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A study on the lasting effects of a parenting training programme in rural China on child brain function and development

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05/07/2026

Recruitment status
Recruiting

Registration date
08/07/2026

Overall study status
Ongoing

Last Edited
29/09/2026

Condition category
Other

[X] Prospectively registered
[_] Protocol
[_] Statistical analysis plan
[_] Results
[_] Individual participant data
[X] Record updated in last year

Plain English summary of protocol

Background and study aims

The first years of life are an important period for children's brain development and later learning. Previous research suggests that a good caregiving environment, including responsive parenting, parent-child interaction and learning support at home, can help children's cognitive, language and socio-emotional development. In contrast, stressful or less responsive caregiving environments may increase the risk of poorer child development.

In rural China, some children in early childhood have faced risks of developmental delay. Parenting training programmes can be used to improve the home environment and secure children's developmental opportunities.

Substantial early childhood development research based on scale-based measurements has emerged, providing important evidence for understanding the effects of early parenting interventions. However, existing studies have mainly focused on caregivers' parenting behaviours and children's observable developmental outcomes and therefore have limited capacity to directly reveal the underlying neurobiological mechanisms through which interventions influence child development. Meanwhile, widely used standardized assessment tools for infant and toddler development cannot fully eliminate the potential interference of subjective reporting in causal identification, and their results may also be affected by assessors' implementation procedures and scoring consistency.

The aim of this study is to evaluate the lasting neurodevelopmental and cognitive outcomes of the "Parenting the Future" programme. This follow-up study compares brain function and developmental outcomes between the intervention and control groups to determine whether the programme exerts sustained effects on children at approximately 10-14 years. By combining child development outcomes with measures of the household caregiving environment, the study explores the potential mechanisms through which early childhood parenting interventions may affect children's brain function and development.

Who can participate?

Children of any sex may take part with their primary caregivers if they were part of previous early childhood parenting studies carried out by the research team in rural western China. The children must have been aged 6–24 months at baseline and are expected to be about 10–14

years old at the 2026 follow-up. They must also have key baseline information and data from the most recent primary-school follow-up. Families must be contactable, and the child's parent or legal guardian must provide written informed consent.
The EEG follow-up study will include 270 children and their households. This includes 90 children from the treatment group and 90 from the control group of a large-scale randomised parenting training programme targeting infants aged 6-24 months in nationally designated poverty counties, as well as 90 children from a county government-led parenting intervention programme. Parents or primary caregivers will bring the children to take part in the follow-up assessment.
Final group sizes may vary slightly, as clusters will be randomly selected and all traceable eligible children within selected clusters will be invited to participate.

What does the study involve?
This is a follow-up study. No new parenting intervention, medicine or treatment is given in this study. Children and households take part in a one-time follow-up assessment. The study compares children from "Parenting the Future," including the treatment and control groups of a large-scale randomised parenting intervention targeting infants aged 6–24 months in nationally designated poverty counties, and children from a county government-led parenting training programme.
Children will complete an EEG assessment, involving the resting-state EEG outcome measures and MMN outcome measures. Children will also complete developmental and reading assessments. These include a socio-emotional and behavioral development test, a cognitive test and reading tests.
Parents or caregivers will answer questionnaires about the child's school situation, family structure, home educational environment, parent-child communication, parenting behaviour, education and health investment, caregiver expectations, caregiver mental health and psychosocial resources. The child's height and weight will also be measured.

What are the possible benefits and risks of participating?
Households receive a participation payment after completing the survey. Participation may stimulate children's curiosity about learning and their own development. Besides, the study may help researchers and policymakers better understand whether early parenting support has long-term effects on children's brain function and development in rural China.
The risks are minimal. EEG is non-invasive, painless, and radiation-free. The EEG equipment only records natural brain signals and does not deliver treatment or medicine. Some children may feel mild discomfort from wearing the EEG cap or from sitting still for a short time. Some participants may feel tired during the assessments or questionnaires. Participants can stop or withdraw at any time.
Personal information will be kept confidential. Study results will be reported in a way that does not identify specific children or households.

Where is the study run from?
The study is managed by Minzu University of China. It is conducted in collaboration with Shaanxi Normal University and Beijing Normal University (China).

When is the study starting and how long is it expected to run for?
July 2026 to December 2028

Who is funding the study?
Hupan Modou Foundation (China)

Who is the main contact?
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Study information

Scientific Title
Lasting effects of parenting training interventions for children aged 0–3 in rural China on brain function and developmental outcomes in school-aged children : a follow-up study of cluster-randomised controlled trials

Study objectives
The objective of this project is to evaluate the lasting neurodevelopment, socio-emotional and behavioral development, and cognitive outcomes of the “Parenting the Future” programme, an early childhood parenting training programme implemented through a large-scale randomized intervention in rural western China.

By comparing brain function and development outcomes between treatment groups and control groups, this follow-up study examines whether early childhood parenting training interventions have lasting effects on children 6-7 years after the end of the intervention. Furthermore, by combining child development outcomes with measures of the household caregiving environment, the study explores the potential mechanisms through which early childhood parenting training interventions may affect children’s brain function.

Ethics approval required
Ethics approval required

Ethics approval(s)
Approved 29/06/2026, Biological and Medical Ethics Committee, Minzu University of China (No. 27 South ZhongGuanCun Avenue, Haidian District, Beijing, 100081, China; +86 (0)1068933254; jason@muc.edu.cn), ref: ECMUC2026008CO

Primary study design
Observational

Secondary study design
Cohort study

Study type(s)

Health condition(s) or problem(s) studied
Child brain function and development

Interventions
Participants will be selected from two previous early childhood parenting training interventions of “Parenting the Future” conducted by the research team in rural western China. The intervention provides caregivers with weekly parenting training, designed to reduce children’s early developmental delays. Trained parenting instructors use an adapted Reach Up and Learn curriculum to teach caregivers age-appropriate, interactive parenting practices. The first programme is a large-scale randomised parenting intervention that targeted infants aged 6-24 months in nationally designated poverty counties. For the present follow-up with EEG assessment, 180 children will be drawn from this study, including 90 children from the treatment group and 90 children from the control group. The second programme is a county government-led parenting intervention programme. A further 90 children will be selected from this programme. The total follow-up sample will therefore include 270 children and their households.

Added 29/09/2026: Given that both programmes were randomised at the cluster level and considering the costs of fieldwork, we aimed to select a similar number of clusters from the treatment and control groups and to include as many children as possible who could be successfully followed up within the selected clusters. As the second programme included substantially fewer clusters than the first, sampling for this programme instead aimed to maintain a similar number of children between the treatment and control groups.

After written informed consent is obtained from the child’s parent or legal guardian, trained fieldworkers will conduct a one-time follow-up assessment with the child and the primary caregiver. Parents or primary caregivers will bring the children to take part in the assessment.

The assessment will collect EEG data and child development data

EEG data are recorded using a 64-channel ANT system in two tasks: (1) a 6-minute resting-state task with eyes-open and eyes-closed conditions, and (2) an auditory mismatch negativity task in which children listen to Chinese syllables while watching a silent film.

Child development measures will cover physical growth, cognitive development, socio-emotional and behavioural development, reading development, psychiatric risk, mental health, school adaptation, sibling relationships, expectations and beliefs, and time use. The child questionnaire and interview include WISC and reading tests, preference games, DASS-Y, and OECD-SSES items. The caregiver questionnaire collects information on the child’s household, school situation, parental migration, school behaviour, educational expectations, SDQ, educational investments, health investments, time use, parenting-related beliefs, and other family and caregiver characteristics.Besides, child’s physical growth is measured.

After fieldwork, EEG, assessment, and questionnaire data will be checked for quality, completeness, and consistency before analysis.

Intervention Type
Behavioural

Primary outcome(s)
1. Child brain function measured using electroencephalography (EEG): 1.1. Resting-state EEG data, including EEG signals recorded under both eyes-open and eyes-closed resting conditions, are analysed by spectral power analysis and EEG microstate analysis. The spectral power analysis primarily focuses on power in different frequency bands, including delta, theta, alpha, beta, and gamma brainwaves, as well as metrics such as absolute power and relative power. EEG microstate indicators include microstate category, duration, occurrence frequency, coverage, and transition probability, which are used to assess the dynamic characteristics of children's brain functional networks during rest. 1.2. The Mismatch Negativity (MMN) task metrics involve collecting event-related potentials using a passive auditory oddball paradigm with Mandarin syllables. The primary measures extracted are the average amplitude, peak amplitude, and peak latency of the MMN, which are used to assess children's ability to automatically detect phonetic differences at follow-up evaluations during the summers of 2026 and 2027

2. Child cognitive development measured using the Wechsler Intelligence Scale for Children, Fourth Edition (WISC-IV): 2.1. The Verbal Comprehension Index, used to assess children's verbal reasoning and language comprehension skills. 2.2. Perceptual Reasoning Index, used to assess children's visuospatial perceptual reasoning abilities. 2.3. The Working Memory Index, used to assess children's ability to actively process short-term information. 2.4. Information Processing Speed Index, used to assess children's information processing speed. 2.5. Full-scale IQ, used to comprehensively assess a child's overall cognitive development at follow-up evaluations during the summers of 2026 and 2027

3. Children's socio-emotional skills and behavioral development measured using 3.1. The OECD Social and Emotional Skills Survey (SSES) is used to assess children's social and emotional competencies, including task competence, emotional regulation, collaboration, openness, and interpersonal skills. 3.2. The Strengths and Difficulties Questionnaire (SDQ) – Parent Version, used to assess children's psychosocial adjustment, including emotional symptoms, behavioral problems, peer relationships, attention/hyperactivity, and prosocial behavior at follow-up evaluations during the summers of 2026 and 2027

4. Children's reading development measured using a battery of reading assessments: 4.1. The Chinese Reading Achievement Test uses the Standardized Test of Chinese Language Achievement for Chinese Children and Adolescents to assess students' accumulation of Chinese language knowledge and reading comprehension skills. 4.2. Chinese character recognition task, which assesses children's accuracy and fluency in recognizing Chinese characters. 4.3. Timed English Word Recognition Task: Assesses the accuracy and fluency of children's English word recognition. 4.4. English pseudoword decoding task, which assesses children's mastery of English grapheme-phoneme correspondences. 4.5. Rapid Naming Task: Assesses children's ability to rapidly and automatically associate and retrieve visual symbols—such as numbers and English letters—with auditory information. 4.6. Children's attitudes toward reading are assessed using questionnaire items on whether they enjoy reading, like talking with others about what they

have read, feel happy to receive books as gifts, find reading boring, want more time to read, learn from reading, enjoy reading materials that make them think, and enjoy books that help them imagine another world at follow-up evaluations during the summers of 2026 and 2027

Key secondary outcome(s)

1. Children's mental health, school adjustment, and developmental expectations measured using children's questionnaires and structured interviews: 1.1. The risk of mental disorders in children is assessed using the child version of the Brief International Neuropsychiatric Interview (MINI-KID). 1.2. Children's mental health status was assessed using mental health questionnaires to evaluate symptoms of psychological distress, such as depression, anxiety, and stress. 1.3. School adjustment in children, assessed through a children's questionnaire that measures their attitudes toward school, how much they like school, their emotions related to school, and their willingness to attend school. 1.4. Children's academic performance is assessed based on information such as their class rank, grade-level rank, Chinese scores, math scores, and the maximum possible score on the most recent major exam. 1.5. Children's Educational and Career Expectations: A questionnaire for children is used to assess their desired level of education, future career aspirations, preferred location for future work and life, and confidence in the future. 1.6.Children's self-efficacy: A questionnaire for children is used to assess their perceived ability to solve problems, achieve goals despite opposition, handle unexpected situations, remain calm when facing difficulties, and cope with problems using their own abilities. 1.7. Children's interests: A child questionnaire is used to assess children's interests and hobbies at follow-up evaluations during the summers of 2026 and 2027

2. Children's time allocation, learning activities, and digital media use measured using a children' s questionnaire: 2.1. Study time, including time spent during school hours and on weekends completing homework assigned by teachers and work from after-school tutoring programs. 2.2. Extracurricular learning and development activities, including after-school tutoring, talent development, interest-based activities, and time for extracurricular reading. 2.3. Screen and digital media use, including time spent watching TV, using a cell phone or tablet, browsing the internet, and playing video games at follow-up evaluations during the summers of 2026 and 2027

3. Children's physical development and health measured using on-site measurements and parent questionnaires: 3.1. Children's height should be measured using standardized, uniform height-measuring instruments. 3.2. Children's weight should be measured using a standard, calibrated scale. 3.3. Utilization of children's health services and health expenditures: A parent questionnaire was used to assess children's illness, frequency of medical visits, hospitalizations, medical expenses, health insurance coverage, physical examinations, vision screenings, dental checkups, and purchases of nutritional supplements at follow-up evaluations during the summers of 2026 and 2027

4. Basic family background, school information, and the child's daily routine measured using a parent questionnaire: 4.1. Basic family information, including the child's current place of residence, family composition, whether the child lives with his or her parents, whether the parents are working away from home, changes in family composition, and changes in the parents' marital status. 4.2. Information about the child's school, including current grade, school address, number of elementary schools attended, school type, location of the school, whether the child is a boarding student, mode of transportation to and from school, commute time, and distance from home to school at follow-up evaluations during the summers of 2026 and 2027

5. The home environment, parent-child interactions, and parenting styles measured using parent questionnaires and relevant scales: 5.1. Family rearing environment: The Family Rearing Environment Scale (FCI) was used to assess the diversity of toy sources, the variety of toy types,

and the diversity of parent-child activities. 5.2. The home educational environment is assessed through a parent questionnaire that evaluates the following aspects: listening to children read aloud, reading with children, telling stories to children, parent-child discussions, activities at libraries or bookstores, the family's book collection, book-buying behavior, checking homework, providing homework guidance, and communication between home and school. 5.3. Quality of Family Interaction and Parent-Child Relationships: Parent questionnaires were used to assess parent-child communication, shared activities, emotional support, praise, comfort, neglect, threats, corporal punishment, and strict discipline. 5.4. Parenting Styles: The Parenting Style Questionnaire (PSDQ) was used to assess behaviors associated with authoritative, authoritarian, and permissive parenting styles. 5.5. Child Neglect and Care Environment: This section assesses the child's care in areas such as physical care, emotional care, education, safety, health, nutrition, and environmental safety, based on a child neglect assessment scale completed by the parents at follow-up evaluations during the summers of 2026 and 2027

6. The psychosocial resources, developmental expectations, and family involvement of caregivers measured using a parent questionnaire: 6.1. Mental Health of Caregivers: Assess caregivers' levels of depression, anxiety, and stress using the Brief Depression, Anxiety, and Stress Scale (DASS-21). 6.2. Caregiver Control Points and Parental Efficacy: The Caregiver Psychological and Social Resources Questionnaire is used to assess parental efficacy, parental responsibility, the child's sense of control over the parents' lives, and the parents' sense of control over the child's life. 6.3. Caregivers' Views and Expectations Regarding Their Children's Development: A parent questionnaire is used to assess caregivers' perceptions of the factors influencing their children's success, their expectations regarding their children's educational attainment, career aspirations, preferred future places of work and residence, and their confidence in their children's future. 6.4. Expenditures on Family Education: Based on a parent questionnaire, this section assesses family expenditures from January to June 2026 on tuition and miscellaneous fees; school meals, lodging, and school bus services; textbooks, reference books, and school supplies; after-school services; supplementary textbooks; extracurricular reading materials; learning devices; off-campus tutoring; arts and skills classes; and other education-related expenses. 6.5. Household health expenditures, assessed through a parent questionnaire covering children's medical expenses, private health insurance, physical examinations, vision screenings, dental checkups, and the purchase of nutritional supplements at follow-up evaluations during the summers of 2026 and 2027

7. Children's social preferences and fairness preferences measured using incentivized preference games: 7.1. Children's social preferences are assessed using incentivized token-allocation tasks involving anonymous peers from the same village and from other villages. 7.2. Fairness preferences are assessed using tasks on allocation decisions under luck-based and performance-based differences. 7.3. Equality-efficiency trade-off tasks are measured using tasks on allocation decisions with extra bonus at follow-up evaluations during the summers of 2026 and 2027

8. Children's sibling relationships measured using child questionnaires: Children's sibling relationships are assessed using questionnaire items to find whether children have siblings and, for the closest-age sibling, sibling relationship quality, including warmth, support, cooperation, communication, conflict, rivalry, parental differential treatment, mutual teaching, admiration, secrecy sharing, and time spent together at follow-up evaluations during the summers of 2026 and 2027

Completion date
31/12/2028

Eligibility

Key inclusion criteria
1. Children of any sex and their primary caregivers who participated in "Parenting the Future"
2. Children drawn from "Parenting the Future", including a treatment group and the control group of one county government-led parenting intervention programme, as well as another large-scale randomised parenting training programme targeting infants aged 6-24 months in nationally designated poverty counties
3. Children who were aged 6-24 months at baseline and children who are approximately 10 to 14 years old at the 2026 follow-up
4. Children with complete information on key baseline covariates and available information from the latest primary-school-stage follow-up
5. Children and caregivers who can be contacted, with written informed consent provided by the child’s parent or legal guardian

Healthy volunteers allowed
Yes

Age group
Child

Lower age limit
10 Years

Upper age limit
14 Years

Sex
All

Total final enrolment
0

Key exclusion criteria
1. The child never participated in any previous parenting training programme of "Parenting the Future"
2. Children who are not selected for the follow-up sample
3. Children whose baseline age is not between 6 and 24 months
4. Children with incomplete information on key baseline covariates, or without available information from the latest primaryschoolstage followup
5. Children or caregivers who cannot be contacted, or children whose parent or legal guardian does not provide written informed consent

Date of first enrolment
15/07/2026

Date of final enrolment
30/10/2027

Locations

Countries of recruitment
China

Sponsor information

Organisation
Minzu University of China

ROR
https://ror.org/0044e2g62

Funder(s)

Funder type

Funder Name
Hupan Modou (HPMD) Foundation

Results and Publications

Individual participant data (IPD) sharing plan

IPD sharing plan summary
Not expected to be made available