# DIFFERENCES IN UNDERCOVERAGE AND NONRESPONSE BETWEEN CITY NEIGHBOURHOODS IN A TELEPHONE SURVEY. [1]

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# DIFFERENCES IN UNDERCOVERAGE AND NONRESPONSE BETWEEN CITY NEIGHBOURHOODS IN A TELEPHONE SURVEY

*Summary.*—We studied two explanations for differences in undercoverage and nonresponse between neighbourhoods in a telephone survey among the inhabitants of the City of Groningen, The Netherlands. Are these differences a consequence of differences in population composition between neighbourhoods, or can these differences be explained by differences in social disorganization between neighbourhoods? To examine these explanations, we performed logistic multilevel analyses on a sample of 7000 inhabitants and all 14 city neighbourhoods. Our results show that the differences in undercoverage and nonresponse between neighbourhoods could be attributed for the greater part to variations in the population composition of the neighbourhoods. Social disorganization had no effect on nonresponse and only a small one on undercoverage: people in neighbourhoods which are in decay (indicated by prolonged vacancies and relatively frequent criminal offences) more often had no telephone or an unlisted number than people in other neighbourhoods.

Survey nonresponse varies between geographical areas, such as countries, urban and rural areas, and city neighbourhoods. Although these differences have long since been known, only recently the question why geographical areas differ in nonresponse has become the subject of systematic study (Goyder, Lock, & McNair, 1992; Groves & Couper, 1998; Johnson, O'Rourke, & Owens, 2002).

Two rivalling explanations can be put forward to account for these ecological differences. In the first, ecological differences in nonresponse are explained as *compositional* effects. Regions and neighbourhoods differ in the sociodemographic make-up of their residents. If these characteristics are also related to nonresponse, differences in population composition between geographical areas can explain why these areas differ in nonresponse. In this vein, Gelb (1975) interpreted differences in response rates between middle class and lower-class *neighbourhoods* as differences in response between middle-class and lower class *persons*.

The second, the *contextual* explanation assumes that social environments affect survey participation by shaping the context within which people decide about their reaction to a request for an interview. Goyder, *et al.* (1992), for instance, investigated the effects of social disorganization on differences in nonresponse (refusals) between and within three cities in Canada. Surprisingly, they only found differences between cities: the

nonresponse increased with increasing city size. No relationship was found between nonresponse rate and extent of social disorganization of city tracts. On the other hand, Groves and Couper (1998) did find evidence for social environmental influences on both contactability and survey participation in the USA. Besides characteristics of the built environment, such as population density and the prevalence of multiunit structures, factors related to social disorganization, such as crime rates, were related to nonresponse as well.

An important limitation of both the studies above is that the authors used only one level of analysis (the individual level) and treated the contextual characteristics as individual characteristics. In view of the fact that they wanted to study effects at the individual as well as at the contextual level, a multilevel analysis would have been more appropriate. A multilevel approach enables us to examine whether the differences between geographical areas are best explained by characteristics of the individuals living in these areas (compositional effects) or by characteristics of the social environment (contextual effects).

Another more general limitation of research in this field is that researchers almost exclusively study nonresponse and disregard a second important source of bias: *undercoverage*. In particular, telephone surveys based on a telephone directory, as the survey we analyzed in this article, are exposed to extensive undercoverage because some people have no telephone subscription or have an unlisted number. Moreover, what is equally important, telephone coverage varies with geographical area. For example, undercoverage in telephone surveys increases with increasing urbanization (e.g., Lavrakas, 1993, p. 34). Therefore, both undercoverage and nonresponse pose a threat to the representativeness of survey studies.

In this article, we report the results of a study of differences in undercoverage and nonresponse between neighbourhoods in a telephone survey. Central to our study is the question which theoretical approach explains the differences in both undercoverage and nonresponse between the neighbourhoods best. Are these differences a consequence of differences in *sociodemographic characteristics of the residents* of these neighbourhoods (composition effects)? Or are these differences a consequence of differences in *neighbourhood characteristics*, notably *social disorganization* (contextual effects)?

The *composition hypothesis* states that differences between neighbourhoods in sociodemographic characteristics of their residents which are also related to differences in undercoverage and nonresponse between individuals can explain why neighbourhoods differ in undercoverage and nonresponse. Two important dimensions on which neighbourhoods differ are the socioeconomic status and the social integration of their residents in important societal institutions, or the lack thereof (social isolation). Social integration is related to

position in the life cycle (marital status, household composition, age) and ethnicity and minority status.

The available literature shows that both dimensions are important in explaining both undercoverage (Ford, 1998; Keeter, 1995; Van Goor & Rispens, 2004) and nonresponse (Goyder, 1987; Green, 1996; Van Goor & Rispens, 2004). Therefore, we used a number of characteristics related to socioeconomic status and social integration of individual residents to determine whether differences in undercoverage and nonresponse between city neighbourhoods were the result of composition effects.

The *contextual hypothesis* posits that neighbourhoods affect survey participation by influencing the norms, attitudes and expectations of their residents, which in turn influence the disposition of local residents towards answering requests for survey participation. In particular, we expect that the social disorganization of a neighbourhood influences both the non-accessibility (undercoverage) and the contactability and non-willingness to participate in surveys (nonresponse) of the residents. How can we explain these effects?

Social disorganization and crime are particularly widespread in neighbourhoods that are poor, ethnically mixed and have a high residential mobility (e.g., Sampson & Raudenbush, 1999/2000). Furthermore, social disorganization and crime influence the attitudes and behaviour of local residents leading to fear of crime, distrust, and feelings of powerlessness (e.g., Ross, Mirowsky, & Pribesh, 2001; Taylor, 1996).

Therefore, in poor and socially disorganized neighbourhoods, people will have less often a telephone subscription because they cannot afford it. But unlisted numbers will be widespread too, because the social disorganization and the concomitant feelings of fear and distrust will cause people to avoid and protect themselves from strangers (distrusted neighbours as well as outsiders). For example, in the Netherlands, unlisted phones were widespread among white inhabitants of poor and disorganized areas and, even more so, among ethnic minorities living for the greater part in disadvantaged areas as well (Engbersen, 1990; Engbersen & Vervaart, 1993). Therefore, we expect more undercoverage in socially disorganized neighbourhoods.

With regard to nonresponse, additional insights can be gained from research on the effects of urbanization on helping behaviour, including participation in surveys. In these studies, nonresponse (in particular refusal) is interpreted as an indicator of unhelpful and distrusting behaviour towards strangers. Helpfulness (including participation in surveys) and level of urbanization are strongly related: urbanites are less helpful than people in rural areas, but no linear relation between population size and helpfulness appears to exist (Steblay, 1987). These seemingly contradictory results can be explained when other environmental characteristics are taken into account. House and Wolf (1978) showed that differences in refusals are not primarily related to population size

or level of urbanization of one's place of residence, but to differences in local crime rates. They maintain that participation in surveys is related to the social organization of one's place of residence. This interpretation is supported by a study of Levine, Martinez, Brase & Sorenson (1994) on helping behaviour in U.S. cities: they found that population density, economic factors, violent crime rates and environmental problems affect helping behaviour. Hence, we assume that social disorganization leads to feelings of fear, distrust and unhelpfulness which results in people answering telephone calls less often, for instance by using a caller-identification device, as well as in people being more inclined to refuse talking to a stranger who calls on behalf of a government agency or a research organization. Therefore, we expect, apart from any composition effect, the characteristics of the neighbourhood to have an independent effect on undercoverage and nonresponse.

## METHOD

### *Data*

In 1996, the Bureau of Research of the City of Groningen, The Netherlands, held a telephone survey among the city's population 16 years and older. The City of Groningen is a provincial capital and university town with approximately 170,000 inhabitants. A sample of 7000 *individual persons* (individual names and associated addresses) was drawn from the municipal population register. Next, the national telephone company made available the telephone numbers belonging to these addresses. This procedure allowed us to accurately determine the number of people dropping out as a consequence of undercoverage. Interviews were administered by CATI (Computer Assisted Telephone Interviewing). Preceding the interview, all prospective respondents were informed about the study by letter.

The data set contained the original sample of 7000 persons. Of all persons, we knew whether or not they belonged to the undercoverage category (no telephone subscription or an unlisted number) or to the nonresponse category (did not answer the telephone or refused to cooperate). Unfortunately, the data set did not allow us to further break down the categories of undercoverage and nonresponse.

The municipal Bureau of Research linked, *at the individual level*, data on unemployment, social assistance benefit, marital status, size and composition of household, age, country of origin, and gender to all 7000 persons. The population register from which these data have been taken is the only source of information for all individuals in the original sample, but only a limited number of variables can be extracted from this source. To measure SES, we used data on unemployment and social assistance benefits; to measure social integration, we

used variables related to the life cycle (marital status, composition and size of household, age). Country of origin ('ethnic group') can be interpreted in terms of both SES and social integration. Ranking the ethnic groups according to average socioeconomic deprivation (SES) or social distance to the indigenous Dutch (social integration) yielded the same results (Van Goor & Rispens, 2004, p. 38). Finally, we also included gender.

Following municipal practice, we divided the city into 14 neighbourhoods containing, on average, approximately 12,000 inhabitants. The data on the neighbourhoods are also from municipal data sets.

To measure social disorganization *at the neighbourhood level*, we used eleven indicators: the three classical indicators of Shaw and McKay (1942), six supplementary neighbourhood characteristics, and two crime variables. 1. *Socioeconomic status*. To measure the socioeconomic status of a neighbourhood, we added the *Z* scores of nine income-related variables (e.g., average household income and percentage of households with a housing benefit per neighbourhood) which loaded on one factor in a factor analysis. 2. *Residential stability*: percentage of the neighbourhood population living at their present address for over six years. 3 and 4. *Ethnic heterogeneity* was measured by two variables. Firstly, percentage of neighbourhood population originating from Western countries or Indonesia (a former Dutch colony) ('non-Dutch'); and, secondly, percentage of the neighbourhood population of non-Western descent ('non-Western'), that is from all other countries. 5. *Age of neighbourhood*: percentage of houses in a neighbourhood built before 1945. 6. *Vacancies*: percentage of houses in a neighbourhood vacant for over a year. 7. *Residential density*: average household size per neighbourhood. 8. *Presence of teen peer groups*: percentage of the neighbourhood population between ten and twenty years of age. 9. *Family disruption* was measured by three variables relating to the presence of single-parent households, singles, and divorced persons in the neighbourhood. Because these variables loaded on one factor, they were combined in one index of family disruption. 10 and 11. *Crime (offenders and offenses)*. Crime was measured by two variables: percentage of arrests among the neighbourhood population during 1994-96 and percentage of criminal offenses in the neighbourhood reported to the police during the same period. Included were arrests and criminal offenses concerning crimes against persons, property crimes, vandalism, and disturbing the peace.

We used the neighbourhood variables in two ways. Firstly, we combined the *Z* scores of these variables into one overall index of social disorganization at the neighbourhood level. Secondly, we performed a factor analysis on the neighbourhood variables to determine whether separate dimensions of social disorganization could be discerned. The factor analysis produced four factors. On the basis of these results, we created four new variables summing the *Z* scores of the variables loading .40 or higher on a factor. The first component indicated to what

extent a neighbourhood was characterized by a stable middle-class population. Post-war neighbourhoods with families with young children and with a stable population scored high on this component. The second component measured the extent of both socioeconomic deprivation and social marginality of the neighbourhood population. Neighbourhoods with a low average income, with relatively high numbers of singles, one-parent families, members of ethnic minority groups, and persons arrested for criminal activities scored high on this dimension. The third component combined the physical decay of the neighbourhood (vacancies) with criminal offences to which local residents in particular fall victim. The fourth component represented the mobility of the neighbourhood population.

### *Method of analysis*

A multilevel design enabled us to examine variables at the individual level as well as at a 'higher' level: in our study, individuals and city neighbourhoods. Because both dependent variables were of a discrete (dichotomous) nature (known or unknown telephone number; interviewed or not), we used a logistic multilevel model (Snijders & Bosker, 1999).

We tested four different models. Model 0, the so-called 'empty' model, shows which part of the variance is located at the individual level and the neighbourhood level respectively. In Model 1, the explanatory variables at the individual level were added. Model 2 consisted of the individual characteristics and our overall index of neighbourhood disorganization. In Model 3, the four dimensions of social disorganization were included. In this way, we could examine which of the dimensions had the strongest effect on undercoverage and nonresponse. The dimensions were tested separately because of the small number of neighbourhoods.

## RESULTS

### *Description of undercoverage and nonresponse at the neighbourhood level*

The percentage of persons with a known telephone number varied considerably between neighbourhoods, from 49.5% to 78.3% ($M$ = 64.4%; $SD$ = 7.8). The percentage of interviewees varied less strongly, from 44.9% to 60.5% ($M$ = 51.6%; $SD$ = 4.6). As a consequence of both undercoverage and nonresponse, the final response varied between 22.4% in the City Center and 47.3% in a recently developed suburban neighbourhood ($M$ = 33.4%; $SD$ = 5.9). Interestingly, there was a positive relationship between undercoverage and nonresponse in the neighbourhoods: $r$ = .41 ($p$ = .08, one-tailed; N = 14), which means that losses caused by both sources of

error tend to cumulate. These results make it clear that the neighbourhoods differed considerably in undercoverage and nonresponse and also that undercoverage caused the greatest differences. Furthermore, our data show that both sources of error in combination resulted in a great loss of potential respondents, in one neighbourhood even up to almost 80%!

Table 1 about here

*Undercoverage: composition versus context*

Table 1 shows the results of the analyses for undercoverage. The variance at the individual level was fixed at 3.29 (Snijders & Bosker, 1999, pp. 224-225). Using in Model 0 the approach proposed by Snijders and Bosker (1999) for determining the proportion of unexplained variance at the individual level and the neighbourhood level, we found that 2.4% of the total variance could be ascribed to the neighbourhood level; 97.6% belonged to the individual level. Therefore, the unexplained variance at the neighbourhood level was small.

In Model 1, the individual characteristics were added. As the results show, those variables generally related to undercoverage, like position in the life cycle (age, marital status, household composition), gender, ethnicity and minority status (country of origin), and a weak and marginal socioeconomic position (unemployment and social assistance benefit) were also important factors in our study. The most important source of bias was country of origin: four of the five dummy variables had a strong, statistically significant effect ($p < .01$).

Just how much of the variance was explained by the individual characteristics? Calculating the proportion explained variance for Model 1 in the same way as for Model 0, we found that 10.4% of the total variance was explained by the variables at the individual level. 88.6% of the variance was unexplained variance at the individual level and 1.0 % was unexplained variance at the neighbourhood level. Thus, compared to Model 0, Model 1 showed that the individual characteristics were responsible for a decrease of the unexplained variance from 97.6% to 88.6% at the individual level and from 2.4 percent to 1.0% on the neighbourhood level. Therefore, the individual variables explained a large part of the proportion unexplained variance at both levels. Not much unexplained variance at the neighbourhood level was left to be explained by the neighbourhood characteristics.

Testing Model 2, the model with our overall index of social disorganization, we found that our overall index had a statistically significant effect. Calculating the proportion explained variance in the same way as for Model

1, we found that 11.4% of the total variance was explained by Model 2. Only 0.6% of the total variance was unexplained variance at the neighbourhood level and 87.9% was unexplained variance at the individual level. A comparison of Model 2 with Model 1 showed that our overall index was responsible for a decrease of 0.4% of the unexplained variance at the neighbourhood level.

Next, we calculated the effects of the four factors, one by one, in Model 3. The effects of factor 1: stable middle-class neighbourhood ($t$ = -1.14), factor 2: socioeconomic and social deprivation ($t$ = 1.26) and factor 4: residential mobility ($t$ = 1.49) were not statistically significant (results not shown). The results for factor 3: physical and social decay of the neighbourhood, were statistically significant: $t$ = 2.38 (see Table 1, Model 3). People living in neighbourhoods with prolonged vacancies and with relatively high crime rates had more often no known telephone number. When we calculated the proportion explained and unexplained variance at the individual and the neighbourhood level in the same way as before, we found that Model 3, with only factor 3 at the neighbourhood level, explained 10.9% of the total variance. The proportion unexplained variance at the individual level was 88.5% and at the neighbourhood level 0.6%. Compared to Model 1, neighbourhood decay explained an extra 0.4% of the variance at the neighbourhood level.

*Nonresponse: composition versus context*

Table 2 shows that the estimate of the unexplained variance at the neighbourhood level was not statistically significant. This means that the neighbourhoods did not differ significantly in response rate. Calculating the proportion unexplained variance of Model 0, we found that only 0.4% of the total variance was unexplained variance at the neighbourhood level and, hence, 99.6% was unexplained variance at the individual level. Because of the negligibly low variance at the neighbourhood level, the research questions concerning the explanation of differences between neighbourhoods were not relevant anymore. Hence, we decided to examine only the effects of the individual characteristics in Model 1. The calculation of the explained variance showed that only 2.7% of the total variance was explained by the individual variables. 0.1% of the total variance was unexplained variance at the neighbourhood level. Therefore, the individual characteristics caused a decrease in unexplained variance at the neighbourhood level from 0.4% to 0.1%. 97.2% of the total variance was unexplained variance at the individual level.

Table 2 about here

## Conclusion

We found considerable differences between the neighbourhoods in undercoverage, and, to a lesser extent, also in nonresponse. The final response ranged between 22% in the City center and 47% in a recently developed suburban neighbourhood. On average, both factors together resulted in a loss of two-thirds of the original sample.

Are the differences in undercoverage and nonresponse between neighbourhoods best explained by individual characteristics (composition effect) or by neighbourhood characteristics (degree of social disorganization, a contextual effect)? Our study shows that the unexplained variance at the neighbourhood level was small, both for undercoverage (2.4%) and nonresponse (0.4%). We have to bear in mind, though, that logistic multilevel models in general explain less variance at the collective level than linear multilevel models (cf. Snijders & Bosker, 1999). Next, in both cases, the unexplained variance at the neighbourhood level was for the most part explained by individual characteristics, which confirms the composition hypothesis. Nevertheless, in the case of undercoverage, Model 2 (overall index of social disorganization) and Model 3 (extent of neighbourhood decay) still showed small but statistically significant effects for neighbourhood characteristics, which lends some support to the contextual hypothesis. It appeared that inhabitants of decaying neighbourhoods relatively frequently had no telephone subscription or an unlisted number.

In sum, we, therefore, conclude that, in our study, differences in population composition were far more important in explaining differences in undercoverage and nonresponse between city neighbourhoods than differences in social disorganization. Social disorganization only played a minor role (undercoverage) or no role at all (nonresponse).

Our study is of an exploratory and limited nature: we studied only one medium-sized provincial capital and university town. Furthermore, the data set did not allow us to break down the categories of undercoverage and nonresponse. This limited our analyses, because a subdivision of these categories (no telephone and unlisted number; not-at-home and refusal) would lead to a more detailed understanding of the ways in which

neighbourhood characteristics act upon survey participation. Moreover, it seems worthwile to study in detail in future research the underlying mechanisms which assumably play a pivotal role in the bridging of social environment and individual (survey) behavior.

Because of these limitations, no far-reaching conclusions can be drawn. However, our results agree with those of Goyder, *et al*. (1992) who also found no relationship in case of nonresponse. The results of Groves and Couper (1998) who found a relation between social environmental factors, among which crime rates, on the one hand and contactability and survey participation on the other, may look at first sight at odds with ours. However, they also showed that the social environmental effects they found could in large part be explained by differences in household composition. In combination, these results suggest that social environmental factors have, at best, only small effects on nonresponse, and that differences in nonresponse between neighbourhoods are largely caused by differences in population composition.

In case of undercoverage, we found both compositional and, although to a lesser extent, contextual effects. Whether this conclusion holds more generally is hard to tell because to our knowledge our study is the only one which examined this topic in a systematic way.

Which implications do our results have for survey research? Firstly, telephone surveys using a telephone directory as their sampling frame have to contend with large and varying levels of undercoverage between neigbourhoods. In some situations, Random Digit Dialing (RDD) may offer a solution to this problem. But although RDD can reduce undercoverage, it is unclear to what extent differences between neighbourhoods will disappear in this way too. Not only do neighbourhoods differ in the percentage of people without a telephone, but nonresponse is in all likelihood also higher among people with unlisted numbers. Secondly, because neighbourhoods differ in population composition and also in social environmental factors, it may be worthwhile to devise field work strategies which are tailored to these neighbourhood differences. Neighbourhoods with widespread undercoverage and/or high levels of nonresponse require more efforts and have to be approached in a different way than middle class neighbourhoods whose residents are more easily accessible and more inclined to cooperation. Efforts and strategies may vary, for instance, in the way people are approached (prenotification,

interview introductions, persuasion strategies), number of callbacks and time of calls, as well as in the characteristics of the interviewers deployed.

## REFERENCES


ENGBERSEN, G. (1990) *Publieke Bijstandsgeheimen: Het ontstaan van een onderklasse in Nederland*. Leiden/Antwerpen: Stenfert Kroese.

ENGBERSEN, G. & VERVAART, J. (1993) Geheime nummers: De Nederlandse onderklasse houdt zich gedekt. *Intermediair* 29, no. 35 (September 3): 25-29.

FORD, E. S. (1998) Characteristics of survey participants with and without a telephone: findings from the Third National Health and Nutrition Examination Survey. *Journal of Clinical Epidemiology,* 51, 55-60.

GELB, B. D. (1975) Incentives to increase survey returns: social class considerations. *Journal of Marketing Research,* 12, 107-109.

GOYDER, J. (1987) *The silent minority: nonrespondents on sample surveys*. Cambridge, UK: Polity Press.

GOYDER, J., LOCK, J., & MCNAIR, T. (1992) Urbanization effects on survey nonresponse: a test within and across cities. *Quality and Quantity,* 26, 39-48.

GREEN, K. E. (1996) Sociodemographic factors and mail survey response. *Psychology & Marketing,* 13, 171-184.

GROVES, R. M., & COUPER, M. P. (1998) *Nonresponse in household surveys*. New York: Wiley.

HOUSE, J. S., & WOLF, S. (1978) Effects of urban residence on interpersonal trust and helping behavior. *Journal of Personality and Social Psychology,* 36, 1029-1043.

JOHNSON, T. P., O'ROURKE, D., & OWENS, L. (2002) Culture and survey nonresponse. In R. M. Groves, D. A. Dillman, J. L. Eltinge & R. J. A. Little (Eds.), *Survey nonresponse*. New York: Wiley. Pp. 55-69.

KEETER, S. (1995) Estimating telephone noncoverage bias with a telephone survey. *Public Opinion Quarterly,* 59, 196-217.

LAVRAKAS, P. J. (1993) *Telephone survey methods: sampling, selection, and supervision* (Sec. ed.). Newbury

Park, CA: Sage.

LEVINE, R. V., MARTINEZ, T. S., BRASE, G., & SORENSON, K. (1994) Helping in 36 U.S. cities. *Journal of Personality and Social Psychology,* 67, 69-82.

ROSS, C. E., MIROWSKY, J., & PRIBESH, S. (2001) Powerlessness and the amplification of threat: neighborhood disadvantage, disorder, and mistrust. *American Sociological Review,* 66, 568-591.

SAMPSON, R. J., & RAUDENBUSH, S. W. (1999/2000) Systemic social observation of public spaces: a new look at disorder in urban neighborhoods. *American Journal of Sociology,* 105, 603-651.

SHAW, C. R., & MCKAY, H. D. (1942) *Juvenile Delinquency and Urban Areas: A Study of Rates of Delinquency in Relation to Differential Characteristics of Local Communities in American Cities*. Chicago: The University of Chicago Press.

SNIJDERS, T., & BOSKER, R. (1999) *Multilevel analysis: an introduction to basic and advanced multilevel modeling*. Trowbridge/Wiltshire, UK: The Cromwell Press.

STEBLAY, N. M. (1987) Helping behavior in rural and urban environments: a meta-analysis. *Psychological Bulletin,* 102, 346-356.

TAYLOR, R. B. (1996) Neighborhood responses to disorder and local attachments: the systemic model of attachment, social disorganization, and neighborhood use value. *Sociological Forum,* 11, 41-74.

VAN GOOR, H., & RISPENS, S. (2004) A middle class image of society: a study of undercoverage and nonresponse bias in a telephone survey. *Quality & Quantity,* 38, 35-49.

TABLE 1
Nonstandardized Effect Parameters of Individual and Neighbourhood Characteristics on Undercoverage (Dependent Variable 'Telephone Subscription and Listed Number' [= Known Telephone Number]: 0 = yes; 1 = no)

| Variables | Model 0 | | Model 1 | | Model 2 | | Model 3 | |
|---|---|---|---|---|---|---|---|---|
| | *B* | *SE* | *B* | *SE* | *B* | *SE* | *B* | *SE* |
| INDIVIDUAL CHARACTERISTICS (*N*=7000) | | | | | | | | |
| *Gender (0=female; 1=male)* | | | -0.15** | 0.05 | -0.15** | 0.05 | -0.15** | 0.05 |
| *Marital status (married=ref.):* | | | | | | | | |
| widowed (0=no; 1=yes) | | | 0.23* | 0.14 | 0.23* | 0.13 | 0.24* | 0.14 |
| divorced (0=no; 1=yes) | | | 0.66** | 0.11 | 0.66** | 0.11 | 0.66** | 0.11 |
| unmarried (0=no; 1=yes) | | | 0.12 | 0.09 | 0.11 | 0.09 | 0.11 | 0.09 |
| *Age (in years)* | | | -0.01** | 0.00 | -0.01** | 0.00 | -0.01** | 0.00 |
| *Country of origin (Nether-lands=ref.)* | | | | | | | | |
| Western countries (0=no; 1=yes) | | | 0.23* | 0.13 | 0.23* | 0.13 | 0.23* | 0.13 |
| Indonesia (0=no; 1=yes) | | | 0.74** | 0.12 | 0.74** | 0.12 | 0.74** | 0.12 |
| Surinam/Antilles (0=no; 1=yes) | | | 1.12** | 0.17 | 1.12** | 0.17 | 1.13** | 0.17 |
| Turkey/North Africa (0=no; 1=yes) | | | 1.79** | 0.37 | 1.77** | 0.37 | 1.79** | 0.36 |
| Other countries (0=no; 1=yes) | | | 0.61** | 0.14 | 0.61** | 0.14 | 0.61** | 0.14 |
| *Unemployment (0=no; 1=yes)* | | | 0.15* | 0.09 | 0.15* | 0.09 | 0.15* | 0.09 |
| *Social assistence benefit (0=no; 1=yes)* | | | 0.77** | 0.10 | 0.77** | 0.10 | 0.77** | 0.10 |
| *Household composition (living together=ref.):* | | | | | | | | |
| One-parent family (0=no; 1=yes) | | | -0.05 | 0.15 | -0.05 | 0.15 | -0.04 | 0.15 |
| Standard family (0=no; 1=yes) | | | -0.40** | 0.15 | -0.40** | 0.15 | -0.39** | 0.15 |
| Three or more adults plus children (0=no; 1=yes) | | | 0.26 | 0.33 | 0.25 | 0.33 | 0.26 | 0.33 |
| Single (0=no; 1=yes) | | | 0.43** | 0.12 | 0.43** | 0.12 | 0.42** | 0.12 |
| *Size of household (number)* | | | 0.08 | 0.09 | 0.08 | 0.09 | 0.08 | 0.09 |
| NEIGHBOURHOOD CHARACTERISTICS (*N*=14) | | | | | | | | |
| *Overall index social disorganization* | | | | | 0.33* | 0.14 | | |
| *Factor 3: decay of neighbourhood* | | | | | | | 0.12* | 0.05 |
| Constant | -0.57** | 0.08 | -1.30** | 0.25 | -1.31** | 0.25 | -1.31** | 0.25 |
| Variance at individual level | 3.29 | 0.00 | 3.29 | 0.00 | 3.29 | 0.00 | 3.29 | 0.00 |
| Variance at neighbourhood level | 0.08* | 0.04 | 0.04* | 0.02 | 0.02 | 0.01 | 0.02 | 0.01 |

Note: One-tailed *t*-test; level of significance: * α = .05; ** α = .01.

TABLE 2
Nonstandardized Effect Parameters of Individual and Neighbourhood Characteristics on Nonresponse (Dependent Variable 'Interviewed': 0 = yes; 1 = no)

| Variables | Model 0 | | Model 1 | |
|---|---|---|---|---|
| | *B* | *SE* | *B* | *SE* |
| INDIVIDUAL CHARACTERISTICS (*N*=4394) | | | | |
| *Gender (0=male; 1=female)* | | | 0.16** | 0.06 |
| *Marital status (married=ref.)* | | | | |
| Widowed (0=no; 1=yes) | | | 0.39** | 0.15 |
| Divorced (0=no; 1=yes) | | | 0.39** | 0.15 |
| Unmarried (0=no; 1=yes) | | | 0.40** | 0.10 |
| *Age (in years)* | | | 0.00* | 0.00 |
| *Country of origin (Netherlands=ref.)* | | | | |
| Western countries (0=no; 1=yes) | | | 0.07 | 0.16 |
| Indonesia (0=no; 1=yes) | | | -0.11 | 0.18 |
| Surinam/Antilles (0=no; 1=yes) | | | 0.45* | 0.27 |
| Turkey/North Africa (0=no; 1=yes) | | | 1.71* | 0.80 |
| Other countries (0=no; 1=yes) | | | 1.01** | 0.22 |
| *Unemployment (0=no; 1=yes)* | | | 0.07 | 0.12 |
| *Social assistance benefit (0=no; 1=yes)* | | | 0.09 | 0.16 |
| *Household composition (living together=ref.)* | | | | |
| One-parent family (0=no; 1=yes) | | | 0.07 | 0.19 |
| Standard family (0=no; 1=yes) | | | -0.07 | 0.17 |
| Three or more adults plus childeren (0=no; 1=yes) | | | 0.53 | 0.44 |
| Single (0=no; 1=yes) | | | 0.21 | 0.14 |
| *Size of household (number of persons)* | | | 0.07 | 0.10 |
| Constant | -0.06 | 0.05 | -0.75** | 0.31 |
| Variance at individual level | 3.29 | 0.00 | 3.29 | 0.00 |
| Variance at neighbourhood level | 0.01 | 0.01 | 0.00 | 0.01 |

Note: One-tailed *t*-test; level of significance: * $\alpha = .05$; ** $\alpha = .01$.