3.912	1.549	17.266	0	1
4	Complete	11.553	0.603	10.369	12.737	0	1
	Observed	11.311	0.601	10.132	12.489	0	1
	Imputed	29.521	7.755	13.943	45.098	0	1
5	Complete	11.354	0.596	10.185	12.523	0	1
	Observed	11.311	0.601	10.132	12.489	0	1
	Imputed	14.582	5.261	4.014	25.150	0	1
6	Complete	11.300	0.597	10.129	12.471	0	1
	Observed	11.311	0.601	10.132	12.489	0	1
	Imputed	10.540	3.931	2.644	18.436	0	1
7	Complete	11.323	0.599	10.147	12.499	0	1
	Observed	11.311	0.601	10.132	12.489	0	1
	Imputed	12.257	5.518	1.173	23.341	0	1
8	Complete	11.390	0.594	10.225	12.555	0	1
	Observed	11.311	0.601	10.132	12.489	0	1
	Imputed	17.277	4.994	7.248	27.307	0	1
9	Complete	11.658	0.603	10.475	12.840	0	1
	Observed	11.311	0.601	10.132	12.489	0	1
	Imputed	37.369	7.341	22.623	52.114	0	1
10	Complete	11.308	0.593	10.143	12.472	0	1
	Observed	11.311	0.601	10.132	12.489	0	1

	Imputed	11.089	4.317	2.417	19.760	0	1
11	Complete	11.284	0.596	10.115	12.453	0	1
	Observed	11.311	0.601	10.132	12.489	0	1
	Imputed	9.351	4.446	0.422	18.281	0	1
12	Complete	11.381	0.597	10.210	12.553	0	1
	Observed	11.311	0.601	10.132	12.489	0	1
	Imputed	16.625	6.252	4.066	29.183	0	1
13	Complete	11.384	0.598	10.211	12.557	0	1
	Observed	11.311	0.601	10.132	12.489	0	1
	Imputed	16.822	5.386	6.004	27.639	0	1
14	Complete	11.584	0.603	10.400	12.768	0	1
	Observed	11.311	0.601	10.132	12.489	0	1
	Imputed	31.872	7.825	16.155	47.589	0	1
15	Complete	11.288	0.594	10.122	12.454	0	1
	Observed	11.311	0.601	10.132	12.489	0	1
	Imputed	9.629	3.407	2.786	16.472	0	1
16	Complete	11.270	0.594	10.105	12.435	0	1
	Observed	11.311	0.601	10.132	12.489	0	1
	Imputed	8.266	3.530	1.176	15.356	0	1
17	Complete	11.301	0.594	10.135	12.467	0	1
	Observed	11.311	0.601	10.132	12.489	0	1
	Imputed	10.584	4.111	2.327	18.841	0	1
18	Complete	11.363	0.594	10.197	12.530	0	1
	Observed	11.311	0.601	10.132	12.489	0	1
	Imputed	15.283	5.044	5.153	25.413	0	1
19	Complete	11.350	0.597	10.179	12.522	0	1
	Observed	11.311	0.601	10.132	12.489	0	1
	Imputed	14.306	5.113	4.036	24.576	0	1
20	Complete	11.553	0.602	10.372	12.735	0	1
	Observed	11.311	0.601	10.132	12.489	0	1
	Imputed	29.541	7.705	14.065	45.017	0	1

Source: Analysis on Natsal-2 data

TABLE 9.43: complete, observed an imputed values overseas partner acquisition, by imputation

Imputation number (m)		% (weighted)	St. Err.	95% C.I.		Min	Max
1	Complete	11.195	0.606	10.005	12.385	0	1
	Observed	11.224	0.615	10.017	12.432	0	1
	Imputed	10.223	2.966	4.337	16.109	0	1
2	Complete	11.277	0.605	10.089	12.465	0	1
	Observed	11.224	0.615	10.017	12.432	0	1
	Imputed	13.034	3.881	5.331	20.738	0	1
3	Complete	11.172	0.600	9.995	12.349	0	1
	Observed	11.224	0.615	10.017	12.432	0	1
	Imputed	9.425	2.832	3.804	15.047	0	1
4	Complete	11.089	0.600	9.912	12.265	0	1
	Observed	11.224	0.615	10.017	12.432	0	1
	Imputed	6.558	2.456	1.684	11.431	0	1
5	Complete	10.982	0.601	9.802	12.162	0	1
	Observed	11.224	0.615	10.017	12.432	0	1
	Imputed	2.884	1.731	-0.551	6.319	0	1
6	Complete	11.075	0.600	9.897	12.253	0	1
	Observed	11.224	0.615	10.017	12.432	0	1
	Imputed	6.081	1.932	2.246	9.917	0	1
7	Complete	11.337	0.612	10.136	12.537	0	1
	Observed	11.224	0.615	10.017	12.432	0	1
	Imputed	15.106	3.648	7.866	22.345	0	1
8	Complete	11.106	0.602	9.925	12.286	0	1
	Observed	11.224	0.615	10.017	12.432	0	1
	Imputed	7.136	2.448	2.278	11.994	0	1
9	Complete	11.311	0.610	10.114	12.507	0	1
	Observed	11.224	0.615	10.017	12.432	0	1
	Imputed	14.209	4.266	5.743	22.675	0	1
10	Complete	11.175	0.603	9.991	12.358	0	1
	Observed	11.224	0.615	10.017	12.432	0	1

	Imputed	9.519	2.957	3.651	15.387	0	1
11	Complete	11.125	0.604	9.939	12.311	0	1
	Observed	11.224	0.615	10.017	12.432	0	1
	Imputed	7.801	2.748	2.347	13.256	0	1
12	Complete	11.341	0.606	10.152	12.530	0	1
	Observed	11.224	0.615	10.017	12.432	0	1
	Imputed	15.246	4.164	6.981	23.510	0	1
13	Complete	11.252	0.606	10.062	12.441	0	1
	Observed	11.224	0.615	10.017	12.432	0	1
	Imputed	12.173	3.125	5.972	18.374	0	1
14	Complete	11.008	0.603	9.825	12.192	0	1
	Observed	11.224	0.615	10.017	12.432	0	1
	Imputed	3.783	1.448	0.910	6.656	0	1
15	Complete	11.358	0.613	10.156	12.561	0	1
	Observed	11.224	0.615	10.017	12.432	0	1
	Imputed	15.846	3.375	9.147	22.544	0	1
16	Complete	10.965	0.600	9.787	12.143	0	1
	Observed	11.224	0.615	10.017	12.432	0	1
	Imputed	2.289	1.366	-0.422	5.001	0	1
17	Complete	11.141	0.602	9.961	12.322	0	1
	Observed	11.224	0.615	10.017	12.432	0	1
	Imputed	8.368	2.356	3.692	13.045	0	1
18	Complete	11.142	0.603	9.960	12.325	0	1
	Observed	11.224	0.615	10.017	12.432	0	1
	Imputed	8.397	3.512	1.427	15.367	0	1
19	Complete	11.137	0.606	9.949	12.326	0	1
	Observed	11.224	0.615	10.017	12.432	0	1
	Imputed	8.233	2.758	2.758	13.707	0	1
20	Complete	11.320	0.608	10.128	12.513	0	1
	Observed	11.224	0.615	10.017	12.432	0	1
	Imputed	14.537	3.498	7.595	21.479	0	1

Source: Analysis on Natsal-2 data

TABLE 9.44: complete, observed an imputed values for unsafe sex, by imputation

Imputation number (m)		% (weighted)	St. Err.	95% C.I.		Min	Max
1	Complete	6.439	0.466	5.524	7.354	0	1
	Observed	6.472	0.472	5.546	7.397	0	1
	Imputed	4.796	2.727	-0.649	10.240	0	1
2	Complete	6.483	0.467	5.568	7.399	0	1
	Observed	6.472	0.472	5.546	7.397	0	1
	Imputed	7.050	3.425	0.212	13.888	0	1
3	Complete	6.419	0.464	5.508	7.330	0	1
	Observed	6.472	0.472	5.546	7.397	0	1
	Imputed	3.772	2.609	-1.436	8.981	0	1
4	Complete	6.425	0.465	5.514	7.337	0	1
	Observed	6.472	0.472	5.546	7.397	0	1
	Imputed	4.106	2.378	-0.642	8.854	0	1
5	Complete	6.449	0.466	5.535	7.364	0	1
	Observed	6.472	0.472	5.546	7.397	0	1
	Imputed	5.313	3.048	-0.772	11.397	0	1
6	Complete	6.348	0.463	5.440	7.255	0	1
	Observed	6.472	0.472	5.546	7.397	0	1
	Imputed	0.150	0.151	-0.152	0.452	0	1
7	Complete	6.465	0.464	5.553	7.376	0	1
	Observed	6.472	0.472	5.546	7.397	0	1
	Imputed	6.101	3.129	-0.146	12.349	0	1
8	Complete	6.628	0.468	5.709	7.547	0	1
	Observed	6.472	0.472	5.546	7.397	0	1
	Imputed	14.419	4.739	4.957	23.881	0	1
9	Complete	6.345	0.463	5.437	7.253	0	1
	Observed	6.472	0.472	5.546	7.397	0	1
	Imputed	0.000	0.000	0.000	0.000	0	1
10	Complete	6.412	0.463	5.503	7.321	0	1
	Observed	6.472	0.472	5.546	7.397	0	1
	Imputed	3.407	2.150	-0.887	7.700	0	1

11	Complete	6.409	0.464	5.498	7.320	0	1
	Observed	6.472	0.472	5.546	7.397	0	1
	Imputed	3.253	2.423	-1.586	8.091	0	1
12	Complete	6.352	0.463	5.444	7.259	0	1
	Observed	6.472	0.472	5.546	7.397	0	1
	Imputed	0.343	0.345	-0.346	1.032	0	1
13	Complete	6.480	0.469	5.559	7.401	0	1
	Observed	6.472	0.472	5.546	7.397	0	1
	Imputed	6.875	2.999	0.887	12.863	0	1
14	Complete	6.736	0.484	5.786	7.686	0	1
	Observed	6.472	0.472	5.546	7.397	0	1
	Imputed	19.921	4.653	10.631	29.210	0	1
15	Complete	6.424	0.464	5.513	7.335	0	1
	Observed	6.472	0.472	5.546	7.397	0	1
	Imputed	4.032	2.426	-0.811	8.875	0	1
16	Complete	6.516	0.464	5.605	7.427	0	1
	Observed	6.472	0.472	5.546	7.397	0	1
	Imputed	8.703	3.262	2.190	15.217	0	1
17	Complete	6.430	0.465	5.517	7.343	0	1
	Observed	6.472	0.472	5.546	7.397	0	1
	Imputed	4.340	2.812	-1.275	9.955	0	1
18	Complete	6.578	0.467	5.661	7.495	0	1
	Observed	6.472	0.472	5.546	7.397	0	1
	Imputed	11.864	4.198	3.483	20.246	0	1
19	Complete	6.382	0.463	5.474	7.290	0	1
	Observed	6.472	0.472	5.546	7.397	0	1
	Imputed	1.915	1.250	-0.581	4.411	0	1
20	Complete	6.469	0.465	5.556	7.381	0	1
	Observed	6.472	0.472	5.546	7.397	0	1
	Imputed	6.299	3.226	-0.142	12.739	0	1

Source: Analysis on Natsal-2 data

TABLE 9.45: complete, observed an imputed values for injected drug use, by imputation

Imputation number (m)		% (weighted)	St. Err.	95% C.I.		Min	Max
1	Complete	1.945	0.235	1.483	2.406	0	1
	Observed	1.979	0.239	1.510	2.449	0	1
	Imputed	0.000	0.000	0.000	0.000	0	1
2	Complete	1.945	0.235	1.483	2.406	0	1
	Observed	1.979	0.239	1.510	2.449	0	1
	Imputed	0.000	0.000	0.000	0.000	0	1
3	Complete	1.945	0.235	1.483	2.406	0	1
	Observed	1.979	0.239	1.510	2.449	0	1
	Imputed	0.000	0.000	0.000	0.000	0	1
4	Complete	1.945	0.235	1.483	2.406	0	1
	Observed	1.979	0.239	1.510	2.449	0	1
	Imputed	0.000	0.000	0.000	0.000	0	1
5	Complete	1.945	0.235	1.483	2.406	0	1
	Observed	1.979	0.239	1.510	2.449	0	1
	Imputed	0.000	0.000	0.000	0.000	0	1
6	Complete	1.974	0.237	1.509	2.439	0	1
	Observed	1.979	0.239	1.510	2.449	0	1
	Imputed	1.667	1.667	-1.668	5.002	0	1
7	Complete	2.032	0.240	1.561	2.503	0	1
	Observed	1.979	0.239	1.510	2.449	0	1
	Imputed	5.000	2.837	-0.678	10.678	0	1
8	Complete	1.974	0.237	1.509	2.439	0	1
	Observed	1.979	0.239	1.510	2.449	0	1
	Imputed	1.667	1.667	-1.668	5.002	0	1
9	Complete	2.003	0.239	1.535	2.471	0	1
	Observed	1.979	0.239	1.510	2.449	0	1
	Imputed	3.333	2.337	-1.343	8.010	0	1
10	Complete	1.945	0.235	1.483	2.406	0	1
	Observed	1.979	0.239	1.510	2.449	0	1
	Imputed	0.000	0.000	0.000	0.000	0	1

11	Complete	1.945	0.235	1.483	2.406	0	1
	Observed	1.979	0.239	1.510	2.449	0	1
	Imputed	0.000	0.000	0.000	0.000	0	1
12	Complete	1.945	0.235	1.483	2.406	0	1
	Observed	1.979	0.239	1.510	2.449	0	1
	Imputed	0.000	0.000	0.000	0.000	0	1
13	Complete	2.032	0.240	1.561	2.503	0	1
	Observed	1.979	0.239	1.510	2.449	0	1
	Imputed	5.000	2.837	-0.678	10.678	0	1
14	Complete	2.032	0.240	1.561	2.503	0	1
	Observed	1.979	0.239	1.510	2.449	0	1
	Imputed	5.000	2.837	-0.678	10.678	0	1
15	Complete	1.945	0.235	1.483	2.406	0	1
	Observed	1.979	0.239	1.510	2.449	0	1
	Imputed	0.000	0.000	0.000	0.000	0	1
16	Complete	1.945	0.235	1.483	2.406	0	1
	Observed	1.979	0.239	1.510	2.449	0	1
	Imputed	0.000	0.000	0.000	0.000	0	1
17	Complete	1.945	0.235	1.483	2.406	0	1
	Observed	1.979	0.239	1.510	2.449	0	1
	Imputed	0.000	0.000	0.000	0.000	0	1
18	Complete	2.061	0.242	1.586	2.536	0	1
	Observed	1.979	0.239	1.510	2.449	0	1
	Imputed	6.667	3.247	0.168	13.165	0	1
19	Complete	1.945	0.235	1.483	2.406	0	1
	Observed	1.979	0.239	1.510	2.449	0	1
	Imputed	0.000	0.000	0.000	0.000	0	1
20	Complete	1.974	0.237	1.509	2.439	0	1
	Observed	1.979	0.239	1.510	2.449	0	1
	Imputed	1.667	1.667	-1.668	5.002	0	1

Source: Analysis on Natsal-2 data

CHAPTER 10 – CONCLUSIONS

This study discusses the relation between prostitution policies, attitudes toward sex work, stigmatization of sex workers' clients and reporting paying for sex in surveys. In an empirical example, I study item missing data in paying for sex and risky behaviours and I compare the correlation of these two sets of variables under two handling missing data techniques: *listwise* deletion and multiple imputation.

Firstly, prostitution policies may influence the reporting behaviour of paying for sex. More specifically, reporting paying for sex may have become less socially desirable in Britain as a consequence of a shift in the focus of policies from sex workers' to clients.

Even though, currently, paying for sex is not fully illegal in Britain, legislation has moved in the direction of an increase in the criminalization of sex workers' clients; in fact, since 2009, buying sex from someone who has been subjected to force, deception or threats became an offence and kerb-crawlers do not need to be persistent to be arrested. This change in policies may have increased the stigma associated with buying sex, and the social (un)desirability of reporting paying for sex.

In general, prostitution policies may change the level of stigma associated with paying for sex, and societal attitudes toward sex work. Indeed, at a global level, the literature found evidence of a higher level of prostitution acceptance in countries where sex work is legal or regulated, in comparison with countries where prostitution is illegal; evidence shows that policies influence attitudes, rather than attitudes influencing policies.

In Sweden – the pioneering country in criminalizing paying for sex – the criminalization of sex workers' clients had the explicit aim of reducing the demand of sexual services, not only by direct punishment, but also modifying attitudes toward sex work.

Similarly, but ten years later, Norway made paying for sex illegal with a legislation which included among its explicit aims a change of attitudes towards sex workers' clients.

Evidence on attitudes toward sex work in Britain shows that paying for sex is considered as a stigmatizing trait – where stigma is measured as the shame associated with having as a family member a customer of sexual services. Regarding attitudes toward criminalizing paying for sex the evidence is mixed: on the one hand there is evidence of positive attitudes toward the legalization of paying for sex; on the other hand, when criminalization is presented as a strategy to reduce human trafficking, the literature shows for making paying for sex illegal.

Besides public opinion and the policy debate, academic research has incorporated stigma in the theoretical discussion of the sex market; some authors have considered stigma as one of the key components that influence the decision to participate in sex purchase.

As an additional interpretation, I argue that stigma may play a role not only in the decision on whether to participate in the sex market, but also in the decision to reveal paying for sex in surveys. Indeed, survey respondents may take into consideration the social (un)desirability of the answer in deciding whether they wish to report (and to report truthfully) paying for sex.

An increase in the stigmatization of sex workers' clients and an increase in negative attitudes toward sex work may have important consequences for collecting sound data on paying for sex; at higher levels of stigmatization, the population of sex workers' clients is more elusive; thus, it is hard to sample. Also, at increasing levels of stigmatization of sex workers' clients the level of (un)desirability of reporting paying for sex increases.

In this research I have presented the definition of “hard to reach”, “hard to survey”, “hidden”, “marginal”, “elusive”, “rare” and “blurred” populations, arguing that sex workers' clients in Britain can be considered a “hard to reach” – or “hard to survey” – highly “elusive”, partially “hidden” and relatively “rare” population. Also, I have argued that the hidden characteristics of this population vary depending on the type of sex purchase.

Given these characteristics, sampling sex workers' clients pose peculiar challenges. Moreover, some techniques typically used to survey hard to reach populations, such as for example, Respondent Driven Sampling, or for rare populations, as Cluster Sampling, are not

feasible for surveying sex workers' clients; in fact, customers of paid sex do not constitute a social network, nor are they geographically clustered.

Social researchers wishing to collect first hand data on this population have mainly used purposive samples; while, in some countries, data on paid sex are available for secondary data analysis; for example, a study collecting data on prostitution in Britain is the National Survey of Sexual Attitudes and Lifestyle (1,2 and 3).

Sampling is not the only challenge associated with studying paying for sex. In fact, besides sampling error, survey data on paying for sex may be characterized by measurement and non response error, which may be caused, among other things, by the sensitivity of questions on paying for sex.

More specifically, survey questions about paying for sex are sensitive, and they fulfil all the three requisites of sensitivity identified by the literature. Indeed, these questions are characterized by: i. the social desirability of the answer, ii. the invasion of privacy and iii. the risk of disclosure to third parties.

Social scientists may reduce the threat of sensitive questions through appropriate questionnaire design, choosing the best available mode of data collection (under budget and time constraints) and, when appropriate, using indirect questioning techniques.

In particular, it is advisable to use open ended and long questions, composed of familiar words, avoiding technical, vague and ambiguous terms. Also, sensitive questions lead to better measurement and lower drop-off rates if they are not posed at the beginning of a survey. Furthermore, the researcher may adopt respondents' evaluation about the items' sensitivity or triangulate different sources to validate the collected data.

Evidence on modes of data collection show that with reference to paying for sex, Audio CASI leads to higher reporting of paying for sex compared to a CASI interview. Also, among indirect questioning techniques, randomized response technique has been adopted in the literature to elicit information on paying for sex; future research may compare existing estimates on paying for sex derived from survey data, with evidence derived from other indirect questioning techniques, as, for example, the item count technique.

As recalled, the sensitive nature of questions on paying for sex may lead to item non response. In an empirical example, I study item missing data in paying for sex and risky

behaviours. More specifically, the substantive literature on sex work finds evidence of a positive correlation of paying for sex with risky behaviours. As both paying for sex and risky behaviours are based on sensitive questions, I argue that item missing data in these topics may influence the estimate of these two sets of behaviours. I put forward results from the literature comparing the estimate of this correlation derived from two different data handling techniques: multiple imputation and *listwise* deletion.

The empirical section is based on data from the National Survey of Sexual Attitudes and Lifestyles 2 (Natsal-2). This is a large nationally representative survey of the British population; The Natsal study, has consisted, up to now, of three cross-sectional surveys: Natsal-1 conducted in 1990, Natsal-2 conducted in 2000; and Natsal-3 conducted in 2010. For this empirical analysis I adopt the second cross-section, which interviews over 12.000 individuals, aged 16-44 in 2000.

In terms of empirical results, I confirm that paying for sex and risky behaviours are characterized by item missing data; also, I observe that most of the item missing data is due to the sample members refusing to participate at all in the self completion section of the questionnaire. Thus, missing data in this case resembles more an unit non response problem, than an item non response issue.

While evidence is found of higher item missing data in paying for sex and risky behaviours compared with socio-demographic factors, there is no such evidence for other sensitive items. Contrary to our expectations, paying for sex and risky behaviours are not the most sensitive items elicited in the survey, since on average other sensitive items have higher item missing data than paying for sex and risky behaviours.

As expected, data are not missing completely at random; conversely, item missing data is associated with socio-demographic factors and respondents' characteristics (including ease in discussing sexual matters, respondents' embarrassment and willingness to participate in the survey). The finding that some paradata are informative of item non response in paying for sex and risky behaviours is particularly promising. As a policy prescription, I do suggest the inclusion of these paradata in data collection on these topics, since these might be useful for constructing weighting and calibration strategies.

The hypothesis that the propensity to produce valid answers varies across the behaviours considered is rejected; indeed, most item missing data are common to the four

variables considered; this is consistent with the finding that the most common missing data pattern is characterized by a missing value in all cases, which, ultimately, is due to the respondent refusing to take part at all in the self completion section of the questionnaire.

Comparing imputed with observed values, the pooled estimates of imputed values in all four behaviours under study are not different from the estimates of observed values. Thus, I reject the hypothesis that the prevalence of paying for sex and risky behaviours is higher among the respondents with item missing values compared with the prevalence among respondents with observed values. Also, for all behaviours under study the multiply imputed values vary widely by imputation; this, reinforces the idea that multiple imputation is preferred to single imputation in this context.

Comparing the results from the model after handling missing data with multiple imputation *versus listwise* deletion, coefficients are not statistically different. Thus, I reject the hypothesis that the correlation of paying for sex and risky behaviours is biased due to missing data – which are not missing completely at random.

The latter two results, i.e. equality in imputed compared to observed values and equality of coefficients under the two different missing data handling techniques, depend on the imputation model being correctly specified; indeed, if the imputation model has not predicted accurately the imputed values the hypothesized differences may be true but not verified by the data.

Finally, as a robustness check, I estimate estimates bounds following the strategy suggested by Manski (1995). Even in extreme cases, results are not significantly different from the model estimated with *listwise* deletion. This finding reinforces the evidence that the correlation of paying for sex and risky behaviours estimated using *listwise* deletion is not biased due to item missing data.

Further research may replicate the results of this analysis using another data source, as for example, Natsal-3, which has just been released for public use. Also, the current availability of three Natsal cross-sections allows analysis of the evolution of item missing data over the decades, leaving promising opportunities for further research.

In this research I have studied item missing data in paying for sex and risky behaviours. However, as has been shown, the four behaviours considered here are not those

with the higher item non response in the survey. Further research may impute missing values for other sensitive behaviours and assess whether their prevalence is significantly different among imputed values compared with observed values.

As recalled, most item missing data in paying for sex and risky behaviours is due to the sample members refusing to participate in the entire self completion section of the survey. Thus, this particular situation resembles a mix of unit and item non response, where unit non response is intended as refusing the self completion section. Further research may address this situation combining inverse probability weighting with multiple imputation (IPW/MI) as suggested by Seaman *et al.* (2012).

Furthermore, another promising area of research on surveys on sexuality and sex work, is the analysis of unit non response – in the standard acceptance of respondents refusing to take part in the survey. Indeed, survey respondents not willing to disclose their sexual habits may refuse to take part in the whole survey. Information on non respondents may be derived from other proxy respondents; additionally, interviewers may collect paradata on sample members, even for non responding households (for example, about the area of residence, the appearance of the house, *etc.*); or, in longitudinal surveys, previous information on non respondents may be derived from previous waves, provided that sample members participated in at least one wave. Further research may use this information to focus on unit non-respondents in surveys on sexual behaviour.

Moreover, both unit non response and item non response may be associated with how the survey is presented to respondents. On the one hand, sample members may decide not to participate at all in a survey on sexuality, given the sensitive topic. On the other hand, respondents may not formulate in their mind a clear idea of the kind of questions they are expected to answer before starting the interview. Some sample members may decide to drop out or refuse some survey sections once they have a clearer idea of what kind of information they are expected to give. A promising area of research may investigate the effect of different levels of detail in invitation letters on sexuality surveys, on unit non response, item non response, drop off rates and participation in self completion sections.

Finally, this study has focused on item missing data; however, another respondents' strategy to avoid the threat of admitting being a sex workers' clients is misreporting. Further research may attempt to assess misreporting in paying for sex.

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