Are frequent offenders more difficult to find and less willing to participate? An analysis of unit non-response in an online survey among offenders

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Abstract
The interpretation of research findings based on self-reported delinquency requires knowledge of how response rates depend on the attributes of potential respondents, including their prior offending. The purpose of the present study was to quantify the extent to which, in a sample of offenders, the two main determinants of non-response – non-contact and refusal – depend on prior offending frequency. We used binomial and multinomial regression models to assess whether frequent offenders are more difficult to contact and less willing to participate in online surveys. These hypotheses are tested on a sample of offenders who were invited by regular mail to participate in the Online Activity Space Inventory Survey (OASIS), an online survey on mobility and safety. Controlling for gender and age as potential confounders, our findings do not confirm that frequent offenders are less likely to be successfully contacted, but they do confirm that, if contacted, they are less likely to participate. Response rates in offender-based research are selective and thus potentially biased towards infrequent offenders. They generally favour conservative estimates and conclusions, implying that any associations found between crime and its predictors are likely stronger in reality.

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Introduction
Empirical research on offending behaviour is challenged by issues of incomplete data. From a policy-oriented perspective, data collected by law enforcement agencies suffer from a dark-number issue because not all crimes are reported to the police and because not all offenders are detected and prosecuted. From a theoretical perspective, they are of limited value because they usually do not contain the type of information that is expected to affect individual offending behaviour, such as moral attitudes, personality traits, peer relations, scholarly achievement, family background, socio-economic characteristics or routine activities.

Self-report crime surveys, in which respondents are asked about any crimes they may have committed, were originally developed to attack the dark-number issue and to provide arguments for the claim that offending behaviour is not deviant but widespread and therefore normal in the statistical sense (Kivivuori, 2011: 4). However, they have become standard tools of investigation also because of their important role in theory development. By including items that measure theoretical concepts (in addition to involvement in crime), self-report crime surveys, particularly those that have used a panel design, have been highly influential in developing and testing aetiological and other theories of offending (Kivivuori, 2011: 2). Examples of criminological theories that have been tested with self-report methods include labelling theory (Bernburg et al., 2006), neutralization theory (Costello, 2000), social control theory (Hirschi, 1969), social learning theory (Brauer, 2009), situational action theory (Wikström et al., 2010) and crime pattern theory (Menting et al., 2020).

Although self-report crime surveys circumvent the limitations of official law enforcement data, they still pose a number of methodological challenges, including non-response (Junger-Tas and Marshall, 1999), an issue that has raised concerns not only in criminology but in most of the social sciences (Stoop, 2005). If non-response to self-report surveys on criminal involvement is selective, it potentially generates bias and jeopardizes not only conclusions about the extent of criminal involvement of the population but also conclusions about the validity of theories that postulate causal relations between criminal behaviour and other behaviours and characteristics. To potentially address this risk, we need a better understanding of non-response tendencies in criminological survey research.1

In research on survey non-response, it is common to distinguish unit non-response from item non-response. Item non-response refers to the situation that a survey participant fails to provide an answer to a specific survey item. Unit non-response refers to the situation that an individual who is in the sampling frame does not participate in the survey at all. The present article addresses unit non-response.

Whereas the results of prior research are mixed with regard to item non-response (Junger-Tas and Marshall, 1999; Pauwels and Svensson, 2008), the findings on unit
non-response suggest that offenders are less likely than non-offenders to participate in self-report surveys (Cernkovich et al., 1985; Shannon, 2006; Van Batenburg-Eddes et al., 2012). One possible reason is that the lifestyle of offenders makes them more difficult to contact, for example because they are homeless (Hagan and McCarthy, 1998), detained or otherwise institutionalized (Shannon, 2006). An additional reason could be that offenders’ presumed lower levels of self-control make them less willing to participate in research when they are contacted and invited. A combination of higher non-contact rates and higher refusal rates implies, obviously, that the overall non-response among offenders is higher than among non-offenders.

Prior research has assessed unit non-response bias in studies of self-reported delinquency in samples of the general population using offline surveys or interviews. The question arises whether the reported findings also hold for high-risk samples and for online self-report surveys. To assist interpretations of research findings of online self-report research, a test of non-response bias is greatly needed. The most important potential bias is that frequent offenders have lower response rates than incidental offenders.

Our specific contribution to the literature on non-response in research on crime and delinquency is threefold. First, whereas most prior research investigates whether response rates of offenders differ from those of non-offenders, we compare the response rates within an offender population and compare the response rates of frequent offenders with those of incidental offenders. The findings are thus particularly relevant for interpreting the results of offender-based research. Second, to the best of our knowledge, we describe the first study that administered an online survey to a general offender population – the first online survey was in a sample of cybercrime offenders with a comparison group of traditional offenders (Weulen Kranenbarg et al., 2017; Weulen Kranenbarg et al., 2019). Obtaining cooperation in online surveys presents unique challenges that may or may not be exacerbated in offender populations. Third, unlike most previous work on response rates, we attempt to distinguish non-contact rates from refusal rates. It is expected that frequent offenders are more difficult to find and contact, and that, when they are found, contacted and invited, they are less likely to participate in surveys.

Returning to the two main reasons for conducting self-report crime surveys, it should be noted that our research questions on non-response are relevant for solving theoretical issues but not for solving the dark-number issue. Given that our sample frame is police-registered offenders, the findings add to our understanding of the correlates of non-response amongst registered offenders, but do not inform us about non-response amongst unregistered offenders. In addition, non-response amongst a small group of very frequent offenders has a limited effect on estimates of the overall prevalence of offending, but it may seriously weaken tests of theory because it reduces observed variability in the dependent variable.

**Theory and hypotheses**

A non-respondent is an individual who is eligible for a study – a person who is in the sample frame – but for whom data are not obtained for some reason (Carkin and Tracy,
The two major causes of non-response are non-contact and refusal. Non-contact occurs when the researchers are unable to locate the individual or to communicate with him or her, to the effect that the individual cannot be invited to participate in the survey. Refusal occurs only if and after contact has been established, when the individual is invited but declines the invitation or is otherwise not eligible to participate, either by explicitly declining the invitation or implicitly, for example by not showing up for an appointment.

One conclusion that follows from the extensive literature on non-response issues in surveys and other types of research is that, if selective non-response takes place, it is often related to the topics of the study (Groves and Peytcheva, 2008). For example, based on subsequent mortality figures, Cohen and Duffy (2002) found that non-respondents to health surveys were less healthy than respondents. A similar phenomenon may jeopardize the study of crime. With respect to violent victimization, it has been suggested that victims are more motivated to participate, but that the most severely victimized are hesitant to participate (Simmons and Swahnberg, 2019). With respect to offending, it has often been assumed that non-respondents in self-report studies of crime and delinquency are more likely to be involved in crime than respondents, and in particular that ‘chronic’ or ‘persistent’ offenders are unlikely to be included at all (for example, Cernkovich et al., 1985; Hirschi and Gottfredson, 1993; Junger-Tas and Marshall, 1999), either because they are difficult to contact or because they are unwilling or unable to participate.

**Non-contact**

The first step in obtaining respondent participation is getting in touch with prospective participants. Depending on the sample frame, this is no trivial task. In most cases, a sample frame is based on some database that contains an individual’s name and address. This allows researchers to visit the individual and ask them in person to participate in the study, or to send them an invitation letter by mail.

There are various reasons why it may be more difficult to get into contact with frequent offenders than with infrequent offenders. First, frequent offenders tend to move more often than infrequent offenders or non-offenders (Tittle and Paternoster, 1988), and therefore it is more likely that address information has become outdated at the time of the survey. The present address of the individual may be difficult to obtain, and invitation letters might get lost or be returned as undeliverable. In addition, frequent offenders are more likely to have become incarcerated at the time of the survey (Shannon, 2006) and, even if information about their incarceration is available to the researchers, it will generally be difficult to have them participate in the survey while incarcerated (Cernkovich et al., 1985). In sum, because frequent offenders are more geographically mobile than incidental offenders, they will be more difficult to contact.

Because frequent offenders tend to be characterized by lower self-control than infrequent offenders (Gottfredson and Hirschi, 1990), they are more likely to have a more chaotic and disorderly lifestyle, which may make it less likely that they will open and read their mail. Thus, even if an invitation letter is delivered at the appropriate address, frequent offenders may be less likely to take note and thus consider survey participation.
The hypothesized greater lack of self-control of frequent offenders also makes them lead a more risky lifestyle, including behaviours that jeopardize their health, such as use of toxic and unhealthy substances (Gottfredson and Hirschi, 1990). As a result, they probably run greater risks of hospitalization, which makes it more difficult to contact them.

Refusal

Refusal occurs when a prospective study participant declines the invitation to participate. Refusal may be motivated by a variety of reasons. The individual may consider the expected investment in time and energy too large (in relation to any material or immaterial incentives promised in return for participation), or they may consider the survey topics uninteresting or painful. In the case of surveys that explicitly address delinquency, offending or other socially undesirable behaviours, prospective participants may fear that participation might make them disclose information they would rather not share with others, or they may fear being perceived negatively by an interviewer.3

We expect that frequent offenders generally hold less favourable attitudes towards the authorities and governmental organizations than infrequent offenders, because frequent offenders have more negative experiences with them, in particular with the criminal justice system. Therefore, we expect that they might try to minimize contacts with governmental organizations, a tendency that may generalize to other institutions, including universities and research teams soliciting their participation. We further expect that some frequent offenders are more likely than incidental offenders to refuse survey participation because they may believe that participation (and truthful responding) may entail a risk of future arrest if the topics are somehow related to law-breaking. Finally, we expect frequent offenders to be more likely than incidental offenders to refuse participation because they have personal characteristics – such as steep time discounting and low self-control – that are negatively correlated with the characteristics – such as patience and careful reading abilities – required to participate successfully in surveys. A key proposition of the general theory of crime (Gottfredson and Hirschi, 1990) is that criminal and other deviant behaviours are caused by lack of self-control. Criticizing the validity of the self-report method, Gottfredson and Hirschi also claim that individuals with weaker self-control are generally less willing and less able to participate in self-report surveys (Hirschi and Gottfredson, 1993). Combining both premises leads to the hypothesis that non-response is positively related to criminality. In a direct test of this hypothesis, Watkins and Melde (2007) did not find support for it. In their longitudinal self-report study, respondents with lower self-control were not more likely to drop out of annual follow-ups. The finding is, however, limited to respondents who did participate in the study in the first place, and thus excludes those who were already non-responders in the first wave.

Based on the above arguments, we formulate three hypotheses regarding overall non-response rates, non-contact rates and refusal rates of frequent versus incidental offenders:

**Hypothesis 1:** Frequent offenders have higher non-response rates than incidental offenders: they are less likely to participate in a survey.
Hypothesis 2: Frequent offenders have higher non-contact rates than incidental offenders: they are less likely to be successfully contacted.

Hypothesis 3: Frequent offenders have higher refusal rates than incidental offenders: when contacted, they are more likely to decline an invitation to participate in a survey.

The three hypotheses are obviously interrelated. Specifically, if both Hypothesis 2 and Hypothesis 3 are confirmed, Hypothesis 1 must also necessarily be confirmed. On the other hand, if either Hypothesis 2 or Hypothesis 3 were not confirmed, Hypothesis 1 might still be confirmed.

Data

The present section describes our data sources and sampling strategy, the response and non-response categories that we distinguished, the attributes of the sampled individuals that could be linked to the response and non-response categories, and the statistical models used in the analysis.

Data sources and sampling strategy

The data were taken from the sample frame of the Online Activity Space Inventory Survey (OASIS), an internet survey that we developed to directly test hypotheses derived from crime pattern theory and the geometry of crime (Brantingham et al., 2017). In the survey, respondents themselves reported on their activities during the three years prior to the survey, the types of location they frequently visited, and where, when and how frequently they visited these.

After obtaining permission from the Dutch Ministry of Justice and Security, Dutch National Police and the ethical committee of the Law Faculty of the Vrije Universiteit Amsterdam, we selected 4170 individuals from the criminal suspect database of the Hague unit of the National Police. Inclusion of an individual in the database indicates that considerable evidence is available for successful prosecution of the suspected individual. Blom et al. (2005) estimated that over 90 percent of charges included in the criminal suspect databases of the Dutch police eventually result in either a transaction (typically a fine imposed) by the Public Prosecutor’s Office or a conviction by the judge in court. In the remainder, we will refer to all individuals in the police suspect database as ‘offenders’.

The selection comprised all 4170 individuals born between 1989 and 1997 who were registered in the database for an offence in the year 2013. They were in the age range of 18–26 years when asked to participate in the survey. For each individual, the database included their criminal records over the period 1996–2013. In the Netherlands, the minimum age for prosecution is 12 years.

Because the survey took place in May through October 2016, the latest police contact in 2014 could have been more than two years before the potential respondents were approached to participate in the online survey. Because residential mobility in delinquent populations is considerable (Tittle and Paternoster, 1988), we attempted to update the home address of all potential participants before contacting them.
In the Netherlands, there is no census as in most other countries in the world. Instead, as in the Nordic countries of Norway, Sweden, Denmark and Finland, the Dutch government in 1994 set up and has since maintained a digital population registry (Basis Registratie Personen, BRP) that continuously documents basic demographic and administrative data about its citizens. The registry includes, among other types of information, gender, date of birth, nationality and residential address, and each individual’s record contains links to the records of their parents, children and marital partners. The system contains information about every person who has a relationship with the Dutch authorities, including not only all individuals with Dutch nationality but also individuals who are employed in the Netherlands or who are otherwise obliged to pay taxes, who are entitled to welfare or other benefit schemes, who are seeking asylum or who are staying in the country for more than three months for some other reason. The BRP system does not include temporary visitors staying in the Netherlands for recreation or business, and it also excludes individuals who are staying in the country without permission (that is, illegal immigrants).

**Response and non-response categories**

To update the residential addresses of the sampled individuals, all individuals in the sample were looked up in the BRP database. The 222 individuals who were not registered in the BRP database were apparently tourists, visitors or illegal immigrants. Because it was extremely unlikely that they could be traced, they were listed as non-contacts.

Individuals registered in the BRP are entitled to indicate that their address information cannot be shared with certain agencies that use address information for non-essential purposes, such as research institutes, insurance companies or religious organizations. Because we were required to respect this guideline, we did not contact the 203 individuals who had opted out in this way, and they were also categorized as non-contacts.

For 289 people, the BRP system contained personal information but not a valid postal or residential address that we could use to contact them. This situation indicates that some government agency has verified that the individual does not live at the registered address, but no alternative address is known. Registered addresses outside the Netherlands that are valid are not excluded because participation in the online survey did not require the participant to live in the Netherlands. Individuals for whom no valid postal or residential address was available in the BRP were categorized as non-contacts.

Finally, four individuals could not be contacted because the BRP system indicated they had died. Their decease removes them from the target population and therefore from the sample frame.

In sum, the 718 individuals comprising the above four categories could not be contacted. We contacted the remaining 3452 individuals by postal mail to ask for their participation in an online research project labelled ‘Waar was het?’ (‘Where did it happen?’). The OASIS study was introduced as an online survey on young people’s whereabouts and safety. The invitation letter contained the URL of the website of the project. It also contained a unique personal access code that could be used to access the online survey, and it stated that participants would receive a €50 gift card after completing the survey.
After accessing the online survey with the code, potential participants received additional information on its contents. They could start the survey only after they had read and agreed with the study’s conditions, as specified in the online consent form. Confidentiality, anonymity and privacy were declared in the invitation letter and in the online survey environment.

The invitation letters were sent in three batches in May, June and September to 3452 individuals. A reminder was sent two weeks after the initial letter. A total of 123 letters were returned by the postal delivery services because the targeted individual appeared to be unknown at the recorded address. Successful postal delivery is no guarantee, however, that the other 3329 invitation letters had all been received and read by the addressee. Some of the letters may never have been seen, opened or read by the potential participants. Therefore, 3329 is the maximum number of potential participants that we may have successfully contacted.

Of these, 413 completed the online survey and 2916 did not. All seven response categories described above are summarized in Table 1.

### Measures and methods

The main outcome variable in our analysis is the response classification in Table 1. In the first part of the analysis, it is recoded into three binary dependent variables: non-response, non-contact and refusal. Non-response is defined for all individuals in the sample frame and indicates that the individual did not participate in the online survey. In Table 1, the sample non-response rate is \((T−P)/T\). Non-contact is also defined for all individuals in the sample frame. The sample non-contact rate is \((T−C)/T\) in Table 1. Refusal is defined only for individuals who were presumably successfully contacted. In Table 1, the sample refusal rate is \(R/C\). In the second part of the analysis, the full classification is the dependent variable.

The three independent variables are gender, age and offending frequency. All three were derived from the police data. Age was based on the registered date of birth, and defined as the age of the individual at the time data collection started (May 2016). Even though the age range is small (18–26 years), it was included as a nominal variable in the

### Table 1. Frequencies of all response categories.

| Response category                                      | No. | Percent | Abbreviation |
|--------------------------------------------------------|-----|---------|--------------|
| **Contacts**                                           |     |         |              |
| Participation (response)                               | 413 | 9.90    | P            |
| Refusal\(^a\)                                          | 2916| 69.93   | R            |
| Subtotal contacts                                      | 3329| 97.83   | C            |
| **Non-contacts**                                       |     |         |              |
| Individual not found in BRP (e.g. foreign tourist)     | 222 | 5.32    | F            |
| Mail returned                                          | 123 | 2.95    | U            |
| No valid address in BRP                                | 289 | 6.93    | A            |
| Opt-out indicator in BRP                               | 203 | 4.87    | O            |
| Deceased                                               | 4   | 0.10    | D            |
| Subtotal non-contacts                                  | 841 | 20.17   | N            |
| **Total**                                              | 4170| 100     | T            |

\(^a\)Invitation letter sent and not returned undeliverable, but no response received.
analysis in order to allow for the possibility of non-linear relationships with the outcome variables. Offending frequency is the number of crimes that had been registered for the individual in the criminal suspect database of the Dutch police up to and including the year 2014. Registrations include all property, violent, sexual, public order and other crimes that can lead to a conviction in the criminal court, but exclude ‘status offences’ such as under-age substance use, truancy and traffic violations.

The analysis proceeds in three steps. We start by describing the outcome variable and its bivariate relationships with offending frequency, gender and age. Next, to assess the role of offending frequency, gender and age on non-response, non-contact and refusal, we apply binary logistic regression models. These models are appropriate for modelling dichotomous outcome variables. Finally, to assess the relationships between offending frequency, gender and age and all categories in the response classification, we use a multinomial logistic regression model, which is appropriate for modelling nominal outcome variables with more than two categories.

**Results**

In Table 2, we describe plain univariate and bivariate results, showing how offending frequency, age and gender relate to survey unit non-response. In Tables 3 and 4, we present the results of the regression models.
Because the main objective of the study was to relate offending frequency to non-response rates (non-contact rates and refusal rates), the criminal history of the sampled individuals was reconstructed from the police data. Offending frequency was defined as the total number of crimes the individual had been listed for in the police data since the age of 12, including the offence in the year 2014 that formed the basis of sample selection. Most individuals (1738 or 42 percent) were listed with a single crime only, and a small minority of 13 percent was listed in the database with 10 or more crimes. About one-fifth of the sample (18 percent) were women. The age distribution, which was part of the definition of the sample frame, was almost uniform over the age range 18–25 years.

Table 2 also shows how offending frequency, gender and age are bivariately related to the overall non-response rate and to the underlying non-contact rate and refusal rate. On average, persistent offenders, men and older individuals have higher non-response rates and higher refusal rates. Non-contact rates seem to be weakly related to offending frequency and gender. Older individuals have higher non-contact rates.

**Regression models**

To disentangle the multiple relationships between offending frequency, gender and age and the three non-response indicators, we used binomial logistic regression models. To

### Table 3. Binomial logistic regression estimates (OR = odds ratio) of non-response, non-contact and refusal on offending frequency, gender and age.

|               | Non-response | Non-contact | Refusal |
|---------------|--------------|-------------|---------|
| **Offending frequency** |              |             |         |
| 1 crime (reference) | 1            | 1           | 1       |
| 2–3 crimes     | 0.931        | 0.764**     | 0.988   |
| 4–9 crimes     | 1.382*       | 0.679***    | 1.507** |
| 10+ crimes     | 1.654*       | 0.930       | 1.679*  |
| **Gender**     |              |             |         |
| Female (reference) | 1            | 1           | 1       |
| Male           | 1.417**      | 1.043       | 1.436** |
| **Age**        |              |             |         |
| 18 (reference) | 1            | 1           | 1       |
| 19             | 1.167        | 1.553*      | 1.091   |
| 20             | 1.158        | 1.661**     | 1.073   |
| 21             | 1.423        | 2.222***    | 1.235   |
| 22             | 1.568*       | 2.387***    | 1.343   |
| 23             | 1.679*       | 2.267***    | 1.468   |
| 24             | 2.237***     | 2.249***    | 1.950** |
| 25             | 2.036**      | 3.103***    | 1.651*  |
| N              | 4170         | 4170        | 3329    |

***p < .001; **p < .01; *p < .05, two-sided.

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allow for the detection of non-monotonic and non-linear relationships between non-response and its predictors, the latter were included as nominal (categorical) variables. The key results – odds ratio estimates and their levels of statistical significance – are summarized in Table 3.

In the first model, we regressed overall non-response on offending frequency, gender and age. In the second model, we regressed non-contact, and in the third model we regressed refusal on the same three variables. Whereas the first two models are estimated on the full sample, the third model is estimated only on the individuals who were assumed to have been successfully contacted. Although most of the bivariate relationships reported in Table 2 are suggestive of monotonic relationships between the independent and the dependent variables, the relationships do not appear to be strictly linear and need not transfer into a multivariate context. Therefore, both prior offending frequency and age were included as categorical variables.6

The first column of estimates in Table 3 shows that overall non-response is significantly larger among frequent offenders, and also among males and older individuals. With respect to prior offending frequency, the odds of non-response do not differ between those who were charged with a single crime and those who were charged with 2–3 crimes. As compared with adolescents with only a single previous crime, the odds of

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**Table 4.** Multinomial logistic regression estimates (RRR = relative risk ratio) of non-response categories on offending frequency, gender and age.

| Variables          | Not found in BRP | No valid address in BRP | Opted out of BRP | Mail returned | Refusal |
|--------------------|------------------|-------------------------|------------------|---------------|---------|
|                    | RRR              | RRR                     | RRR              | RRR           | RRR     |
| **Offending frequency** |                  |                         |                  |               |         |
| 1 crime (reference) | 1                | 1                       | 1                | 1             | 1       |
| 2–3 crimes         | 0.732            | 0.552**                 | 1.062            | 1.047         | 0.984   |
| 4–9 crimes         | 0.254***         | 0.653                   | 2.188**          | 3.659***      | 1.501** |
| 10+ crimes         | 0.088***         | 1.188                   | 4.233***         | 5.319***      | 1.688** |
| **Gender**          |                  |                         |                  |               |         |
| Female (reference) | 1                | 1                       | 1                | 1             | 1       |
| Male               | 2.046***         | 2.016***                | 0.568**          | 1.693         | 1.420** |
| **Age**            |                  |                         |                  |               |         |
| 18 (reference)     | 1                | 1                       | 1                | 1             | 1       |
| 19                 | 3.435*           | 3.647**                 | 1.025            | 0.942         | 1.09    |
| 20                 | 2.557            | 4.940***                | 1.084            | 0.985         | 1.069   |
| 21                 | 6.864***         | 6.740***                | 0.962            | 1.697         | 1.237   |
| 22                 | 5.039**          | 9.410***                | 1.421            | 1.819         | 1.346   |
| 23                 | 8.579***         | 7.918***                | 1.361            | 1.457         | 1.456   |
| 24                 | 11.599***        | 11.652***               | 1.359            | 1.879         | 1.956** |
| 25                 | 12.451***        | 14.264***               | 1.779            | 1.884         | 1.626*  |

Note: N = 4166 (excluding 4 deceased individuals).

***p < .001; **p < .01; *p < .05, two-sided.
non-response are 38 percent larger for those who committed 4–9 previous crimes, and 65 percent larger for those who committed 2–9 previous crimes.

Table 3 further shows that, against expectations, the probability of non-contact is lower among frequent offenders. In fact, the association between prior offending frequency and non-contact is curvilinear, as both one-time offenders (who had only one recorded crime) and notorious offenders (who had 10 or more recorded crimes) were more likely to be contacted than offenders who had 2–9 recorded crimes. Gender appears to be unrelated to non-contact, whereas non-contact is positively related to age.

With respect to refusal, the results are similar to those of overall non-response in terms of the direction of the relationships and the statistical significance of the estimates. Refusal is significantly more likely by offenders who had four or more crimes on their record than by offenders with fewer than four crimes on their record, and the odds of refusal increase monotonically with the number of prior crimes. Men are more likely to refuse than women, and there is a tendency for the likelihood of refusal to rise between ages 18 and 25.

Distinguishing the various causes of non-contact allows us to assess which causes of non-contact, if any, are related to prior offending frequency. To further scrutinize the unexpected results regarding non-contact, we estimated a multinomial logit model in which the outcome variable included, in addition to refusal, the various distinct causes of non-contact. As in the binary non-response model, the individuals who actually participated in the survey (the response group) are the reference category. They are thus contrasted with all categories of non-response (either non-contact or refusal). We excluded decease as a distinct cause, because including the four individuals who had deceased would lead to estimation issues and unreliable results. The results of the multinomial logit model are displayed in Table 4.

With respect to offending frequency, the relative risk ratio estimates and their associated significance levels in Table 4 demonstrate that frequent offenders were more likely to have an opt-out indicator set in their BRP registration, that their invitation letters were more likely to be returned as undeliverable and that they were more likely to refuse survey participation when invited. However, they were more likely than infrequent offenders to be included in the BRP census administration. Each of the five non-response reasons was more likely to apply to older than to younger offenders, and four of the five were more likely to apply to men than to women. Women, however, were more likely than men to have an opt-out indicator set in their records.

**Discussion**

The present study quantified the extent to which non-response and its two main causes – non-contact and refusal – are related to the frequency of prior offending in a sample of adolescent offenders taken from police records. Controlling for gender and age as potential confounders, our findings do not confirm that frequent offenders are less likely to be successfully contacted, but they do confirm that, if contacted, they are less likely to participate.

As hypothesized, the likelihood of refusal increased with the number of prior crime records, indicating that frequent offenders are less willing to participate. The hypothesis
that frequent offenders are more difficult to contact was rejected, however. Both one-time offenders and offenders with 10 or more recorded offences were more likely to be contacted than those who had 2–9 recorded offences. The increased refusal rates of frequent offenders confirm the findings from prior research (Van Batenburg-Eddes et al., 2012), although the refusal rate in our research is higher than the refusal rate in most prior studies, which have usually targeted younger age groups and have typically been based on school samples.

Our finding that contact rates for frequent offenders do not significantly differ from contact rates for occasional offenders is surprising though, because it contrasts with findings from prior work suggesting that frequent or ‘chronic’ offenders are less likely to participate in self-report delinquency studies because they are more difficult to find and contact (Cernkovich et al., 1985; Hagan and McCarthy, 1998; Shannon, 2006).

To explore this unexpected finding, we distinguished between four different causes of non-contact. Although these four causes are closely linked to the specifics of our research design and of the Dutch BRP population register, each also has implications for offender-based research that are relevant and applicable in other countries and jurisdictions, in broader research contexts and in different research designs.

The first cause occurs when an individual in the police records is not listed in the national BRP database. This cause of non-contact is most likely for individuals with a single police-recorded crime and less likely for frequent offenders. A plausible reason for this finding is that it applies to the police records of offenders who are temporary visitors to the Netherlands, such as tourists, and who do not have the Dutch nationality. These offenders are included in police files because they were charged with an offence, but they are not listed in the BRP database. Because most of them are temporary visitors to the Netherlands, few have more than a single offence in the police records. More generally, researchers should be aware that offender-based samples from police records generally include offenders who reside in other jurisdictions, and that tracing and contacting them might be more difficult than tracing and contacting local offenders – practically and possibly also legally.

Frequent offenders are more likely to opt out of the BRP, which means they do not give permission for their address information to be shared with research institutes and other agencies that have access to the BRP files. We believe this may reflect a greater distrust of governmental agencies and authorities by frequent offenders than by less active offenders. This interpretation is not restricted to the BRP registry and to the Netherlands, but can probably be generalized to other contexts where contacting offenders depends on the amount of information they have been willing to share with governmental agencies and other institutions that represent conventional society, including, for example, parole offices, schools, employment agencies, employers or hospitals. The finding that frequent offenders are more likely to opt out of the BRP seems to be at odds with their presumed weaker self-control. Opting out is not as easy as clicking a button. It requires some effort, skill and patience, whereas the benefits of not being solicited for research participation or other activities are long term, and they are uncertain because these requests may never arrive in the first place. A possible but speculative explanation is that many frequent offenders had been opted out before they were 18 years old by their parents or other caretakers when they were still in their care.
Alternatively, the assumption that frequent offenders have less self-control or have lower cognitive skills may require correction (Oleson and Chappell, 2012). Some of them might also constitute a special group that systematically avoids detection, either by refusing to participate in activities that may reveal their criminal lifestyle, or by actively trying to make themselves difficult to find by conventional organizations.

The proportion of postal mail that was returned as ‘undeliverable’ is larger among frequent offenders than incidental offenders. This may reflect that frequent offenders move more often than incidental offenders, a finding that is not limited to the Netherlands (for example, see Tittle and Paternoster, 1988).

Overall survey non-response is composed of the combined effects of non-contact and refusal. Our results demonstrate that the higher refusal rates of frequent offenders dominate the findings. As a result, and in line with the first hypothesis, we conclude that non-response is larger among frequent offenders than among incidental offenders. This finding implies that results based on self-reported delinquency are selective and thus biased towards infrequent offenders. If the aim of the research is to estimate levels of crime involvement, the selective non-response creates a downward bias in the estimated prevalence of delinquency, because the most frequent offenders are underrepresented. If the aim of the research is to investigate associations between offending frequency and other variables, which is usually the case, the bias towards infrequent offenders generates conservative estimates, that is, the estimated associations are likely stronger in reality than in the sample.7

Apart from contributing to a general understanding of how prior offending frequency affects non-response tendencies in offender-based research, our results could also be used to calculate weight factors to be applied in the analysis of the sample data. In the most straightforward case, we would assign to each respondent a weight that is inversely proportional to their predicted likelihood of response, conditional on gender, age and prior offending frequency (based on the non-response model reported in Table 3). This weight could be used in all subsequent analyses of the survey data to correct for the non-response bias that we demonstrated.

In addition, the finding that offending frequency increases refusal rates, but does not affect non-contact rates, suggests that any additional resources allocated to increasing response rates in self-report studies may be most effective when they are dedicated to increasing the motivation to participate, either by offering participants remuneration or by other means that increase the perceived benefits of participation.

Limitations

Our conclusions are subject to limitations and depend on some assumptions. An important limitation concerns one of the dependent variables, that is, the distinction between individuals contacted and individuals not contacted. Throughout the analysis, we assume that, if the invitation letter has not been returned undeliverable by the postal services, the potential respondent has received and read it. This need not always be the case. The invitation letter might not have been found, or it might have been discarded without being read, by either the prospective respondent, a family member or somebody else. If this is what happened to the first letter and the reminder, and if the offender did consequently not
participate, the offender is incorrectly assigned to the ‘refusal’ category, whereas ‘non-contact’ might have been the more appropriate category. This limitation, which is common to all research in which participants are contacted not in person but through postal or electronic mail, is one of the reasons we also analysed overall non-response, irrespective of whether a non-participating individual actually read and understood the invitation letter; in either case, the individual is a non-responder. If this scenario were to be more likely for frequent offenders than for infrequent offenders, our results underestimate frequent offenders’ likelihood of non-response and overestimate their likelihood of refusal. To make sure that invitations for survey participation actually reach the targeted individuals, few methods can beat personal contact or contact by telephone. These methods may also allow researchers to explore some of the arguments that individuals give for refusing to participate in the survey. Some social media also allow control over whether targeted individuals have received messages addressed to them, and the use of social media for initial and continued communication with survey participants deserves to be further explored.

Another limitation applies to prior offending frequency, the main independent variable. The number of offences that individuals had committed before they became part of our sample was derived from police records. However, police records underestimate involvement in criminal conduct. Not all crimes are reported to the police, and the police do not solve all crimes reported. Both selection mechanisms (whether a crime is reported and whether it is solved) may be subject to bias and thus lead to biased estimates in our analysis. For example, crimes committed by adolescents who reside in affluent neighbourhoods might be less likely to be reported to the police, or they might be less likely to be solved by the police, than crimes committed by adolescents from deprived neighbourhoods. If this were the case, we would underestimate the prior offending frequency of the former (affluent) group more strongly than the prior offending frequency of the latter (deprived) group, and our results would be biased. This limitation obviously applies to all research that relies on crime reported to and solved by the police for measuring an individual’s involvement in crime.

As has been argued in developmental and life course criminology, offending frequency is a limited measure of criminal involvement. Other dimensions are the duration of a criminal career, the recency of offending and the severity and types of crimes committed. Future studies could investigate whether these dimensions affect the likelihood of non-contact and refusal to participate in self-report surveys.

A final limitation concerns the overall generalizability of our findings. Our sample consists of a specific age group (18–25) and a specific relatively urbanized area in the Netherlands – the greater Hague area – and one particular online survey – OASIS. Its results do not necessarily apply outside these geographical, age and methodological boundaries. As a result, we would not advocate applying our findings to create weight factors for analysing other samples than the OASIS survey sample. Nevertheless, our findings and methodology could easily be applied to other samples, provided that an external measure of prior offending frequency is available (for example, police records).

We finish by returning to the key question addressed in this study, which is whether frequent offenders are more difficult to find and less willing to participate in self-report delinquency surveys. Concisely formulated, the answer is that they are less willing to
participate but not more difficult to find. The relevance of our findings is not that they help solve the dark-number issue by improving our estimates of the prevalence of offending. Their relevance is that they inform us about the usefulness of self-report crime data for testing theories of crime causation, which in contemporary criminology appears to be the main most important rationale for both offline and online self-report surveys.

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**Notes**

1. Non-response issues should be distinguished from validity issues. Validity issues refer to the truthfulness of participants’ responses to survey questions, rather than to their likelihood of survey participation in the first place. Studies on the validity of self-reported delinquency include Hindelang et al. (1981); Huizinga and Elliott (1986); and Farrington et al. (1996).
2. Samples of young people are often school-based, and contacts with potential participants are established via the school administration at the premises of the school. Although obtaining cooperation from schools is a challenge in its own right (Van der Gaag et al., 2019), school-based sampling may create similar issues of potentially selective non-response. For example, truancy may be more common among delinquent youths.
3. In addition, but less relevant to the issue of unit non-response, law-breakers and individuals who lack self-control complete fewer items in surveys (item non-response) and provide less valid and truthful answers (Hindelang et al., 1981; Huizinga and Elliott, 1986).
4. For a comprehensive description of the study design, the sample and the contents of the online survey, see Menting et al. (2020). That publication uses a sample size of 3451 because it excludes 719 individuals who in the present research are considered non-responders because they could not be contacted.
5. Guidelines for reporting survey responses suggest that refusal rates should be defined as the ratio of the number of individuals who decline the invitation to participate to the size of the sample frame (which includes individuals who have not been contacted). Because here we analyse refusal as a choice, and because individuals who have not been contacted can neither decline nor accept, we excluded the potential respondents who had not been contacted from the denominator.
6. As a check on the robustness of the findings, we also estimated the three models reported in Table 3 using a continuous version of offending frequency (number of offences registered) and using a continuous relative version (number of offences per year since age 12). The substantive conclusions regarding the effects of offending frequency on non-response, non-contact and refusal are identical to those made here on the basis of the categorical version of offending frequency. Results can be obtained from the authors.
7. An additional issue that is not addressed in the present study concerns the validity of the self-report measures: If frequent and incidental offenders do participate in surveys, are they equally likely to report their involvement in crime?
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