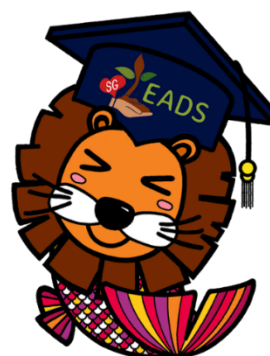


Singapore Longitudinal Early Development Study (SG LEADS)



Panel Survey Wave 2

Study Guide

Wei-Jun Jean Yeung, Xuejiao Chen, Luxi Chen, Seyoung Oh
and Joyous Tan

Centre for Family and Population Research
National University of Singapore
June 2022

Table of Contents

Introduction.....	4
Part A.....	5
1. Study Design.....	5
2 Questionnaire.....	6
2.1 Survey Content.....	6
2.2 Questionnaire Administration.....	7
2.2.1 The WJ Test of Achievement Form C.....	10
2.2.2 The Forward and Backward Digit Span Tasks.....	11
2.3 System Testing.....	11
2.4 Pilot Testing.....	11
3 Field Procedures.....	12
3.1 Fieldwork Team & Interviewer Training.....	12
3.1.1 Number of Interviewers Trained.....	12
3.1.2 Training Overview.....	12
3.1.3 Follow-Up Action Taken for Interviewers Identified to Need Further Training.....	13
3.1.4 Interviewer Grouping System.....	13
3.1.5 Interviewer Pool and Changes over Fieldwork Period.....	14
3.2 Field Manual, Question by Question Objectives, Hardcopy Questionnaires.....	14
3.3 Respondent Eligibility.....	15
3.3.1 Child(ren).....	15
3.3.2 Primary Caregiver (PCG).....	15
3.3.3 Interviewer.....	16
3.4 Respondent Recruitment.....	16
3.4.1 Calls Attempts.....	16
3.4.2 House Visits Conducted During Recruitment.....	17
3.4.3 Outcome Status.....	18
3.4.4 Special Scenarios in Wave 2.....	19
3.4.5 Reasons Noted under ‘Others, Specify’.....	19
3.5 Duration of Interviews.....	19
3.6 Keeping Track of Respondents.....	20
4 Response Rates.....	21
4.1 Cross-sectional response rates (RRs).....	21
4.1.1 Conceptualization.....	21

4.1.2	Calculation of Unconditional Cross-Sectional Response Rate (RRs).....	21
4.2	Cumulative Response Rates.....	25
4.2.1	Unweighted Cumulative Response Rates (UCCRs)	25
4.2.2	Weighted Cumulative Response Rates (WCCRs)	26
5	Sampling Weights.....	28
5.1	Sample Attrition between Wave 1 and Wave 2	28
5.2	Weight Construction Procedure	29
6	Types of Variables	33
6.1	Raw Variables.....	33
6.2	Constructed Variables	33
7	Weighted descriptive statistics.....	33
7.1	Household level Characteristics of SG LEADS Households in Wave 2	33
7.2	Child level.....	36

Introduction

Funded by the Social Science Research Thematic Grant MOE2016-SSRTG-044, the first and second waves of the Singapore Longitudinal Early Development Study (SG LEADS) were conducted by the NUS Centre for Family and Population Research (CFPR) in June 2017 – May 2022 and led by Professor Wei -Jun Jean Yeung, Founding Director of the NUS Centre for Family and Population Research, Provost’s Chair Professor at the NUS Department of Sociology.

The Panel Survey is led by PI Professor Wei-Jun Jean Yeung and co-PIs Assistant Professor Ding Xiaopan and Associate Professor Ryan Hong from the NUS Department of Psychology, and Professor Lim Sun Sun from the Singapore University of Technology and Design.

This User’s guide documents the second wave of the panel survey’s study design, instruments, field procedures, response rate calculation, sampling weights, and data structure including how to merge two waves’ data.

The NUS Research Team for the second wave is composed of Luxi Chen as Research Fellow, Xuejiao Chen as Postdoctoral Fellows, Joyous Tan, Seyoung Oh, Min Hong, Joel NG Yi Sheng, and Sreeja Narayanankutty as Research Assistants, and Lee Yan Song as the Research Manager.

Data collection for the second wave was carried out by NielsenIQ.

Part A

1. Study Design

The second wave of the Panel Survey was conducted from February to October 2021, following up with the nationally representative sample of 5,005 children aged 0-6 years (from 3,476 households) who took part in the first wave of study in November 2018 to September 2019. A total of 4,351 children aged from 1 to 9 years old (from 3,017 households) and their primary caregivers (PCGs) were successfully interviewed in Wave 2.

The same theoretical framework as Wave 1 guided the crafting of the Panel Survey instrument for the second wave of data collection.

2 Questionnaire

The Wave 2 questionnaire was developed by the NUS SG LEADS team from June 2019 to December 2020. Most of the Wave 1 questions were included in the second wave of study for cross-wave comparison, with some new items added and some items removed. The Wave 2 questionnaires were programmed into a CAPI form by NielsenIQ and was reviewed extensively by both the NUS SG LEADS Team and NielsenIQ before it was launched for fieldwork in February 2021.

2.1 Survey Content

The Wave 2 questionnaires were categorized into 7 sections: 1) Recruitment Questionnaire, 2) Consent Form, 3) Household Information Form or Household Screener, 4) Household Booklet, 5) Child Booklet, 6) Child Assessment, and 7) Observation Form.

Table 2-1 below summarised the various sections of the SG LEADS questionnaire indicating the objectives, respondents, and survey topics of each section.

Table 2-1 SG LEADS Panel Survey Wave 2 Questionnaire's Objectives and Topics

Sections	Main objectives	Respondent(s)	Survey topics
1. Recruitment Questionnaire	Identify the PCG and eligible household for Wave 2, and make appointment	<ul style="list-style-type: none"> • PCG 	<ul style="list-style-type: none"> • Identify the PCG • Address of the household • Make appointment
2. Consent Form	Obtain the PCGs' consent for the interview	<ul style="list-style-type: none"> • PCG • Interviewer 	Not applicable
3. Household Screener	Update the information of household members	<ul style="list-style-type: none"> • PCG 	<ul style="list-style-type: none"> • Confirm or update the sociodemographic information of household members, and their relationships to target child(ren) and the PCG • Confirm or update household member's sociodemographic information • Documented members moved in and out since Wave 1, and the date and reason
4. Household Booklet	Obtain information of the target child's household, family environment, and neighbourhood	<ul style="list-style-type: none"> • PCG 	<ul style="list-style-type: none"> • Neighbourhood, and utilisation of community services • Food Security and nutrition • The PCG's psychological wellbeing, social support, and lifestyle • The PCG's child-rearing values and rules • General home environment

			<ul style="list-style-type: none"> Family income, financial strains, housing type and car ownership Impacts of Covid-19 on family, the PCG, and children
5. Child Booklet	Obtain information of the child's health and behaviour, family environment, school enrolment, time use, PCG's parenting practices and parental investments on the child.	<ul style="list-style-type: none"> PCG 	<ul style="list-style-type: none"> Child health Home environment of the target child Child behaviour School enrolment and school environment Parenting practices Parental expenditures and savings for the child Child care arrangement Home-based learning during Covid-19 Information on absent parent Time use
6. Child Assessment	Measure the child's height and weight, and assess the child's academic achievement, working memory, and self-control	<ul style="list-style-type: none"> PCG Child 	<p>For children aged 3 and above:</p> <ul style="list-style-type: none"> Woodcock Johnson IV Test of Achievement: The child's academic skills learned (reading and mathematics) Digit Span Tasks: The child's working memory Delay of Gratification: The child's future-oriented self-control <p>For all children:</p> <ul style="list-style-type: none"> The child's and the PCG's height and weight
7. Observation Form	Obtain interviewer's observation of the child's home environment	<ul style="list-style-type: none"> Interviewer 	<ul style="list-style-type: none"> PCG-child interaction Physical home environment

2.2 Questionnaire Administration

The questionnaires were administered to the respondents through face-to-face interviews at their homes. For each interview, a pair of interviewers went to the respondent's house. One interviewer interviewed the PCG (referred to as PCG interviewer) and the other interviewed the child (referred to as the Child interviewer).

For the second wave of the Panel Survey, a crucial step was to identify the correct PCG of the target child in Wave 2, because the PCG in Wave 2 could be different from the PCG in Wave 1.

During the recruitment (usually happened over a phone call or face-to-face interview), interviewers administered the recruitment questionnaire to the Wave 1 PCG to identify the PCG of the target child in Wave 2, based on the following criteria:

- The PCG is a person living in the household who is mainly responsible for providing care for the target child. In most instances, the PCG is usually the:
 - The mother (biological, adoptive, step, foster), or
 - The father (biological, adoptive, step, foster), especially when the mother is not living with the child.
 - In some cases where both of the parents are absent, the PCG could also be the legal guardian of the child (e.g., an aunt/uncle, a grandparent or other relatives who reside with the child and has been assigned legal custody of the child).
 - In cases where the person providing the most care for the child is not living in the same house, such as a grandparent who comes during the day to look after the child but goes back home at night once the child's parent/s are home, the PCG will have to be one of the parents or the legal guardian who resides with the child.
- By definition, the PCG must live with the target child. Thus, co-residency with the child is a requisite for the PCG role. People who are paid to do caregiving roles such as domestic workers will not be considered as the PCG.
- For split-off households with two target children staying in two different households in Wave 2, Wave 2 PCGs of the two children are different. Both target children and their PCGs will have to be interviewed.

During the home visit, the PCG Interviewer ensured that the Household Information Form, the Household Questionnaire and the Child Questionnaire were completed. Most of the Questionnaires were administered with the PCG Interviewer reading the questions and options aloud to the Respondent. For those questions, the tablet is positioned in a way that the PCG can see the screen clearly while the Interviewer was reading the questions. Such approach facilitates Respondents to understand the questions as they can read and hear the questions at the same time.

For self-administered questions, the PCG Interviewer handed the tablet to the PCG and let the PCG work on the questions on his/her own unless there were clarifications. The PCG Interviewer was prompted in the questionnaire if the question was self-administered.

Meanwhile, the Child Interviewer administered the Child Assessment component to the child. Children 3 years old and above completed a battery of assessments including an academic achievement test (WJ IV ACH) in math and reading, a Delay of Gratification test called Now or Later, a Digit Span task to measure working memory (called the number game), as well as height and weight measurements. Children below 3 years only took part in the height and weight measures.

The administering rules of the Child Assessment component are the same as the Wave 1. The Child Interviewers were instructed to ask the PCG for an area in the house conducive for the Child Assessments. The PCG interview and the Child Assessment should be conducted in separate areas as far as practicable from each other to avoid distractions. For children who are shy and did not want to be separated from the PCG, the PCG can stay with the Child before the assessment or sit nearer the child during the assessment (without intervening the child assessment). In this case, the assessment should be done whenever the PCG feels that the child is ready for assessment. The Interviewer should emphasize to both parents and children that the games are designed in a way that children of a certain age would find certain items difficult and would not be able to answer them, and therefore, it is perfectly

acceptable for kids to not go very far in the assessments. More importantly, the Child Interviewer should stress that the PCG must not interfere with the Child(ren)’s answers or the ways by which the questions are being asked. Interferences will be considered as wrong answers and result in an inaccurate assessment for the Child.

The PCG was encouraged to help during the measurement of the child’s height and weight, especially for children under 3. Interviewers were trained not to touch the Child(ren) in any way that would be deemed inappropriate.

The details of which questionnaires are administered to which respondent is shown in Table 2-2 below.

Table 2-2: Administration Mode of SG LEADS Wave 2 Survey Questionnaires

Questionnaire Booklet	Respondent	Mode of administration
Recruitment Questionnaire <i>(One booklet per eligible household)</i>	PCG	CAPI Interviewer-administered (phone call or face-to-face)
Household Information Form <i>(One booklet per eligible household)</i>	PCG	CAPI Interviewer-administered
Household Booklet <i>(One booklet per eligible household)</i>	PCG	CAPI Mix of interviewer- and self-administered
Child Booklet <i>(One booklet per eligible child)</i>	PCG	CAPI Mix of interviewer- and self-administered
Child Assessment <i>(One assessment per eligible child)</i>	PCG	CAPI Interviewer-administered
	Children under 3	CAPI Interviewer-administered with caregiver’s assistance (Height & Weight measure)
	Children aged 3 years and above	Pen and paper for the WJ IV Test of Achievement Test CAPI for the remaining components of the Child Assessment
Observation Form <i>(One form per eligible child)</i>	Interviewer	CAPI Self-administered

By default, the questionnaires were administered to the PCG through CAPI and in English. For respondents who do not speak English, the versions in Mandarin, Malay, and Tamil are available too. Respondents had the option to do the interviews in either of these languages.

The Child Assessment questionnaire was administered solely in English. In cases where the child does not speak English but understands the language, the interviewer continued administering the questionnaire to the child. However, if the child does not understand English at all, the interviewer has to stop administering the Child Assessment booklet and avoid translating the questions to the child.

2.2.1 The WJ Test of Achievement Form C

The WJ IV Test of Achievement is a standardized battery of tests published by Riverside Publishing to measure the level of reading, writing, mathematics, and academic knowledge among 2 to 80+ years of age. For SG LEADS, the WJ IV ACH Form C was administered to kids aged 3 and above. In particular, SG LEADS administered the following sub-tests:

- Test 1: Letter-Word Identification
- Test 2: Applied Problems
- Test 4: Passage Comprehension
- Test 5: Calculation

Same as Wave 1, to ensure the suitability of the test to Singaporean children, selected culturally-sensitive questions of the WJ IV Test of Achievement Form C were adapted to the local context. These are:

- Test 2: Applied Problems - Items 24 & 36
- Test 4: Passage Comprehension - Items 19 & 26. Do note that the adaptation in Item 26 did not require a change in phrasing of the question itself but involved the acceptance of the term “plaster” as one of the correct answers.

In administering the test, the interviewer needs the WJ IV ACH Base Kit Form C, a Response Booklet for each child, and a Test Record for each child. The WJ IV ACH Base Kit Form C is a small easel where one side faces the interviewer and the other side faces the child. The easel facing the interviewers shows the questions that must be read out to the child, as well as instructions for the interviewers on how to administer a particular item in the test. The easel facing the child shows possible answers where the child could choose from. For Test 1, Test 2 and Test 4, it is necessary for the interviewer to sit in an angle where both the instructions page and the answer page of the easel can be seen. Doing so will facilitate the recording of the child’s raw score in the Test Record and avoid unnecessary movements that can distract the child’s attention from the test. For test 5, the child gets his/her own Response Booklet where calculations are made.

In processing the WJ standardized scores, SG LEADS used an offline scoring platform customised by HMH for SG LEADS. Each child’s raw scores, together with the child’s name or ID, gender, birth date, date of testing, grade, examiner’s name, and examiner’s observation of the test session are entered into the platform. Additional information such as the child’s use of glasses or hearing aid can also be inputted. A range of standardized scores based on US norms such as age-standardized scores, W-scores and Z-scores can be generated from the scoring platform.¹ The Singapore Norm constructed using Wave 2 data is documented in Wave 2 Technical Report 7.

¹ More details about the WJ scores can be found in McGrew, LaForte and Schrank (2014)

2.2.2 The Forward and Backward Digit Span Tasks

The forward and backward digit span tasks test measures a child's short-term memory and working memory capacity. Administration of the test involves the interviewer playing a set of audio recording of numbers to the child at a rate of one digit per second. In cases where the audio clips cannot work well (e.g., in a noisy environment), the interviewer needs to read out the set of numbers clearly at a rate of one digit per second. After playing or reading each number series, the interviewer will pause and allow the child to repeat the numbers (forward or backward) that the interviewer has just read. In the Forward Digit Span Tasks, the child must repeat the numbers in the same sequence that the interviewer has read to them such that "1, 2, 3, 4" must be repeated by the child as "1,2,3,4". In the Backward Digit Span, the child must say the numbers backward such that "5,6,7,8" must be repeated as "8,7,6,5". Interviewers need to ensure the child focuses their attention on the test. Once the number series is played or read, the interviewer is not allowed to repeat it even if the child requests the interviewer to do so.

Before the actual test, the child interviewer administered two practice trials with feedback provided (correct or incorrect), but the practice scores will not be included in the calculation of the total score. The actual test starts with a set of two 2-digit number series. Each set of 2 number series increases in length by 1 digit. Both number series in the same set need to be administered. If the child gets at least one item in a set correctly, the child progresses to the next set of 2 number series. The interviewer stopped the test when children answer neither of the items correctly in a given set, or until they reach the 8-digit number set.

2.3 System Testing

Except for the WJ IV Test of Achievement component, the full English questionnaire was programmed into the computer-assisted personal interviewing (CAPI) system. A series of automated programmes such as non-permissible codes, inconsistent codes, and logic checks were devised to detect possible errors when administering the questionnaire.

User acceptance testing of the programmed questionnaire was done by the SG LEADS team in multiple stages. Intensive testing was done in several stages: a) before pilot testing, b) before the actual fieldwork, and c) in the first few weeks after the launch of the fieldwork. Random testing was further conducted all throughout the data collection period to ensure that all skipping rules and data quality checks embedded in the instrument are working.

2.4 Pilot Testing

The pilot test was conducted from 18 November to 1 December 2019 to test the readiness of the CAPI system and estimate the actual survey duration, in Wave 2 of the study. Pilot testing was done on a convenience sample of 50 respondents from 35 households.

Some issues in the system were experienced caused by logic errors. Appointments were suspended on 20 November 2019 to allow for survey link edits to be rolled out. After the pilot test, the research team adjusted the length of the questionnaire based on the feedback from the respondents and interviewers. To ensure minimal disruptions in case of system malfunction or battery and internet connection issues, emergency protocols were established so that interviewers would know what to do in case of disruptions.

3 Field Procedures

The fieldwork was completed from 18 February – 17 October 2021 and 2 November – 7 November 2021.

Note: The original fieldwork period end date was 17 October 2021. The fieldwork period was extended for a period of 1 week (2 Nov to 7 Nov 2021) upon request from SG LEADS to attempt n=9 more households to increase the final response rate to 86.8%. These additional households were identified as they had shown interest in participating in the study, but an appointment could not be scheduled during the original fieldwork period (before 17 October 2021).

3.1 Fieldwork Team & Interviewer Training

3.1.1 Number of Interviewers Trained

A total of n=72 interviewers were recruited.

- 36 PCG qualified interviewer
- 33 Child qualified interviewer
- 3 Dual role interviewers

Among the n=72 interviewers, there were 3 Supervisors who conducted interviews on a need's basis. The supervisors were classified as PCG interviewers in the above breakdown. One Supervisor dropped out of the study on 29 June 2021.

In June, 3 interviewers were trained in the briefing session to become dual role interviewers. These interviewers were initially trained as PCG interviewers and were also assessed to be suitable to be Child Interviewers. Interviewers were chosen based on their overall performance and underwent the full Child Interviewer training session and role play before being deployed onto field. Approval from SG LEADS was obtained for the proposed interviewers to be deployed onto field as dual role interviewers.

3.1.2 Training Overview

Three main sessions of interviewer training and assessment was conducted, with 15-21 prospective interviewers undergoing the training programme at each session.

The full training programme for both PCG interviewers and child interviewers spanned across 3.5 days and was conducted by the SG LEADS team and NielsenIQ team:

- **Day 1:** Introduction of research project, Fieldwork Manual briefing, Questionnaires Training 1, 2, and 3.
- **Day 2:** Questionnaires Training 4, Child Assessments 1, 2, and 3.
- **Day 3:** Role-Play, both PCG and Child interviews
- **Day 4:** Assessment of Interviewers on study concept and interviewing skills

Interviewers were brought into NielsenIQ's office ahead of the training sessions to collect the following:

- Fieldwork Manual
- Questionnaires
- Tablets

All interviewers would be assessed for both PCG and Child interviewer roles on Day 4 by the SG LEADS team. Scores from assessment day would be taken into consideration by NielsenIQ's fieldwork leads when planning for manpower deployment. Retraining would be conducted by NielsenIQ's fieldwork leads for interviewers who have not performed well during assessments. Interviewers whose performance requires further evaluation will be placed on probation and be heavily monitored by supervisors and the independent evaluators.

Due to the multiple training sessions, the deployment of interviewers into the field was also staggered. Project Kick-off Refresher Trainings were conducted for each batch of interviews deployed, to ensure interviewers were still familiar with the interview procedures and updated on new Covid-19 restriction protocols.

3.1.3 Follow-Up Action Taken for Interviewers Identified to Need Further Training

Retraining of interviewers was conducted on NielsenIQ's premise by the fieldwork team and supervisors. Feedback from SG LEADS would be reviewed with the interviewer.

The re-training process consisted of 1-on-1 retraining with NielsenIQ's fieldwork team. Interviewers were debriefed on the questionnaire and link management (e.g. navigating the Household Grid, protocol to follow in the event of link crashes, accessing the Time Diary page). During each session, interviewers would also engage in a role-playing activity with the NielsenIQ staff.

After clarifications, interviewers would be given time to practise before their second assessment. The fieldwork lead (Wai Kuan) will evaluate the interviewer's performance using SG LEADS evaluation matrix.

After interviewers had undergone the re-training exercise and deployed onto the field, supervisors were assigned to each interviewer's first appointment. More witnessing was also conducted for interviewers that had undergone the re-training.

3.1.4 Interviewer Grouping System

From Week 10 onwards, 4-5 Child Interviewers were grouped, and assigned to a PCG interviewer, basis on their geographical locations (where the interviewers stay). This was to improve the efficiency of interviewers picking up appointments and to motivate interviewers to take up more interviews.

3.1.5 Interviewer Pool and Changes over Fieldwork Period

In general, 23-45 PCG & child interviewers were actively conducting interviews during fieldwork period, with a decrease towards the tail end of fieldwork.

Over the course of the fieldwork period, interviewers and supervisors have also dropped out due to reasons such as:

- Unable to commit due to a finding a full-time job
- Personal reasons (e.g., health, family-related concerns)

Please refer to Table 3-1 for a summary of the number of interviewers that were active, on a reduced commitment schedule, or dropped out. Note that the monthly breakdown below does not include the 3 supervisors.

Table 3-1: Number of Interviewers

Month	Number of PCG interviewers			Number of Child Interviewers		
	Active	Reduced	Dropped	Active	Reduced	Dropped
March	26	3	1	19	2	4
April	21	7	3	16	6	4
May	21	7	3	14	7	5
June	20	7	6	17	3	6
July	22	8	8	23	2	8
August	18	10	10	20	2	11
September	15	8	15	16	2	15
October	13	1	23	10	0	21

3.2 Field Manual, Question by Question Objectives, Hardcopy Questionnaires

A copy of the Fieldwork Manual, Question by Question Objectives (QxQ) and a hardcopy set of the questionnaires were provided to all interviewers to bring to the field.

The fieldwork manual is a full documentation of the interview procedures and correct protocols that were discussed during the interviewer training. It also includes a compilation of all the necessary fieldwork materials and preparations required for interviewers.

The QxQ contains the rationale for each of the items in the SG LEADS questionnaire. It also provides instructions on how questions should be administered.

The hardcopy questionnaires were prepared for use during any unexpected crashes of the CAPI system.

3.3 Respondent Eligibility

The target respondents in the SG LEADS Panel Survey Wave 2 are the 5,005 children who previously participated in Wave 1 of the study, and their primary caregivers in Wave 2.

3.3.1 Child(ren)

Children are considered eligible for this study based on the following criterion:

- The child was a target participant in Wave 1 of the study in 2018/2019.

No new children were added in W2 (e.g., a new baby born since Wave 1 of the study). Children aged 3 years and above participated in a battery of assessments of broad reading and mathematics ability, cognitive function, social-psychological development, and height and weight measures. Children under 3 only took part in the physical measurements of height and weight.

3.3.2 Primary Caregiver (PCG)

The PCG of target child(ren) were the main respondent for the questionnaires. The PCG was required to sign the informed consent form, complete the PCG interviews (one about the household and one about each target child), and assist with the child(ren)'s physical measurements.

The PCG is a person who is mainly responsible for providing care for the target child(ren) and living in the same household as the target child(ren).

The PCG of the target child(ren) in Wave 2 may be different from Wave 1. Interviewers were required to identify the PCG in Wave 2 based on the above definition. For example, in a case where the PCG was the child's grandmother in Wave 1, but the child's mother has moved back to the household to reside with the child in Wave 2, then the PCG in Wave 2 should be the child's mother.

In cases where the person who provides the most care for the child is not living with the child, such as a grandparent who comes during the day to look after the child in the child's home but goes back to their own home at night once the child's parent/s are home, the PCG is still one of the parents or the legal guardian who resides with the child.

In cases where the child stays in another household (e.g., grandparents' house) for a very short period of time (e.g., for school break), but stays in parent(s)' or legal guardian's household for most of the time, the PCG is one of the parents or legal guardians who resides with the child in the target household.

For a household with multiple target families:

- If two or more different target families in Wave 1 have moved into the same house in Wave 2, but remain as separate families, the PCG and target children in each family unit have to be interviewed;
- If all the target children in the household are cared for by the same PCG (e.g., target children from different extended families have moved to grandparent's house in Wave 2, and all of them are taken care of by grandmother), only one PCG (i.e. grandmother) and all the target children from the household will be interviewed.
- If two target families have combined as one family in Wave 2 (e.g., mother of target child 1 in family 1, married father of target child 2 in family 2), only one PCG (e.g., the mother) and all the target children from both original families will be interviewed.

3.3.3 Interviewer

The Child Interviewer is also a Respondent in this study. Interviewers report their observations of the home environment and dynamics within the households, especially PCG's interactions with the target child(ren). These observations were recorded in the Interviewer Observations Section at the end of the Child Assessment.

3.4 Respondent Recruitment

Before visiting the households, notification letters were sent by Nielsen to the addresses in the sampling frame. The letters explained the objectives of the study, eligibility for the survey, tasks involved if they decide to participate, duration of the survey, and tokens that will be received at the end of their participation. Hotlines and email addresses were included in the letter to provide participants with the option to call the Nielsen & SG LEADS team to schedule an interview.

Interviewers reached out to respondents via phone calls for the first 5 attempts to secure their participation in the study. Subsequent attempts were made through home visits and further phone calls. Two additional personnel were hired in May and June as dedicated callers to attempt refusal conversions and schedule appointments to improve rate of appointments scheduled. The callers were assigned listings that fell into either of the following categories:

- Households that interviewers had yet to contact
- Households that interviewers were unsuccessful in contacting after 3 attempts
- Households that were marked as soft refusals

Calls and visiting attempts were made at different times of the day and on separate days (including weekends). Only when all possible means of contact have been exhausted would a non-response status be assigned.

3.4.1 Calls Attempts

Overall, between 1-15 attempts were made across all households. Please refer to Table 3-2A and Table 3-2B for the distribution of the number of contact attempts across completed and incomplete households:

Table 3-2A Call attempts for complete households

	5 attempts or less	6 - 10 attempts	More than 10 attempts	Total Completed
Number of completed households	2669	317	32	3018
% of total households	88.4%	10.5%	1.1%	100.0%

Table 3-2B Call attempts for incomplete households

	5 attempts or less	6 - 10 attempts	More than 10 attempts	Total Incomplete
Number of incomplete households	270	171	24	465
% of total households	58.1%	36.8%	5.2%	100%

Reasons for incomplete households that did not reach 5 call attempts include:

1. Child is not in Singapore and will not be returning for an indefinite period of time.
2. Child has passed away.
3. Family has migrated back to their home country or to another country.
4. Child was incorrectly recorded as a member of the household in Wave 1.
5. Duplicate household.
6. Split household and lost contact with child.
7. PCG from Wave 1 lost contact with child(ren) and their current PCG.

3.4.2 House Visits Conducted During Recruitment

House visits were conducted on the 6th attempt, or from the 8th attempt onwards (alternating between house visits and phone calls).

Please refer to Table 3-3 for the distribution of number of home visits conducted across all households (both complete and incomplete interviews):

Table 3-3 Number of Visits during Recruitment

	No house visits	1 house visit	2-5 house visits	Total
Number of households	2900	403	181	3484
% of total households	83.2%	11.6%	5.2%	100.0%

In an effort to boost response rate, n=684 persuasion letters were mailed on 2 July to 2 groups of households - those whom we have not been able to contact despite the multiple call attempts and those identified as 'soft refusals'.

3.4.3 Outcome Status

At the close of fieldwork, outcome codes for households were as follows:

Table 3-4 Outcome Codes in Wave 2

Codes	Outcome Code	Households Selected	% of Households
200	Hard Refusal Case (respondent is hostile/ insists to be taken off the study and no longer be approached)	261 ¹	7.49%
210	Soft Refusal (respondents refuse but are not hostile towards interviewer)	4 ²	0.11%
300	Contacted household (No one at home/No one picked up the phone), specify _____	33	0.94%
310	Contacted household (Respondent is busy/Not at home), specify _____	17	0.49%
320	Contacted household (Respondent is overseas), specify when to re-contact _____	0	0.00%
330	Incorrect phone number (wrong number of number is not in use), to visit household, specify _____	26	0.75%
400	Ineligible household (no eligible children; e.g., all target children are not staying in this household), specify _____	2	0.06%
500	Invalid Contact Information (Incorrect address/Demolished/En-bloc AND Incorrect Phone Number), specify _____	56	1.61%
600	Appointment Made	3018	86.62%
610	To re-contact Respondent for an appointment (Agreed but have to sort out schedule)	0	0.00%
620	To contact new family for pre-screening (e.g., target child(ren) is/are in a new family)	0	0.00%
630	To contact new PCG for pre-screening (e.g. target child(ren) is/are in same family but new PCG)	0	0.00%
700	Restricted access (Condo/ Private Apt)	7	0.20%
900	Others, specify <u>(due to COVID)</u>	17	0.49%
	Others, specify _____	43	1.23%

*Note. Code 620 may be selected together with 400, 600, 610 in the scenario that the household is a split household (i.e. two PCGs to be contacted).

¹69 indicated COVID as the reason

²1 indicated COVID as the reason

3.4.4 Special Scenarios in Wave 2

- The child of n=1 household was deceased (HHID_W1 142230)
- There were a total of n=3 split-child households (HHID_W1 21367, 331352, 361345). Please see Table 3-5.

Table 3-2 Split Households in W2

W1_CHID	W2_CHID	Status
21367CHILD1	20254CHILD1	Completed W2 IW
21367CHILD2	23483CHILD1	Completed W2 IW
331352CHILD1	22834CHILD1	Completed W2 IW
331352CHILD2		Did not complete W2
361345CHILD2	23088CHILD1	Completed W2 IW
361345CHILD1		Did not complete W2

3.4.5 Reasons Noted under ‘Others, Specify’

Common reasons for being unable to set up an appointment with the respondents include:

- Survey too long
- PCG busy, no time (e.g. need to look after 4 children)
- Child or family of the child is overseas, unable to advise on return date (e.g. migrated completely or were not sure on when they would be able to return)
- Prefer to be interviewed via Zoom

3.5 Duration of Interviews

The Length of Interview (LOI) of n=3,019 households were recorded. Outliers above 300 minutes were excluded from the calculation of average LOI.

One-child households took an average of 99.3 minutes to complete the survey, while 2-child households took an average of 124.3 minutes. In general, households took 111.4 minutes to complete the entire interview. See tables below for detailed timings per booklet.

Table 3-6A Average LOI by Household Type

Household Type	Average LOI (min)
1-child Household	99.3
2-child Household	124.3
All Households	111.4

Table 3-6B Average LOI by Booklets

Booklet	Average LOI (min)
HH Info LOI	7.1
PCG Booklet LOI	35.5
CHILD Booklet 1 LOI	51.9
CHILD Booklet 2 LOI	36.0
CHILD Assessment	40.40499

3.6 Keeping Track of Respondents

Household addresses were consistently checked throughout the fieldwork period. There were interviews identified that had inconsistent addresses recorded across platforms (i.e. recruitment link, merged link, and master listing provided by SG LEADS).

To automate checks on the addresses collected on the separate platforms, a macro was written to compile all addresses collected and to flag any cases where addresses collected differed across the platforms. Addresses collected were obtained from the Merged Link raw data, CMS raw data, and preload data.

In addition, cases that were indicated as a household which moved out from the W1 address were flagged if the address collected matched the W1 address (i.e. W2 address did not change).

Once any cases of mismatching addresses were identified, NielsenIQ would obtain feedback from the field team (interviewers/supervisors) to confirm the final address that the interview was conducted at.

Feedback was forwarded to the SG LEADS team and upon confirmation, data edits would be conducted to rectify any erroneous data (e.g. address was not correctly updated, interviewer incorrectly marked the household as not moved out).

In a few instances, respondents did inform the SG LEADS or Nielsen team about changes in their contact information throughout the duration of fieldwork. Such changes were updated by Nielsen in the merged link data.

The final contact information list was derived from:

- Incomplete households – CMS data
- Complete households – Merged Link data (obtained via the interview)

After compiling the contact information from the two data sources, the following amendments were made:

- List was updated with new contact information collected via email, for households that reached out to SG LEADS only after the interview was already completed.
- Invalid contact numbers were identified. Contact numbers were deemed invalid after callers attempted to reach the respondents (while conducting callbacks) but the number was not in use.

4 Response Rates²

The section reports a measure of the response rates for the cohort of SG LEADS sample persons interviewed in the first wave of panel data collection. It should be noted that the derived response rate statistics reported here do not take into account noncoverage for the original samples from which the original panel of Wave 1 families and sample persons were derived (e.g., children born after Wave 1 samples). Three different types of response rates were calculated: the unweighted unconditional cross-sectional response rates (RRs), the unconditional cumulative response rates (UCRRs) and the weighted unconditional cumulative response rates (WUCRRs).

4.1 Cross-sectional response rates (RRs)

4.1.1 Conceptualization

Response rates are calculated by dividing the number of successful responses returned by the total number eligible in the sample chosen (Fincham, 2008). Definition of each outcome group is listed below:

Respondents— Each study defines a “response” in a given wave as full or partial completion of a core interview or proxy interview, but not necessarily the supplemental components (e.g. self-completion or nurse visit). In SG LEADS W2, we define a “response” as full completion or partial completion of the interview (e.g., completion of the household booklet, but not the child booklet) in that wave.

Ineligible — In SG LEADS study, participants who have died after wave 1 study are treated as ineligible.

Non-respondents — This group consists mainly of those who have refused at a given wave or who could not be contacted.

Unknown eligibility—Each study has a sub-group of sample members whose eligibility is ‘unknown’ at a given wave due to non-contact or unsuccessful tracing. Those “unknown” cases not reclassified as ineligible remain as non-respondents.

4.1.2 Calculation of Unconditional Cross-Sectional Response Rate (RRs)

In Wave 2, one household reported a death of sample children after Wave 1. Therefore, at the household level, there is 1 ineligible household, with 1 ineligible child at the child level. The unweighted response rates in Wave 2 are 86.8% and 86.9% at the household-level and child-level, respectively.

² This section is extracted from Chen and Yeung, 2021. *SG LEADS Wave 2 Technical Report 1: SG LEADS Wave 2 Response Rate*. Singapore: NUS Centre for Family and Population Research.

Table 4-1. Wave 2 Unconditional Cross-sectional Response Rates (RRs)

	Household level	Child level
Total number in our sample	3,476	5,005
Wave 2 completions	3,016	4,352
Ineligible cases	1	1
RRs	3016/ (3476-1) =86.8%	4352/ (5005-1) =87.0%

A breakdown of the circumstance of the nonresponse household is presented in Table 4-2. The top reason of nonresponse is refusal (59.4%), with 23.3% clearly indicating a refusal because of concerns on the COVID-19 situation. Another top reason of nonresponse is unreachable (e.g., the respondent is no longer living in the address indicated in wave 1, and can not be contacted through phone or email address provided, 33.3%). Other reasons of nonresponse include special circumstances such as the respondent is too busy to arrange an interview within the fieldwork period; the families are abroad and will not be back before the fieldwork ends; there is a change in the primary caregiver, and the current caregiver loses contact with the previous caregiver.

Table 4-2. Breakdown of the Nonresponse

Circumstances	n	%
Refusal	166	36.1%
Refusal (COVID 19 concerns)	107	23.3%
Unreachable	153	33.3%
Special circumstances	33	7.1%
Total	460	100.0%

We also compared the nonresponse and response cases by their wave 1 characteristics. As seen in Table 4-3, the nonresponse cases are more likely to have a male primary caregiver ($p<0.1$), and the head of household tends less likely to have a bachelor's degree ($p<0.1$) or being employed ($p<0.05$). These nonresponse households are more likely to live in rental HDB flats ($p<0.1$) and less likely to live in HDB 5-room flats. These households tend to have a family income fall in the lowest quartile ($p<0.05$), and locate in the West planning region ($p<0.1$). At the child level, nonresponse children are more likely to be born in low birth weight ($p<0.05$) and have an absent mother ($p<0.05$).

Table 4-3. SG LEADS W2 Response and Nonresponse Sample by Wave 1 Characteristics (weighted)

	Nonresponse	Response	Total	P value
Household level				
Head of household's age	39.8	39.3	39.4	
Head of household is male	90.7%	88.0%	88.4%	
head has a spouse living in the HH	95.9%	95.9%	95.9%	
PCG is male	4.6%	3.8%	3.9%	+
Head of household's race				
Chinese	64.5%	67.5%	67.1%	
Malay	15.8%	14.1%	14.3%	
Indian	15.4%	13.1%	13.4%	
Others	4.3%	5.2%	5.1%	
Head of household's education				

secondary and below	26.6%	23.4%	23.8%	
post-secondary	31.5%	29.1%	29.4%	
university and above	41.9%	47.4%	46.7%	+
Head of household's employment status				
working	90.8%	94.3%	93.9%	*
housewife/homemaker	4.9%	3.6%	3.8%	
other-not working	4.4%	2.0%	2.3%	
Housing type and homeownership				
Rental HDB Flats	6.6%	4.6%	4.9%	+
Owned HDB 1- and 2-Room Flats	1.1%	0.6%	0.7%	
Owned HDB 3-Room Flats	12.4%	11.6%	11.7%	
Owned HDB 4-Room Flats	36.1%	36.4%	36.3%	
Owned HDB 5-Room/Executive Flats	22.3%	28.5%	27.7%	*
Owned/rental Condominiums & Landed Properties	21.6%	18.2%	18.7%	
Income Quartile				
incomeQ1_lowest	28.9%	25.0%	25.5%	*
incomeQ2	24.2%	25.8%	25.6%	
incomeQ3	22.2%	26.3%	25.8%	
incomeQ4_highest	24.7%	22.9%	23.2%	
Planning region				
Central	21.3%	18.9%	19.2%	
East	11.1%	13.5%	13.2%	
North	10.9%	15.4%	14.8%	+
North-East	36.5%	28.2%	29.3%	+
West				
N	460	3,016	3,476	

Child level				
Age	3.0	3.2	3.2	
Boy (1=yes)	50.5%	51.2%	51.1%	
Child has chronic conditions (1=yes)	7.7%	6.2%	6.4%	
Low birth weight (1=yes) a	12.8%	8.3%	8.9%	*
Absent father (1=yes)	2.2%	2.7%	2.6%	
Absent mother (1=yes) b	0.8%	0.2%	0.3%	*
N	653	4,352	5,005	

* p<0.05, + p<0.1

^a there are 914 missing values in low birth weight; ^b there are only 31 children who have an absent mother

The unweighted response rates by planning region and planning area are also provided in Table 4-4 and Table 4-5. As seen, the overall response rates in each planning region are between 84% to 89%, with the North-East having the lowest response rates. A breakdown of the response rates by planning area is shown in Table 4-5.

Table 4-4. Unweighted HH-level Cumulative Response Rate by Planning Region

planning region	W1	W2 complete	RR by W1 planning region (ascending)	# of incomplete households
North-East	864	721	83.5%	143
Central	680	591	86.9%	89
East	417	362	87.1%	55
West	944	834	88.3%	110
North	571	508	89.0%	63
total	3,476	3,016	86.8%	460

Table 4-5. HH-level Cross-sectional Response Rates by Planning Area

Planning area	W1	W2 complete	RRs by planning (ascending)	W1 area	# of incomplete households
(Z7) ANG MO KIO	1	0	0.0%	1	1
(Z1) BUKIT TIMAH	2	1	50.0%	1	1
NOVENA	38	28	73.7%	10	10
RIVER VALLEY	4	3	75.0%	1	1
ANG MO KIO	167	131	78.6%	36	36
BUKIT TIMAH	24	19	79.2%	5	5
TANGLIN	5	4	80.0%	1	1
MARINE PARADE	26	21	80.8%	5	5
PUNGGOL	282	228	80.9%	54	54
SERANGOON	49	41	83.7%	8	8
TOA PAYOH	113	96	85.0%	17	17
JURONG EAST	71	61	85.9%	10	10
TAMPINES	172	148	86.0%	24	24
PASIR RIS	96	83	86.5%	13	13
BUKIT PANJANG	167	145	86.8%	22	22
JURONG WEST	261	227	87.0%	34	34
SENGKANG	224	195	87.1%	29	29
BISHAN	31	27	87.1%	4	4
QUEENSTOWN	113	99	87.6%	14	14
BEDOK	147	129	88.4%	18	18
YISHUN	260	231	88.8%	29	29
CLEMENTI	81	72	88.9%	9	9
WOODLANDS	199	177	88.9%	22	22
BUKIT MERAH	145	129	89.0%	16	16
GEYLANG	74	66	89.2%	8	8
SEMBAWANG	112	100	89.3%	12	12
HOUGANG	141	126	89.4%	15	15
OUTRAM	19	17	89.5%	2	2

CHOA CHU KANG	212	190	89.6%	22
BUKIT BATOK	152	139	91.4%	13
KALLANG	74	69	93.2%	5
NEWTON	4	4	100.0%	0
ROCHOR	8	8	100.0%	0
SIMEI	2	2	100.0%	0
Total	3,476	3,016	82.3%	185

4.2 Cumulative Response Rates

As a statistical measure of panel retention (or the complement, panel attrition), estimates of Cumulative Response Rates can take several forms. This document introduces the unweighted cumulative response rates and weighted cumulative response rates. unweighted cumulative response rates are the ratio in which the numerator is the unweighted count of W1 sample households/persons responding at Wave 2 and the denominator is the unweighted count of W1 sample households /persons alive at Wave 2 (Heeringa, Chang and Johnson, 2018). Below is the calculation of the unweighted response rates at the household and the child level:

4.2.1 Unweighted Cumulative Response Rates (UCCRs)

Household level

$$UCRR(t)_{HH} = \frac{R_t}{N_{wave1} - MX_t}$$

Where:

R_t =the unweighted count of Wave1 sample households responding at Wave t;

N_{wave1} =the unweighted count of Wave 1 sample households (N=3,477); and

MX_t = cumulative total of households with no alive Wave 1 sample children at Wave t.

Child level

$$UCRR(t)_{child} = \frac{r_t}{n_{wave1} - mx_t}$$

Where:

r_t =the unweighted count of Wave1 sample children responding at Wave t;

n_{wave1} =the unweighted count of Wave 1 sample children (N=5,006); and

mx_t = the Wave t cumulative total of deaths of Wave1 sample children

It is worth mentioning that the Wave 2 cross-sectional response rate is same as the wave 2 Unweighted Cumulative Response Rates since both are measuring the percentage of successful re-interviews in of Wave 1 households in Wave 2. From Wave 3 and onwards, these two would be different.

UCRRs

In Wave 2, one household reported a death of sample children after Wave 1. Therefore, at the household level, there is 1 ineligible household, with 1 ineligible child at the child level.

Table 4-6. Wave 2 unweighted cumulative response rates (UCRRs)

	Household level	Child level
Total number in our sample	3,476	5,005
Wave 2 completions	3,016	4,352
Ineligible cases	1	1
UCRRs	3016/ (3476-1) =86.8%	4352/ (5005-1) =87.0%

4.2.2 Weighted Cumulative Response Rates (WCRRs)

To account for the different response rates by subgroups we calculated the weighted response rates. The weighted cumulative response rates are defined as below:

$$WCRR(t) = \frac{\hat{N}_{t,r}}{\hat{S}_{t,r}} = \frac{\sum_i W_{i,wave1} * I_{i\epsilon r}(t)}{\sum_i W_{i,t} * I_{i\epsilon r}(t)}$$

$\hat{N}_{t,r}$ =the weighted estimate of the count of the Wave1 study population "represented" by Wave1 sample persons responding at Wave t;

$\hat{S}_{t,r}$ =the weighted estimate of the count of the Wave1 study population members alive at Wave t;

i = indexes the individual Wave1 sample persons (n=5,006)

$I_{i\epsilon r}(t)$ =indicator that Wave1 sample person i is a SG LEADS respondent at Wave t,

= 1 if respondent at Wave t, 0 otherwise;

$W_{i,wave1}$ =Wave 1 base sampling weight for Wave 1 sample person i ;

$W_{i,t}$ =Wave t SG LEADS longitudinal individual weight for Wave1 sample person i , includes mortality and nonresponse adjustments at and prior to Wave t.

In Wave 2 study, we have completed data collection from 3,016 households and 4,352 children. Using Wave 1 raw weights, the WCRRs at the household level and child level is listed below:

Household level WCRRs: 87.1%

Child level WCRRs: 87.1%

Table 4-7. Weighted HH-level Cumulative Response Rates by Wave 1 Dwelling Types.

Wave 1 dwelling type	(A) unweighted count by Wave1 housing types	(B) Wave 2 respondents by Wave 1 housing type	(C) weighted count by Wave1 housing types	(D) Weighted count of Wave 2 respondents by Wave 1 housing type	WCRRs at the household level by Wave 1 housing type (C)/(D)
HDB 1- and 2- Room flats	388	313	7,655	6,197	80.9%
HDB 3-Room flats	957	827	25,002	21,540	86.2%
HDB 4-Room flats	1,097	962	76,015	66,787	87.2%
HDB 5-Room flats	550	493	58,427	52,316	89.5%
Condominium	428	376	32,441	27,386	84.4%
Landed Properties	56	45	6,056	5,350	88.3%
Total	3,476	3,016	206,220	179,599	87.1%

5 Sampling Weights³

Singapore Longitudinal Early Development Study (SG LEADS) is a longitudinal study that began in 2018. It provides a nationally representative sample of Singaporean children aged 0 to 6 in 2018 and their families.

In SG LEADS Wave 1 study, 3,476 families with 5,005 children were interviewed. For each household, up to two eligible children were interviewed. The second wave of study was conducted in 2021, and 3,016 Wave 1 households (3017 wave 2 household, including a successful interview of a split-off household) with 4,352 children have been successfully re-interviewed. The study includes several modules: 1) primary caregiver household interview, 2) primary caregiver child interview, and 3) child assessment for children aged 3 and above.

To account for different selection probabilities and response bias, sampling weights were created for SG LEADS wave 1 sample (see technical report of sampling weights for wave 1 study). In wave 2, weights were constructed to account for attrition. The household level weights are used for household-level analysis using data merely from the primary caregiver household interview. The child-level weights are applied for child-level analysis, whenever the data from primary caregiver child interview or child assessment is used.

5.1 Sample Attrition between Wave 1 and Wave 2

In Wave 2, one household reported a death of sample children after Wave 1. Therefore, at the household level, there is 1 ineligible household, with 1 ineligible child at the child level. This returns 3,476 households with 5,005 children in wave 1 dataset. In the second wave, 3,017 households with 4,351 children were successfully re-interviewed. The unweighted response rates in Wave 2 are 86.8% and 86.9% at the household-level and child-level, respectively.

Table 5-1: Sample Attrition in Wave 2

	Household level	Child level
Total (Wave 1 sample)	3,476	5,005
Wave 2 complete interview	3,016	4,352
Non-response	460	653
Ineligible (sample child is deceased)	1	1
Response rate*	86.8%	87.0%

*Excluding ineligible cases

³ This section is extracted from Chen and Yeung, 2022. *SG LEADS Wave 2 Technical Report 2: SG LEADS Wave 2 Weights*. Singapore: NUS Centre for Family and Population Research.

5.2 Weight Construction Procedure

Weights are constructed in sample survey data to adjust for unequal sample selection probabilities, non-response or data that is missing at random. Weights are inversely proportional to the selection probability of each case, and conditional on the response to the survey questions. In a longitudinal dataset, the joint probability at time t , where the study started at $t-1$ or earlier, can be expressed as:

$$P(S_t=1) = P(S_{t-1}=1) * P(R_t=1|S_{t-1}=1)$$

In which S_t indicates participation in a study at time t , and R_t refers to response at time t . The probability of being a participant at time t is a product of being a participant at the previous wave (e.g., time $t-1$) and conditional on the probability of being a response at the current wave. The probability of being a participant at the previous wave (the term $P(S_{t-1}=1)$) is proportional to the weight in previous wave. Therefore, the weight in the current wave is a product of the weight in previous wave and the inverse of probability of response in the current wave (the term $P(R_t=1|S_{t-1}=1)$). Thus, the attrition adjustment factor in wave 2 is $1/P(R_t=1|S_{t-1}=1)$. The wave 2 weight is a product of wave 1 weight and the wave 2 attrition adjustment factor.

In other Panel studies like Panel Study of Income Dynamic Child Development Supplements (PSID CDS) and The Longitudinal Study of Australian Children (LASC), the probability of a sample person or household being successfully re-interviewed in wave 2 onwards was typically modeled with the linear logistic model. Several wave 1 indicators were taken into consideration in the model specification including: the sample child's age, gender and race, head of household's age, gender, educational level, employment status, whether head of household's spouse lives in the household, Wave 1 income quartile, dwelling types and home ownership, region of residence. Since Wave 1 family income has missing values ($n=59$ at the household level), a separate multiple imputation for Wave 1 income at the household level was conducted. In the multiple imputation, the head of household's age, age square, gender, race, education, employment status, occupation were used to predict their family income. After the imputation, the logistic model of Wave 1 children's probability of responding in Wave 2 was fitted. The logistic model is presented in Table 5-2.

As seen, younger children, male-headed household, head of household is a housewife or home maker, head of household's spouse lives in the household, children in rental HDB or owned HDB 1- and 2-Room Flats in north planning area are slightly less likely to response to the Wave 2 survey.

Table 5-2: Logistic Regression on Wave 1 Children's Probability of Responding in Wave 2 Interview

Variable	Coefficient	Robust std. err.	z	P> z
Child's age	0.037	0.022	1.650	0.099
Boy	-0.079	0.087	-0.900	0.366
Head of household's age	0.009	0.008	1.150	0.252
Head of household is male	-0.840	0.225	-3.720	0.000
Head of household's race (ref. Chinese)				
Malay	-0.121	0.143	-0.850	0.396
Indian	-0.273	0.177	-1.540	0.124
Others	-0.019	0.309	-0.060	0.951
Head of household's education (ref. secondary and below)				
post-secondary	-0.025	0.150	-0.170	0.867
university and above	0.240	0.190	1.260	0.207

Head of household's employment status (ref. working)				
housewife/homemaker	-0.774	0.296	-2.610	0.009
other-not working	-0.367	0.283	-1.300	0.194
Head of household's spouse lives in the household	0.534	0.252	2.120	0.034
Housing type and homeownership (ref. Owned HDB 4-Room Flats)				
Rental HDB	-0.298	0.204	-1.460	0.144
Owned HDB 1- and 2-Room Flats	-0.587	0.343	-1.710	0.087
Owned HDB 3-Room Flats	-0.020	0.154	-0.130	0.895
Owned HDB 5-Room/Executive Flats	0.243	0.190	1.280	0.201
Owned/rental Condominiums & Landed Properties	-0.203	0.200	-1.020	0.309
Income quartile (ref. Incomeq1_lowest)				
Incomeq2	0.043	0.160	0.270	0.790
Incomeq3	0.150	0.194	0.770	0.440
Incomeq4_highest	-0.143	0.234	-0.610	0.542
Planning region				
East	0.030	0.202	0.150	0.882
North	0.312	0.197	1.580	0.114
North-East	-0.235	0.161	-1.450	0.146
West	0.150	0.171	0.880	0.380
Constant	1.784	0.463	3.850	0.000
N	5,006			
Pseudo R2	2.40%			

Each Wave 1 child's probability of responding to Wave 2 survey (P) was estimated using the model presented in Table 5-3. The Wave 2 response adjustment factor was constructed for those who have been re-interviewed in Wave 2 by taking the inverse of their response probability(1/P) (refer to Table 3 for the distribution).

Table 5-3. Distribution of Responding Cases' Response Probability and Nonresponse Adjustment Factor

Percentiles	Probability of response	Wave 2 nonresponse adjustment factor
1%	0.73	1.05
5%	0.79	1.07
10%	0.82	1.09
25%	0.85	1.11
50%	0.88	1.14
75%	0.90	1.18
90%	0.92	1.22
95%	0.93	1.26
99%	0.95	1.36

The last step of weight construction is to censor the extreme weights to reduce their influence on the sample estimation of the population statistics. The weights were top coded and bottom coded at 99th

and 1th percentile respectively. The child level weight has been created and stored in the variable `child_weight_W2` (normalized weight) and `child_raw_weight_W2` (raw weight). According to PSID CDS II user guide, the household level weights are constructed by taking the mean of the W2 child weights of each child observation provided by a caregiver. The household-level weights are stored in `HH_weight_W2` (normalized weight) and `HH_raw_weight_W2` (raw weight).

Table 5-4 provides a weighted comparison of some basic demographic, geographic, and socioeconomic variables between Wave 1 sample (weighted by Wave 1 weights) and Wave 2 sample (weighted by Wave 2 weights). AS shown both the household level and child level weighted distribution of Wave 2 sample is close to the Wave 1 sample. It suggests that the Wave 2 attrition adjustment factors used to construct the weights help to compensate for potential attrition bias in the family type and demographic composition of the SG LEADS panel data. We should also note that this comparison does necessarily not rule out the possibility of spurious or more subtle forms of selection bias that may not be associated with the demographic, geographic and socio-economic characteristics of SG LEADS respondents.

Table 5-4. Weighted Comparison of Selected Variables Between Wave 1 Sample and Wave 2 Sample

	SG LEADS Wave 1 (2018-2019)		SG LEADS Wave 2 (2021)	
	n	weighted %	n	weighted %
Household level				
Planning region	3,476	100.0%	3,017	100.0%
Central	680	19.2%	591	18.7%
East	417	13.2%	363	13.8%
North	571	14.9%	508	15.0%
North-East	864	29.3%	721	28.8%
West	944	23.5%	834	23.9%
Dwelling type	3,476	100.0%	3,017	100.0%
HDB 1- to 2-room flats	388	3.7%	314	4.1%
HDB 3-room flats	957	12.4%	827	12.2%
HDB 4-room flats	1097	36.9%	962	37.0%
HDB 5-Room and Executive Flats	550	28.4%	493	28.4%
Condominiums	428	15.8%	376	15.4%
Landed Properties	56	2.9%	45	3.0%
Education of the household head	3476	100.0%	3,017	100.0%
Secondary and Below	967	23.9%	821	23.9%
Post-Secondary	1143	29.4%	980	29.7%
University	1366	46.7%	1216	46.4%
Race of the household head	3,476	100.0%	3,017	100.0%
Chinese	2187	67.1%	1923	66.5%
Malay	801	14.3%	677	15.2%
Indian	369	13.4%	314	13.1%
Others	119	5.1%	103	5.2%
Child level				
child's gender	5,005	100.0%	4,352	100.0%
boy	2,518	51.2%	2179	51.4%
girl	2,487	48.8%	2173	48.6%
child's race	5,005	100.0%	4,352	100.0%
Chinese	3140	62.7%	2762	67.6%
Malay	1269	25.4%	1083	17.2%

Indian	454	9.1%	382	10.3%
Others	142	2.8%	125	5.0%

6 Types of Variables

6.1 Raw Variables

Raw variables refer to the original data frame and the questions directly asked to respondents. These variables were checked and cleaned by the data team during fieldwork. For instances of skipped questions and consequently, missing values, respondents were contacted again to obtain the missing information.

6.2 Constructed Variables

After fieldwork concluded, the data team created additional variables using the original data. These *constructed variables* are meant to assist data users in their analyses. There is a separate codebook for constructed variables and syntax is available on request.

7 Weighted descriptive statistics

Shown below are the weighted sample distribution of the W2 SG LEADS dataset at the household level and at the child level:

7.1 Household level Characteristics of SG LEADS Households in Wave 2

Table 7-1: SG LEADS Household by Dwelling Type

Dwelling type	Unweighted observation (n)	%	Weighted %	2017 National statistics (%) ^a
HDB 1- to 2-room flats	282	9.35	3.73	2.90
HDB 3-room flats	737	24.43	11.36	11.75
HDB 4-room flats	952	31.55	35.86	35.93
HDB 5-Room and Executive Flats	575	19.06	28.70	27.45
Condominiums	415	13.76	17.01	18.16
Landed Properties	56	1.86	3.34	3.51
Total	3,017	100	100	100

Note: ^a DOS, 2017. Singapore resident household by presence of member aged 0-6 years and type of dwelling, 2021.

Note: Household-level sampling weights are used in the calculation

Table 7-2: Education of the Head of SG LEADS Households in Wave 2

Education of the household head	n	%	Weighted n	Weighted %	GHS2015(%) ^a
Secondary and Below	751	24.89	618.61	20.50	24.03
Post-Secondary	922	30.56	839.36	27.82	29.30
University	1,279	42.39	1,492.07	49.46	46.52
No Response	65	2.15	66.97	2.22	
Total	3,017	100	3,484	100	100

^a Figures from DOS Table on Resident household with at least 1 child aged below 7 years, by type of dwelling, highest qualification attained and ethnic group of head of household, 2015, from DOS

Note: Household-level sampling weights are used in the calculation

Table 7-3: Race of SG LEADS Household Heads in Wave 2

Race of the household head	n	%	Weighted n	Weighted %	GHS2015 (%) ^a
Chinese	1,874	62.1	1,950.85	64.66	66.81
Malay	652	21.6	437.86	14.51	14.2
Indian	308	10.2	392.22	13.00	13.38
Others	118	3.9	169.11	5.61	5.31
Missing	65	2.1	69.97	2.22	
Total	3,017	100	3,017	100	100

^a Figures from DOS Table on Resident household with at least 1 child aged below 7 years, by type of dwelling, highest qualification attained and ethnic group of head of household, 2015

Note: Household-level sampling weights are used in the calculation

Table 7-4: Household Size

Household size	Unweighted n	Unweighted %	Weighted n	Weighted %
2	16	0.53	8.64	0.29
3	370	12.26	301.24	9.98
4	888	29.43	808.00	26.78
5	906	30.03	949.46	31.47
6	491	16.27	558.32	18.51
7	191	6.33	204.23	6.77
8	107	3.55	126.07	4.18
9	32	1.06	44.79	1.48
10 and above	16	0.54	16.26	0.54
total	3,017	100	3,017	100

Note: Household-level sampling weights are used in the calculation

7.2 Child level

Table 7-5: Age of SG LEADS Target Child

Age in years	n	%	Weighted n	Weighted %
1	16	0.37	18.11	0.42
2	368	8.46	364.13	8.37
3	606	13.92	593.54	13.64
4	702	16.13	709.51	16.30
5	689	15.83	678.88	15.60
6	653	15.00	679.89	15.62
7	635	14.59	622.04	14.29
8	591	13.58	594.60	13.66
9	92	2.11	91.41	2.10
Total	4,352	100	4,352	100

Note: Child-level sampling weights are used in the calculation

Table 7-6: Gender of SG LEADS Child

Gender	n	%	Weighted n	Weighted %
Male	2,179	50.07	2,235.13	51.44
Female	2,173	49.93	2,116.87	48.56
Total	4,352	100	4,352	100

Note: Child-level sampling weights are used in the calculation

Table 7-7: Race of SG LEADS Child

Race	n	%	Weighted n	Weighted %
Chinese	2,763	63.49	2,927.47	67.27
Malay	1,054	24.22	721.21	16.57
Indian	395	9.08	467.47	10.74
Others	140	3.22	235.85	5.42
Total	4,352	100	4,352	100

Note: Child-level sampling weights are used in the calculation