

PSYCHIATRIC EPIDEMIOLOGY

Evaluation of non-response bias in mental health determinants and outcomes in a large sample of pre-adolescents

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Abstract. Since non-response may jeopardize the validity of studies, comprehensive assessment of non-response is a prerequisite for proper interpretation of study findings. Recently, the baseline assessment of the TRacking Adolescents' Individual Lives Survey (TRAILS), a prospective cohort study among Dutch pre-adolescents, was completed. The aim of this report is to examine non-response bias by comparing responders and non-responders regarding mental health determinants (e.g., demographics and cognitive performance) and outcomes, as well as associations between the two. Furthermore, we examine whether extended efforts to recruit participants

contribute to the prevention or reduction of non-response bias. Thanks to various recruitment procedures, the initial response rate of 66% increased to a final rate of 76%. The extended efforts to recruit participants prevented non-response bias in the prevalence rates of psychopathology. Although non-responders differed from responders with respect to several individual characteristics, no significant differences were found regarding associations between these characteristics and psychopathology. We conclude that TRAILS provides a solid basis to improve our understanding of the development of mental health during adolescence.

Key words: Adolescent behavior, Cohort studies, Longitudinal studies, Mental health, Prospective studies, Selection bias

Abbreviations: CI = confidence interval; GLM = generalized linear model; OR = odds Ratio; TRAILS = tracking adolescents' individual lives survey

Introduction

The importance of longitudinal population-based studies for understanding the etiology of mental health problems is broadly acknowledged. However, many factors threaten the validity of such studies, amongst others non-response and attrition. Most studies, but not all [1], have found that, compared to responders, non-responders have less favorable relations with peers [2–4], a lower socioeconomic status [5], a less favorable lifestyle [6], different psychological characteristics [6] and higher levels of psychopathology [4, 7]. To reduce non-response, various recruitment efforts, including special interview training, reminder letters, phone calls, home visits and incentives, have been developed and employed in many social and epidemiological studies [7, 8]. Such recruitment efforts have been reported to increase the response [9] and may reduce or prevent non-response bias. Preferably,

studies comprehensively evaluate and, if necessary, adjust for non-response bias. This however requires relevant information on non-responders, which is often scarce or absent.

This report focuses on non-response at the first measurement wave in the TRacking Adolescents' Individual Lives Survey (TRAILS). TRAILS used extended recruitment efforts. We denote the participants recruited by these extended efforts as late or difficult-to-recruit responders, whereas the participants recruited in the first phase are denoted as early or easy-to-recruit responders. To evaluate the impact of non-response comprehensively, we collected information about non-responders from different sources, e.g., parents, teachers and classmates.

The objectives of this report are to (1) assess the impact of extended recruitment efforts on *reducing* non-response bias in prevalence rates of mental health determinants and outcomes, and (2) examine the extent of *residual* non-response bias in prevalence

rates and determinant-outcome associations, i.e. does non-response bias still occur between responders including those recruited with the extended efforts versus definite non-responders. Both questions are important. Extended recruitment efforts can be very costly, hence quantifying their impact on survey estimates will permit cost-benefit considerations; and insight in residual non-response bias will help to evaluate the validity of the current and future TRAILS results.

Methods

Study design

The TRacking Adolescents' Individual Lives Survey (TRAILS), a prospective cohort study among Dutch pre-adolescents, was developed by a consortium of investigators from different institutions and universities in The Netherlands. The main objective of the TRAILS consortium is to contribute to the understanding of the development of psychopathology, as well as the underlying etiological mechanisms. TRAILS is a multidisciplinary study with data on various domains of determinants and outcomes collected in multiple sources (child, parent, teacher and classmates) with multiple methods (self-report measures, face-to-face interviews, (neuro)cognitive tests, and biological measures). Since the incidence of emotional and behavioral problems increases substantially in adolescence, TRAILS follows pre-adolescents (age 10–12) until the age of 24 with biennial assessments. This report is based on data collected during the first measurement wave, which

ran from March 2001 through July 2002. The survey was approved by the national ethical committee 'Centrale Commissie Mensgebonden Onderzoek'. Informed consent was obtained of all parents after the nature of the study had been fully explained. More details on the objectives, design, assessments and quality assurance measures can be sent upon request.

Sampling procedures

The sample selection involved two successive stages, summarized in Figure 1. First, to select the target sample of pre-adolescents, five municipalities in the North of The Netherlands were requested to provide information from the community registers (i.e., name, date of birth, gender, and address) of all inhabitants born between 10-01-1989 and 09-30-1990 (Groningen, Leeuwarden) and between 10-01-1990 and 09-30-1991 (Assen, Dantumadeel, Winschoten). Subsequently, all primary schools ($n = 135$), including schools for special education, received a letter accompanied by detailed information about the goals, design and practical procedures of TRAILS. School participation was a prerequisite for eligible children and their parents to be approached. A total of 13 primary schools (9.6% of the primary schools) refused to participate, resulting in the exclusion of 338 children of the population of 3483 children.

Second, to recruit the children and their parents, parents or guardians received a short and personally signed introduction letter accompanied by two visually attractive and pleasantly readable information brochures, one for themselves and one for their children. The letter and brochures were meant to inform

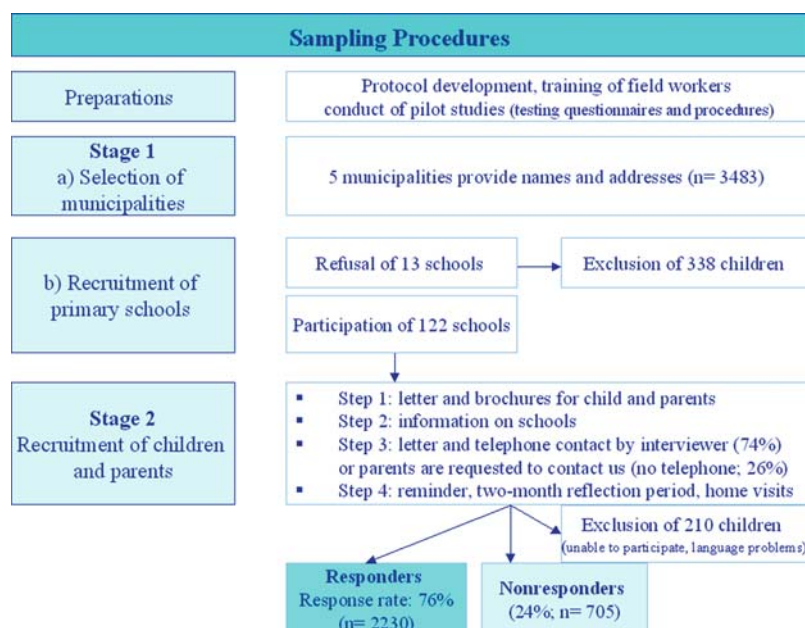


Figure 1. Sampling procedures.

the potential participants about the study goals, selection procedure, confidentiality, and measures administered during the baseline measurement. Approximately 1 week later, a TRAILS staff member visited the schools to tell eligible children about the study. Shortly thereafter, an interviewer, already announced in the introduction letter, contacted parents by telephone. All interviewers were carefully selected and received a training course tailored to the purpose of their task. Interviewers made phone calls at different times of the day and on days of the week, in order to maximize probability of contact. Parents who refused to participate were asked for permission to call back in about 2 months. This two-month-reflection period was used to minimize the number of refusals due to temporary reasons. Dependent on the reasons of refusal, the same interviewer or one of the staff members contacted the parents again after 2 months. Parents with an unlisted telephone number were requested to contact us and pass on their number. If they reacted neither to the introduction letter, nor to a reminder letter sent a few weeks later, a staff member or experienced interviewer paid a personal visit to their house. After two home visits without contact, a letter was left with a reply card and a pre-paid envelope. Children were excluded ($n = 210$) if they were incapable to participate due to severe mental retardation or a serious physical illness or handicap, or if no Dutch-speaking parent or parent surrogate was available. Turkish and Moroccan parents who were unable to speak Dutch were interviewed in their own language.

Data collection and measures

To assess non-response bias, we categorized the eligible participants into three groups: (1) early responders (participation after the initial letter with or without reminder); (2) late responders (participation after 2-month reflection period, home visit or the

letter left after the second home visit without contact); and (3) non-responders (explicit refusal or no contact). Data used in this report come from four sources: community registers, parents, teachers and classmates. Table 1 presents the data available for each of these three groups.

Community registers – Information on gender and age was available for all (non)responders from the community registers.

Parent – Information on family composition and parental level of education was obtained during a comprehensive face-to-face interview with the responders and a short interview with the non-responders.

Teacher – Both responders and non-responders were asked for permission to collect information from their child's teacher. The teacher questionnaire for (non)responders contained questions on cognitive performance and problem behaviors. We decided to collect teacher information on these variables rather than parental information, since parental information might be confounded by response status. Teachers' ratings of problem behaviors were obtained with the Teacher Checklist of Psychopathology, containing nine items with descriptions of problem behaviors: withdrawn, somatic complaints, anxious/depressed, social problems, thought problems, attention problems, activity/impulsivity, aggressive behavior, delinquent behavior; corresponding to the dimensions of the Teacher Report Form [10]. Response options for each description ranged from 0 'not applicable' to 4 'very clearly or frequently applicable'. A score for internalizing problems was calculated by averaging the scores for withdrawn, somatic complaints and anxious/depressed; a score for attention/hyperactivity problems was calculated by averaging the scores for attention problems and activity/impulsivity; and a score for externalizing problems by averaging the scores for aggressive behavior and delinquent behavior.

Table 1. Sources of information and available data

| Sources of information | Early responders | | Late responders | | Early and late responders | | Non-responders | |
|--|------------------|------|-----------------|------|---------------------------|------|----------------|------|
| | No. | (%) | No. | (%) | No. | (%) | No. | (%) |
| Community registers | | | | | | | | |
| Gender and age | 2085 | 100 | 145 | 100 | 2230 | 100 | 705 | 100 |
| Parent | | | | | | | | |
| Family composition and educational level | 2057 | 98.7 | 131 | 90.3 | 2188 | 98.1 | 418 | 59.3 |
| Teacher | | | | | | | | |
| Cognitive performance | 1800 | 86.3 | 114 | 78.6 | 1914 | 85.8 | 285 | 40.4 |
| Psychopathology | 1809 | 86.8 | 116 | 80.0 | 1925 | 86.3 | 287 | 40.7 |
| Classmates | | | | | | | | |
| Sociometric status | 970 | 46.5 | 48 | 33.1 | 1018 | 45.7 | 232 | 32.9 |

Classmates – During the class administration of the self-report questionnaires, sociometric status of (non)responders was assessed by means of peer nominations. In classes with at least 10 participating children, children received a list of all classmates and were asked to indicate whom of the classmates they liked or disliked. We listed all classmates because, in agreement with the literature [4], we thought that removing the names of a small number of children without parental consent had greater potential to stigmatize those children than leaving their names on the list. Sociometric status was defined as being popular, average, controversial, rejected, or neglected [11]. Sociometric status was available for 84 non-responders with parental information and 148 non-responders without parental information.

Data analysis

The quality of the data was ascertained by monitoring reports (e.g. percentage of response, response realized by each interviewer, incomplete data), regular contacts with interviewers and quality control by staff members. All questionnaires were scanned into the computer, converted, verified and subsequently data were checked.

First, we compared the sociometric status of non-response children with and without parental information. Since we consider sociometric status an important indicator of psychosocial adjustment, we used this analysis to evaluate whether, and to which extent, the group of non-responders with parental information were representative of the total group of non-responders.

To evaluate the impact of the extended efforts to recruit participants, the early responders were compared with the group consisting of both the late responders and non-responders, which is labeled as initial non-responders. To assess the residual non-response bias, early and late responders were compared with the final non-responders. Differences between groups were tested using χ^2 tests for dichotomous

variables and Mann–Whitney tests for ordinal variables.

Logistic regression analysis was applied to calculate odds ratios (ORs) and 95% confidence intervals (CIs) for each association separately for responders and non-responders. Selected outcomes were (1) internalizing problems, (2) attention/hyperactivity problems and (3) externalizing problems. To test whether associations between determinants and outcomes were different for responders and non-responders – in other words, whether non-response interacted with the determinants – we employed an additive model, rather than a multiplicative one; because only additive effects can be conceptualized unambiguously [12]. Additive interaction effects cannot be tested in a logistic regression model, because logistic regression models multiplicatively link the predictor variables to the outcome. Therefore, the interaction effects were tested using a generalized linear model (GLM) with a binomial distribution and identity link function, which offers the opportunity to test additive effects, while taking into account the dichotomy of the outcome variable. Differences between groups and interaction effects were considered to be significant if $p < 0.05$.

Results

Table 2 summarizes the results of the recruitment of the 2935 eligible children and their parents. After the above-described recruitment procedures to facilitate participation, the initial response rate of 66% increased to a final response rate of 76%. Most frequent explanations for non-response were no interest (33.8%), participation in other research or unfavorable experiences with research (15.4%), too much of a burden on the child (12.2%), lack of time (10.3%), concerns about privacy and confidentiality (8%), and child does not want to participate because friend(s) do not participate (4%). Only in 34 cases (1.2%) we failed to contact anyone in the household.

Table 2. Effect of different recruitment procedures on the response rate

| | Cumulative response rate | | |
|-------------------------------------|---|---|------------------|
| | Telephone contact by interviewer (n = 2176) | Parents are requested to contact TRAILS (parents without listed telephone number) (n = 759) | Total (n = 2935) |
| Response (%) after | | | |
| Initial letter | 78 | 30 | 66 |
| Reminder | | 50 | 71 |
| Two-month reflection period | 80 | | 72 |
| Home-visit | | 63 | 76 |
| Letter left after second home-visit | | 64 | 76 |
| Total | 80 (n = 1745) | 64 (n = 485) | 76 (n = 2230) |

Table 3. Sociometric status for nonresponders with and without parental information

| | Non-responders with information | Non-responders without information | Total |
|-------------------------------------|---------------------------------|------------------------------------|-------|
| Sociometric status (%) ^a | | | |
| Popular | 10.7 | 10.1 | 10.3 |
| Average | 60.7 | 53.4 | 56.0 |
| Controversial | 2.4 | 6.1 | 4.7 |
| Neglected | 11.9 | 12.8 | 12.5 |
| Rejected | 14.3 | 17.6 | 16.4 |

^aFrequencies are presented for 32.9% of the non-responders ($n = 232$) because peer nominations were only determined in classes with at least 10 participants. Data were available for 84 non-responders with information and 148 non-responders without information.

Table 3 presents sociometric status of non-responders with and without parental information to assess the impact of missing non-response information. No significant differences were found for sociometric status, although non-responders without parental information tended to be less frequently average ($\chi^2 = 1.17, p = 0.28$) and are more frequently controversial ($\chi^2 = 1.62, p = 0.20$).

The characteristics of (early) responders and (initial) non-responders regarding mental health determinants and outcomes are presented in Table 4. Significant differences were present for almost all determinants for both comparisons (early responders vs. initial non-responders and responders vs. final non-responders). For some variables (single parent, rejection), however, only significant differences were present for the comparison of early responders and initial non-responders, showing that the extended recruitment efforts reduced the non-response bias for some determinants. When comparing early responders with the initial non-responders, we found significant differences for almost all indices of psychopathology, except somatic complaints, anxious/depressed and thought problems. The prevalence rates of psychopathology showed no significant differences between early and late responders and final non-responders. Hence, without extended efforts the prevalence of psychopathology would have been underestimated in the sample.

Finally, Table 5 presents the associations between determinants and important study outcomes: internalizing problems, attention/hyperactivity problems, and externalizing problems. Comparison of the ORs for responders and non-responders did not yield a consistent pattern. As might be expected, all determinants were significantly associated with one or more outcomes; but there was no consistent trend in the direction of higher or lower ORs for the non-responders, and no significant interaction effects were found with GLM.

Discussion

Knowledge of the development of mental (ill)health, as well as the underlying etiological mechanisms, has

great importance for effective prevention and intervention measures. Epidemiological studies have provided insight in the occurrence of mental health disorders [5, 13–15] and their negative consequences [16–21]. Furthermore, several large prospective cohort studies have been important in establishing risk factors for psychopathology [6, 22–32]. Despite numerous studies, the development and etiology of mental (ill)health are still poorly understood. To improve our understanding of the development of mental health, an important objective of the staff of TRAILS was to build a rich and high quality database during the baseline assessment, including the prevention of non-response bias.

Thanks to various recruitment procedures, the initial response rate of 66% increased to a final rate of 76%. Against a background of declining response rates in surveys (8, 33), we consider our response rate of 76% as quite adequate, particularly given the extensive baseline assessments and the required participation of both the parent and child. Probably, the large variety of measures to facilitate participation has contributed to this response rate. Features of our study design were personally signed letters, attractive brochures, personal contact with eligible children during the information at schools, carefully selected and well-trained interviewers, sampling in a geographically limited area, and media appearances.

To enable a comprehensive analysis of non-response bias, information on mental health determinants and outcomes was collected for both responders and non-responders. Missing data of part of the non-responders may have hampered our analysis of non-response bias. However, based on the observation that sociometric status of non-responders with and without parental information showed no significant differences, we assume that non-responders with and without additional information were largely comparable.

The first objective of this report was to assess the impact of extended recruitment efforts for the prevention or reduction of non-response bias. In our study, the extended efforts to facilitate participation proved to be beneficial as evidenced by the recruitment of more vulnerable children after extended recruitment efforts. If late responders had been excluded from our

Table 4. Characteristics of responders and non-responders

| | Without extended recruitment efforts | | With extended recruitment efforts | |
|---|--------------------------------------|------------------------|-----------------------------------|----------------------|
| | Early responders | Initial non-responders | Early and late responders | Final non-responders |
| Mental health determinants | | | | |
| Girls (%) | 50.9** | 44.1 | 50.8*** | 43.1 |
| Single parent (%) | 14.7* | 18.4 | 15.3 | 16.5 |
| No siblings (%) | 9.0* | 12.6 | 9.2* | 12.7 |
| Low educational level parent (%) ^a | 31.8*** | 44.8 | 32.6*** | 44.2 |
| <i>Unsatisfactory school performance (%)^b</i> | | | | |
| Language skills | 18.4*** | 31.8 | 19.6*** | 28.9 |
| Arithmetic skills | 21.4*** | 34.3 | 22.9*** | 29.6 |
| Gymnastic skills | 5.4*** | 11.0 | 5.9*** | 9.8 |
| Creative skills | 5.1*** | 11.8 | 5.6*** | 10.8 |
| Need for additional help due to learning difficulties (%) | 20.5*** | 29.0 | 21.1** | 28.4 |
| <i>Sociometric status (%)</i> | | | | |
| Popular | 18.1** | 11.4 | 18.1** | 10.3 |
| Average | 50.8 | 52.1 | 50.0 | 56.0 |
| Controversial | 6.7 | 5.7 | 6.9 | 4.7 |
| Neglected | 12.2 | 12.9 | 12.3 | 12.5 |
| Rejected | 12.2* | 17.9 | 12.8 | 16.4 |
| Mental health outcomes | | | | |
| <i>Psychopathology^c</i> | | | | |
| Withdrawn | 20.8** | 27.1 | 21.6 | 24.8 |
| Somatic complaints | 13.4 | 16.8 | 13.9 | 14.8 |
| Anxious/depressed | 19.3 | 20.2 | 19.4 | 20.0 |
| Social problems | 15.6*** | 19.4 | 16.3 | 16.4 |
| Thought problems | 6.0 | 8.0 | 6.4 | 6.0 |
| Attention problems | 30.6** | 38.1 | 31.6 | 34.6 |
| Activity/impulsivity | 20.0** | 26.8 | 20.9 | 23.7 |
| Aggressive behavior | 17.5* | 21.8 | 18.2 | 19.2 |
| Delinquent behavior | 6.6* | 10.2 | 7.1 | 8.0 |
| Internalizing problems | 21.5* | 26.6 | 22.0 | 25.1 |
| Attention/ hyperactivity problems | 28.5** | 36.8 | 29.7 | 32.5 |
| Externalizing problems | 12.2* | 17.6 | 13.0 | 14.3 |

Significant differences at * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$ between early responders and initial nonresponders; and early and late responders and final nonresponders.

^aEducational level ranges from 1 'elementary education' to 7 'university degree'. Percentages were calculated covering response option 1 (elementary education) to 3 (lower tracks of secondary education).

^bResponse options for school performance ranged from 1 'unsatisfactory' to 5 'excellent'. Percentages were calculated covering response option 1 and 2 'almost satisfactory'.

^cResponse options for each description of the Teachers Checklist of Psychopathology range from 0 not applicable' to 4 'very clearly or frequently applicable'. For the assessment of psychopathology percentages were calculated covering response option 2 'apply a little or sometimes' to 4.

sample, there would have been an underestimation of the prevalence of psychopathology. A number of previous studies have also reported that additional efforts to recruit participants resulted into more accurate estimates of prevalence rates, risk factors and the associations between risk factors and outcomes [34, 35]. In other studies, however, the benefits of additional efforts were very small or negligible [36, 37]. The benefits of additional efforts may depend on a wide range of factors, for instance the type of health outcome [38]. Due to the large differences in study topics, design and populations, it is not rational to draw

general conclusions with regard to the impact of extended efforts on the reduction of bias. Nonetheless, our results suggest that extended efforts to recruit study participants certainly pay off in mental health surveys among children and adolescents.

Although our results underscore the importance of extended recruitment efforts, extended efforts might also be accompanied with detrimental effects on data quality, if late responders have more incomplete information [7]. In our study, late responders had more missing data indeed (Table 1). Awareness of these problems is important for the future data

Table 5. Associations between mental health determinants and outcomes for responders and nonresponders

| Variables ^b | Internalizing problems ^a | | | Attention/hyperactivity problems ^a | | | Externalizing problems ^a | | | | | |
|--|-------------------------------------|----------|----------------|---|-----|----------------|-------------------------------------|----------|----------------|----------|-----|-----------|
| | Responders | | Non-responders | Responders | | Non-responders | Responders | | Non-responders | | | |
| | OR | 95% CI | OR | 95% CI | OR | 95% CI | OR | 95% CI | OR | 95% CI | | |
| Gender (girl = 0, boy = 1) | 1.1 | 0.9, 1.4 | 1.4 | 0.8, 2.4 | 2.9 | 2.4, 3.6 | 3.1 | 1.7, 5.4 | 3.7 | 2.7, 5.0 | 2.0 | 1.0, 4.4 |
| Single parent (no = 0/yes = 1) | 1.6 | 1.2, 2.2 | 1.5 | 0.7, 3.3 | 1.7 | 1.3, 2.2 | 2.6 | 1.3, 5.2 | 2.4 | 1.8, 3.3 | 3.1 | 1.4, 6.8 |
| Presence of siblings (yes = 0/ no = 1) | 1.3 | 0.9, 1.9 | 1.0 | 0.4, 2.5 | 1.2 | 0.9, 1.7 | 1.0 | 0.5, 2.3 | 1.7 | 1.1, 2.5 | 1.2 | 0.4, 3.4 |
| Educational level parent (high = 0/low = 1) | 1.4 | 1.1, 1.8 | 1.2 | 0.7, 2.2 | 1.7 | 1.3, 2.1 | 1.1 | 0.6, 2.0 | 1.7 | 1.3, 2.4 | 1.4 | 0.6, 3.0 |
| Unsatisfactory school performance (no = 0, yes = 1) | | | | | | | | | | | | |
| language skills | 2.1 | 1.7, 2.7 | 2.8 | 1.6, 5.0 | 6.2 | 4.9, 7.9 | 5.1 | 2.9, 8.9 | 3.2 | 2.4, 4.3 | 3.6 | 1.8, 7.2 |
| arithmetic skills | 2.4 | 1.9, 3.0 | 3.3 | 1.9, 5.8 | 5.4 | 4.3, 6.7 | 3.8 | 2.2, 6.5 | 2.5 | 1.9, 3.3 | 3.4 | 1.7, 6.8 |
| gymnastic skills | 5.1 | 3.4, 7.5 | 4.9 | 2.2, 11.0 | 3.0 | 2.0, 4.4 | 1.7 | 0.8, 3.7 | 2.1 | 1.3, 3.3 | 1.8 | 0.7, 4.9 |
| creative skills | 2.5 | 1.7, 3.8 | 3.3 | 1.5, 7.1 | 7.2 | 4.6, 11.2 | 4.0 | 1.8, 8.6 | 5.5 | 3.7, 8.3 | 5.3 | 2.3, 12.1 |
| Need for additional help (no = 0/ yes = 1) | 2.0 | 1.6, 2.6 | 2.1 | 1.2, 3.8 | 3.4 | 2.7, 4.2 | 3.1 | 1.8, 5.3 | 1.7 | 1.2, 2.3 | 1.7 | 0.9, 3.5 |

OR = odds ratio; CI = confidence interval.

^aThe dependent variables were defined to be 0 if the score was lower than 2, and 1 if the score range from 2 to 4.^bSociometric status was not selected because the number of cases in the four cells was insufficient.

collection and analysis of TRAILS. Therefore, we increased the quality promoting measures in cases with a special history in the second data collection wave of our study (2003–2004).

Non-response is affected by many factors such as the saliency of the research topic, perceived threat or embarrassment, non-contact, number and timing of phone calls, and expected personal benefit from responding [9, 37, 39]. Fortunately, non-contact was negligible in our study, due to our strategy to administer phone calls until contact and to pay at least two home visits in families without listed phone numbers. Notwithstanding all efforts to facilitate participation, our findings show that some groups of children are somewhat under-represented in our sample. In agreement with other studies we found that children with lower cognitive performance were more often non-responders [4, 40]. Probably, these children tend to avoid activities such as filling out questionnaires or performing test. It has been suggested that individuals performing less well may be more reluctant to participate because the research situation might be associated with feelings of embarrassment or treat [39].

For the evaluation of non-response, however, it is more important to investigate whether non-response bias exists in the estimated prevalences of psychopathology and associations between determinants and psychopathology. As observed in previous studies [1], it seems unlikely that our estimates of psychopathology are underestimated due to non-response. Furthermore, no indication for selective non-response was found for the associations between determinants and outcomes. Our results underscore that adjustment for selective non-response in potential risk factors such as sociodemographic variables may be unnecessary, since non-response bias may be negligible for relevant study outcomes despite differences between responders and non-responders with respect to potential risk factors, which is in accordance with other study findings [3, 39, 41].

In conclusion, the extended efforts to recruit participants were important for the reduction of non-response bias. No indication of non-response bias was found for the prevalence estimation of psychopathology in our study. Although non-responders differed from responders with respect to several characteristics, no significant differences were found regarding associations between these characteristics and psychopathology. In our opinion, the baseline data of TRAILS provide a solid basis to improve our understanding of the development of mental health.

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