



THE NORWEGIAN CENTER FOR  
CHILD BEHAVIORAL DEVELOPMENT

# A Flowchart of Participation and Collected Data Across 15 Years of *The Behavior Outlook Norwegian Developmental Study (BONDS)*

Harald Janson, Görel Eriksson Bringedal, & Ane Nærde

The Norwegian Center for Child Behavioral Development  
Oslo, Norway  
March 2023



## **A FLOWCHART OF PARTICIPATION AND COLLECTED DATA ACROSS 15 YEARS OF THE BEHAVIOR OUTLOOK NORWEGIAN DEVELOPMENTAL STUDY (BONDS)**

Harald Janson, Görel Eriksson Bringedal, and Ane Nærde

**The Norwegian Center for Child Behavioral Development (Nasjonalt utviklingssenter for barn og unge, NUBU), Oslo, Norway**

March 2023

### *ABSTRACT*

This report describes participation and collected data across the 15 first years of an ongoing prospective, longitudinal Norwegian study of early social development; BONDS (The Behavior Outlook Norwegian Developmental Study). The BONDS is aimed at generating knowledge about children's social, behavioral and academic development from age 6 months and onward. In the 15-year period from 2006 to 2021, eleven major waves of data collection from the children's parents were implemented, as well as additional data collections from child care centers and schools. The period covered the original study up to 4 years as well as two renewed consent periods: from 5 years through Grade 2, and from 2018 through 2021 when the three cohorts of children were in 5th to 9th grade. A flow chart (Figure 1) shows participation, non-participation, and inactivity across data collection waves. Altogether 96.7% of the original 1159 participants were still participating at the end of the original study period at age 4: 85.9% in Grade 2 at the end of the first renewed consent period, and 43.3% in 2021 (Grades 7-9) at the end of the second renewed consent period.

### *ACKNOWLEDGEMENTS*

We thank Tonje K. Fehn-Jacobsen and Sigrid Madslie for invaluable assistance with retrieving and quality controlling participation information from the project's contact databases. This research was supported by the appropriations to the Norwegian Center for Child Behavioral Development, and partially by grants from the Research Council of Norway (Grants 202438/S20, 283438/H20, and 212260/HRO). The authors are very grateful to the families who participated in the study, as well as to interviewers, child health clinics, municipalities, child care centers, and schools that made the study possible by their participation or support.

Correspondence should be addressed to  
Ane Nærde, The Norwegian Center for Child Behavioral Development,  
P.O. Box 7053 Majorstuen, N-0306 Oslo, Norway.  
E-mail: [ane.narde@nubu.no](mailto:ane.narde@nubu.no)

## 1. THE STUDY

The BONDS (Behavior Outlook Norwegian Developmental Study) conducted by the Norwegian Center for Child Behavioral Development, focuses on children's social development from 6 months onwards, with respect to social, behavioral and academic development [1]. The study is generally guided by Bronfenbrenner's social-ecological framework [2] and that of the social interaction-learning model [3, 4]. A specific aim is to identify individual developmental pathways leading to competence and problems, and predictors related to this development. Another objective is to provide an empirical basis for the early identification of children at risk for poor developmental outcomes. The study is particularly designed to contribute new knowledge about the role of fathers and that of child care experiences for children's subsequent development within the Norwegian context.

The current report describes participation and collected data across the 15 first years of the project.

## 2. RECRUITMENT AND CONTINUED PARTICIPATION

Figure 1 (see page 8) displays a flow chart which shows participation, non-participation, and inactivity across data collection waves, as well as the numbers of participants who contributed the main types of data.

### 2.1. THE ORIGINAL SAMPLE

As reported elsewhere [1], the original population-based sample of the BONDS consisted of 1159 children (559 girls and 600 boys) from five municipalities in southeast Norway. Recruitment took place in 2006-2008 at publicly funded child health clinics, which are attended almost universally. Inclusion criteria were the child being of the appropriate age and one parent being able to participate without an interpreter. Families of 1931 eligible children were informed about the project. Of the 1465 (76% of those eligible) who agreed to be contacted, 1159 (79% of those contacted or 60% of those eligible) opted to participate. The sample was fairly representative of the general population, however, somewhat biased toward mothers with higher education, fewer immigrant parents, more firstborns, and fewer single mothers [1], and thus similar to what is typically found for volunteers in population-based studies.

### 2.2. STRATEGIES FOR REDUCING ATTRITION

Several measures were taken to reduce the burden on participants in the hope of increasing the likelihood that they would stay motivated to continue to volunteer data to the project. From study start and until the end of the first continuation in Grade 2, the project employed interviewers with training in childcare or healthcare, who received thorough training and follow-up. Participants were assigned to one personal interviewer for continuity of contact. Personal interviews and video observations were conducted in central premises in the municipalities where participants had been recruited, or could be conducted in the participants' home if they so preferred. Appointments were made flexibly and adjusted to participants' timetable. Parking fees were refunded. A gift card representing a small monetary compensation was furthermore given to participants for their time spent at interviews (e.g., NOK 200, about USD 35 in 2011 currency, for participating parents at personal interviews up to age 4). Regular newsletters were distributed

to participants who had opted to receive them, and up to age 4 an annual lottery took place, in which NOK 10 000 (~ USD 1700 in 2011 currency) was disbursed to a randomly chosen participating family. The project further informed child care centers and schools who were asked to contribute data about the project, and personnel and teachers were invited to theme days with researchers.

### 2.3. GIVEN REASONS FOR DISCONTINUATION

Norwegian law protects the rights of research participants to withdraw or discontinue participation without giving a reason. Participants who volunteered a reason almost always cited time constraints as their reason for not continuing their participation. Moving abroad, which made participation difficult, was also cited by a few families.

### 2.4. PARTICIPATION IN THE ORIGINAL STUDY UP TO 4 YEARS

Out of the originally 1159 participating children, the families of two children withdrew exercising their right to have all collected data deleted prior to data analysis; for these two families the only retained statistic was the child's gender (which was a sampling parameter and not collected data). Up to and including the last data collection of the original study period at 4 years, the families of another 36 children had opted to discontinue data collection, leaving a total of 1121 children (96.7% of the original 1159) still participating in the study at 4 years (1149 [99.1%] still participating at 1 year; 1136 [98.0%] at 2 years; 1128 [97.3%] at 3 years, respectively).

Mothers and fathers were both invited to contribute data at ages 6 months. At 1, 2, and 3 years, one parent was primarily invited to the interview: the father at 1 and 3 years, and the mother at 2 years. At 4 years, while the mother was primarily invited, the father was also asked to contribute questionnaire reports. A small proportion of participants did not contribute data at each time point; the most frequent reason being that an interview could not be scheduled due to parents' time constraints, travels, illness, or similar. In a handful of cases, part of or all data from an interview or questionnaire was also lost due to technical failure of computerized interview, questionnaires lost in mail, or similar. The total number of children for which any caregiver data was secured at 4 years was 1081 (96.4% of the participating children at that age and 93.3% of the original 1159; at earlier ages the numbers of children for whom any caregiver data was secured was 1155 [99.7% of the original 1159] at 0.5 years, 1107 [95.5%] at 1 year, 1090 [94.0%] at 2 years, and 1070 [92.3%] at 3 years).

In addition to parent reports, the project also collected data from additional sources when parents consented to this, including the following:

- Reports from the child's child care center at 2, 3, and 4 years (if the child was in center-based child care and the parents had given explicit consent to ask the child care center for reports). Reports from child care centers were provided for 751 children at age 2 (64.8% of the original 1159), 828 at age 3 (71.4%), and 700 children at age 4 (60.4%).
- Videotaped interactions of one parent and the child at 1, 2, and 3 years. By study design, one parent was primarily invited to the interview at these ages, and it was the interaction between the invited parent and the child that was videotaped. Fathers were primarily invited at age 1 and 3, and mothers at age 2. A number of families opted not to participate in videotaped interactions, or were not able to because of time or location

constraints, and a handful of interactions were lost for technical reasons, bringing the total number of children with videotaped interactions with at least one parent to 945 at age 1 year (82.2% of those still participating, and 81.5% of the original 1159). At age 2, 932 videotaped interactions were contributed (80.4% of the original 1159), and at age 3 the number of contributed interactions was 827 (71.4% of the original 1159).

- A brief testing session at age 4 with the child including age-appropriate tests of vocabulary, motor development, and effortful control. 945 children (84.3% of those still participating, and 81.5% of the original 1159) completed at least one of the three tests.

## **2.5. FIRST CONTINUATION THROUGH GRADE 2 WITH RENEWED CONSENT**

Participants remaining in the study throughout the original study period up to 4 years were asked for renewed consent to continue participation through Grade 2 (in the child's 8th year). A small proportion declined continuation, and contact could not be established for securing confirmation or non-confirmation of consent with some. In the first round of data collection in the renewed consent period, at age five, 1024 children (88.4% of the original 1159) were participating, and 962 parents (93.9% of those still participating, or 83.0% of the original 1159) contributed data. The mother was primarily invited to take part in the telephone interviews at 5 years and when the child was in Grade 2, and when the child was in Grade 1, the father was primarily invited to take part in the interview, and the mother was also invited to contribute questionnaire reports.

Reasons for no parent contributing data were the same as earlier. In the last round of data collection in the first renewed consent period, when the children were in Grade 2, 996 children (85.9% of the original 1159) were participating, and 924 parents (92.8% of those participating, or 79.7% of the original 1159) contributed data. In Grades 1 and 2, the child's school teacher also provided questionnaire reports for consenting parents; in Grade 1, the teachers of 877 children contributed reports (87.0% of children still participating, or 75.7% of the original 1159), and in Grade 2, the teachers of 901 children (90.5% of children still participating, or 77.7% of the original 1159) provided data. Reasons for teachers' not contributing data included no parent consent for teachers' data contribution, declination of the school or teacher to collect data, or nonresponse of the teacher.

## **2.6. SECOND CONTINUATION IN 2019-2021 (GRADES 5-7 THROUGH 7-9) WITH RENEWED CONSENT**

Participants remaining in the study throughout the continuation study up to Grade 2 (in the child's 8th year) were contacted again in 2018-2019 and asked for renewed consent to participate in a third study period with data collection in 2019-2021 (child age about 11-15 years; the children would be in Grade 5, 6, or 7 in 2019 and in Grade 7, 8, or 9 in 2021).

At the time of the request for consent, the project had not been in contact with participating parents, except for sending newsletters, for a period of 2-5 years. The data collection was planned to be carried out digitally, and the interviewers who had been the participants' primary contact person were no longer with the project. Consequently, participants were contacted by telephone, mail and/or e-mail by project staff with whom they for the most part had not been in contact with before. For some families, contact details (mail, telephone or e-mail) could not be established, and for some families contact between the project and the family could not be established for other reasons. Due to changes in legislation involving an expansion of persons'

right to the protection of personal data which had been put in place since the previous rounds of consent, more comprehensive information was provided to participants than in previous rounds, and the process of giving renewed consent was more extensive. All in all, up to the final data collection in 2021 in the second continuation of the project, parents of 503 children (43.3% of the original 1159) had given consent for themselves, or their child, or the child's teacher, to contribute data to at least one of the three yearly data collections in the consent period. At the end of the second continuation in 2021, the families of 502 children (43.3% of the original 1159) were still participating, while there were 154 non-participants (who had either withdrawn from the study, declined or discontinued further participation at an earlier time point, in addition to one deceased child), and 503 inactive participants (for whom consent in the last continuation was insufficient – e.g., only by one parent – or who had agreed to be contacted at some later time point, or with whom contact had not been successfully established).

In the second continuation of the study, both parents were invited to contribute questionnaire reports at all three times. One or both parents contributed questionnaire reports for 323 children in 2019 (69.0% of those still participating, and 27.9% of the original 1159), 414 children in 2020 (84.5% of those still participating, and 35.7% of the original 1159), and 427 in 2021 (85.1% of those still participating, and 36.8% of the original 1159). Reasons for no data from any caregiver included when the project did not send out questionnaires to participants (due to e.g., consent received too late for data collection or administrative failure), when caregivers did not complete/return questionnaires or questionnaires were not received by project for other reasons, and when families had not consented to provide data from caregivers but had consented to other parts of the data collection (i.e., teacher and official registry data).

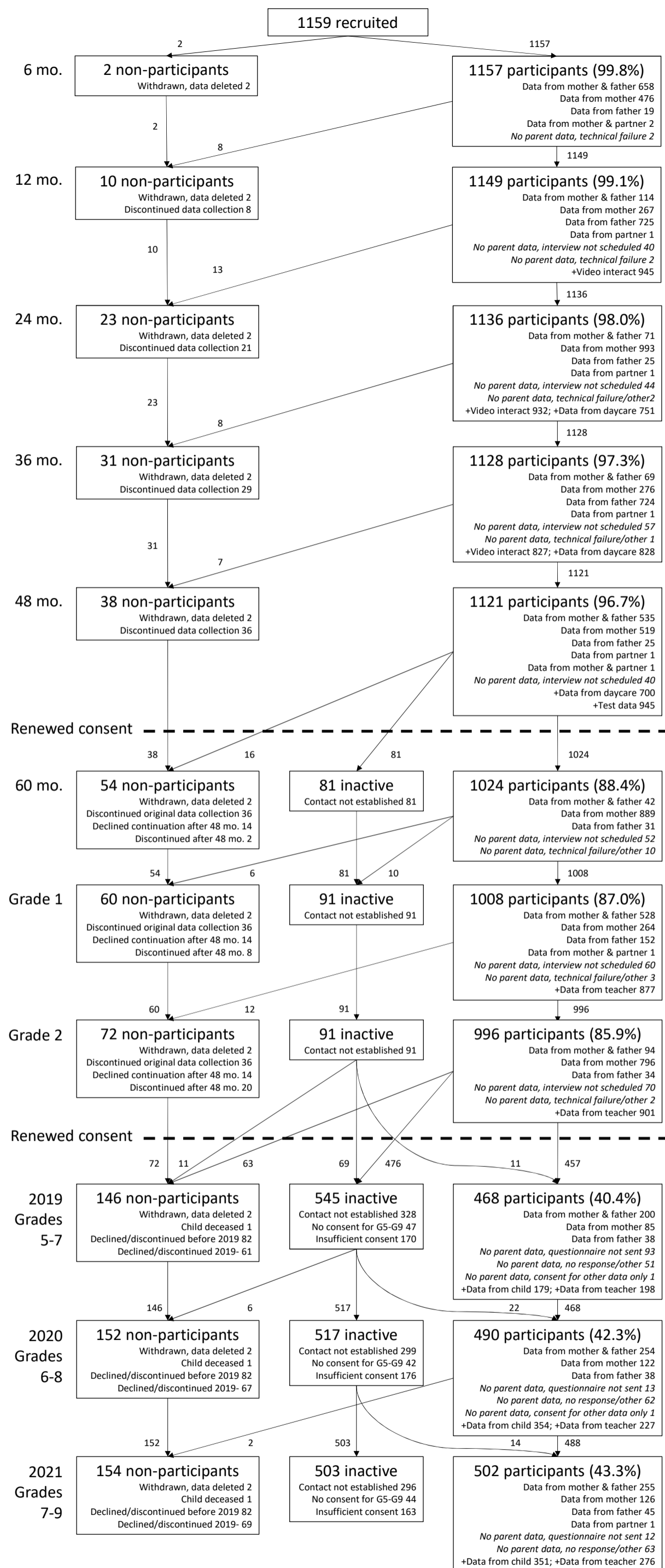
With explicit consent from parents, the child's teacher provided questionnaire reports about the children. In 2019, there were questionnaire reports for 198 teachers (42.3% of participating children, or 17.1% of the original 1159); in 2020 the number of teacher reports was 227 (46.3% or 19.6%, respectively, out of current participants and out of the original number), and in 2021, the number of teacher reports was 276 (55.0% or 23.8%, respectively).

Also, in the second continuation of the project, when parents consented, the child also provided questionnaire reports. In 2019, there were reports from 179 children (38.2% of participants or 15.4% of the original 1159), in 2020 the number of reports from children was 354 (72.2% or 30.5%, respectively, out of current participants and out of the original number), and in 2021 the number of reports from children was 351 (69.9% or 30.3%, respectively).

Further, the project asked parents for consent to collect data from official registry data on (a) national school test results in 5th and 8th grade, as well as (b) historical neighborhood data on income and welfare service beneficiary rates, crime victim rates, and center-based child care coverage. Families of a total of 481 children (95.6% of those participating at any time in the second continuation of the project, or 41.5% of the original 1159) gave consent to collect one or both types of official registry data.

### 3. REFERENCES

- [1] Nærde, A., Janson, H., & Ogden, T. (2014). *BONDS (The Behavior Outlook Norwegian Developmental Study): A prospective longitudinal study of early development of social competence and behavior problems*. (Report.) Oslo, Norway: The Norwegian Center for Child Behavioral Development. <http://dx.doi.org/10.13140/RG.2.2.10945.56169>
- [2] Bronfenbrenner, U. (1979). *The ecology of human development*. Oxford, England: Oxford University Press. <https://doi.org/10.2307/j.ctv26071r6>
- [3] Dishion, T. J., & Patterson, G. R. (2006). The development and ecology of antisocial behavior in children and adolescents. In D. Cicchetti & D. J. Cohens (Eds.), *Developmental psychopathology: Vol. 3. Risk disorder and adaptation* (pp. 503–541). New York, NY: Wiley. <https://doi.org/10.1002/9780470939406.ch13>
- [4] Reid, J. B., Patterson, G. R., & Snyder, J. (2002). *Antisocial behavior in children and adolescents. A developmental analysis and model for intervention*. Washington, DC: American Psychological Association. <https://doi.org/10.1037/10468-000>





**Figure 1.** Flow chart of participants (children) in major data collection waves in the BONDS involving (up to Grade 2) personal interviews and comprehensive telephone interviews and (in Grades 5-9) mail-in or internet-completed questionnaires with parents from recruitment through 2021. The original consent to participate involved the period up to 48 months. Families who continued in the study were asked for renewed consent twice, marked by dashed horizontal lines: after 48 months for data collections through Grade 2, and in 2018-2019 for data collections in Grades 5-9 through 2021 as well as for access to specific official registry data. Non-participation is tallied in the following categories: Withdrawal from the study and deletion of collected data (which occurred for two families before 48 months prior to publication of results); declination to give renewed consent to further participation; and discontinuation of data collection. Inactivity is tallied in the following categories: Contact not established or not contacted by project for other reasons; no consent for Grade 5-9 data collection (not excluding later participation); and insufficient consent (e.g., by only one of two parents, or with errors on consent form). At each time point, one or two caregivers could contribute parental data. Both parents were invited to contribute reports at 6 months and 4 years. Further, for the purpose of estimating inter-parent associations, 50 families agreed to contribute both mother and father reports at one or more ages from 1 to 4 years, and 46 families contributed video recorded interactions separately with mother and father at one or more ages from 1 to 3 years. Reasons for no parent/caregiver data up to Grade 2 occurred when an interview could not be scheduled (e.g., if parents were too busy, traveling, or otherwise temporarily unavailable) or in the case of loss of collected or provided data due to technical failure in computerized data collection, apparent loss in the mail of send-in paper-form questionnaires, or other administrative or technical failures. Reasons for no data from any caregiver in Grades 5-9 occurred when the project did not send out questionnaires to participants (due to e.g., consent received too late for data collection or administrative failure), when caregivers did not complete/return questionnaires or questionnaires were not received by project for other reasons, and when families had not consented to provide data from caregivers but had consented to other parts of the data collection (i.e., teacher and official registry data). The given numbers of participants with parent/caregiver data indicate the number of children for whom any data was provided from any informant; these included rare incomplete data sets due to for example early termination of interviews due to participant's limited time, missing or uncompleted parts of mail-in questionnaires, and in a handful of cases also partial data loss due to e.g., technical failure in computerized data collection. In addition to parent/caregiver data for which reasons for missing data are tallied, entries marked "+" tally the number of children for which there were codings of video recorded structured interactions ("Video interact"), questionnaire reports from the child's day-care center personnel, motor, language and effortful control test results (at age 4), questionnaire reports from the child's teacher, or questionnaire reports from the child themselves; missing data points for these data types are not tallied but reasons could include absence of consent from caregivers or respondents to collect the specific type of data, unreturned questionnaires, conditions not amenable or insufficient time to conduct videotaped observations or test sessions, as well as rare instances of technical failure of videotape recording equipment etc.