ISRCTN73584371 https://doi.org/10.1186/ISRCTN73584371

Psychosocial ADHD and disruptive behavior interventions – mechanisms

Submission date
08/04/2026

Recruitment status
No longer recruiting

Registration date
16/04/2026

Overall study status
Completed

Last Edited
15/04/2026

Condition category
Mental and Behavioural Disorders

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

Plain English summary of protocol

Background and study aims
Based on a wide range of literature on behavioral parent training for children with ADHD, changes in parenting behaviors, parental cognitions, and parental emotions, as well as children's behaviors can be expected as a result of this intervention. However, it remains unclear if and which changes in parenting behaviors, parental cognitions, and parental emotions affect changes in child behaviors. To explore this, we need to better understand the sequence of these changes.
Research questions:
1. Confirmatory research question: Do parenting behaviors, parental cognitions, parental emotions, and children's behaviors change after a single session of parent training?
2. Exploratory research question: In what sequence do changes in parenting behaviors, parental cognitions, parental emotions, and children's behaviors occur and do these changes influence each other?

Who can participate?
Parents of children (6-10 years old) with ADHD, who are willing to attend a one-session parent training.

What does the study involve?
1. Intervention
Parents will receive one session of individually-tailored parent training for disobedient behaviour, their child is not included in these sessions. This session will be given at home (when the child is not at home) or at any other place that is convenient for parents. The session will take three hours (180 minutes), in which parents are provided psychoeducation about ADHD and in which they learn parenting techniques that were shown to be effective in our previous microtrial (Hornstra et al., 2021): parents learn to help their child towards positive behaviour by stimulus-control techniques such as structuring the situation, setting rules and giving clear instructions. Parents also learn how te react to their child by contingency-management techniques such as praise, reinforcement or setting negative consequences. An intervention plan is made together with parents, which will be practised immediately within the session. After the session, parents are encouraged to carry out this intervention plan at home every day.

2. Measurements
The primary caregiver will answer 15-20 short questions (in total taking about five minutes per measurement), seven days per week, twice a day for six weeks (including the week in which the intervention is provided) via a secure web application on their mobile phone (using https://m-path.io). To gain insight into mechanisms of change, we will make use of a multiple single-case design with a randomized baseline in which variables will be measured repeatedly and systematically in each participant.
Due to the short duration, the measurements will be minimally burdensome for parents. In the daily measurements (morning and evening), we ask parents about the behaviour of their child, their (parenting) behaviour, perceptions of their own competence as a parent, and emotions they expressed towards their child since the previous measurement. Additionally, we ask if there were any notable events during the period since the previous measurement. Finally, in the measurements after attending the parent training session, a manipulation and validity check is added by asking parents if they followed the action plan they made with the trainer (1 item) and if they spent time with their child since the previous measurement.
Only the primary caregiver (the parent who sees the child most of the time) will participate in the daily measurements; these will not be conducted with the children.
For baseline measurement, the DISC-IV will be assessed, together with a baseline measurement of disobedient child behaviour and some contextual questions (duration max. 75 minutes).
This research setup was conceived in consultation with a representative of the parent association Balans, an organization that advocates for and shares knowledge with parents of children who need extra support in learning or upbringing. They consider the measurements to be feasible for parents since (1) the measurements are very short, (2) there is sufficient financial compensation, and (3) parents are reminded by phone or message on their phone. In addition, our previous experiences and those of other researchers within our PAINT consortium with daily measurements in Multiple Single Case Experimental Design studies (MSced's) and other designs, confirm that parents find the short daily measurements to be minimally burdensome.

What are the possible benefits and risks of participating?
All parents receive a one-session parent training program of which the components have previously been shown to be effective for handling disruptive behaviours, such as hyperactivity, impulsivity and symptoms of oppositional defiant and conduct disorder. In the training, parents will learn stimulus-control and contingency-management techniques to diminish the disobedient behaviour of their child. This training will be provided freely by a trained and very experienced clinician (licensed clinical psychologist) and will cost parents less time compared to regular parent training programs. There will be no financial costs for the parents.

To motivate parents for the measurements (twice a day for nine weeks, approximately 5 minutes each), we send them daily reminders and provide financial compensation. For participation in the study, parents receive a compensation of 2.50 euros per measurement (thus 5 euros per day), and when 90% of the measurements are completed, parents receive a 10% bonus on the total number of completed measurements. In total, parents can receive a maximum compensation of 350 euros.

The risk of any physical or mental harm to the study is very low and not expected to be higher than what may be expected in the daily life of the parents and their children. We will exclusively use conventional behavioural methods.

Where is the study run from?
Accare Child Study Center, Groningen, The Netherlands.
The parent training will take place in different locations in the Netherlands, depending on what is convenient for participating parents.

When is the study starting and how long is it expected to run for?
The study started in February 2025 and concluded in February 2026. Data collection will be completed in May 2026.

Who is funding the study?
This study is funded by the Netherlands Organization for Health Research and Development in the Dutch funding round “Onderzoek naar kernelementen van interventies in de jeugdsector”.

Who is the main contact?
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Netherlands Organization for Health Research and Development (ZonMw) dossier number
07440212310027

Study information

Scientific Title
Working mechanisms of behavioral parent training for children with ADHD: a multiple baseline single-case experimental design study

Acronym
PAINT-M

Study objectives
This study includes a confirmatory and an exploratory research question.
Based on a wide range of literature on behavioral parent training for children with ADHD, changes in parenting behaviors, parental cognitions, and parental emotions, as well as children's behaviors can be expected as a result of this intervention. However, it remains unclear if and which changes in parenting behaviors, parental cognitions, and parental emotions affect changes in child behaviors. To explore this, we need to better understand the sequence of these changes.
Research questions:
1. Confirmatory research question: do parenting behaviors, parental cognitions, parental emotions, and children's behaviors change after a single session of parent training?

2. Exploratory research question: in what sequence do changes in parenting behaviors, parental cognitions, parental emotions, and children's behaviors occur and do these changes influence each other?

Ethics approval required
Ethics approval required

Ethics approval(s)
1. Approved 10/09/2024, Scientific and Ethical Review Board (VCWE) of the Faculty of Behavior & Movement Sciences, VU University Amsterdam (De Boelelaan 1105, Amsterdam, 1081 HV, Netherlands; +31 20 5989898; vcwe.fgb@vu.nl), ref: VCWE-2024-137

2. Approved 22/04/2024, Medical Ethics Review Board of the University Medical Center Groningen (METc UMCG) (P.O. Box 30 001, Groningen, 9700 RB, Netherlands; +31 50 3614204; metc@umcg.nl), ref: METc 2024/233

Primary study design
Observational

Secondary study design
Multiple Baseline Single-Case Experimental Design

Study type(s)

Health condition(s) or problem(s) studied
Behavioral parent training for parents of children with Attention-Deficit/Hyperactivity Disorder (ADHD) and behavioral problems.

Interventions
To answer our research questions, we will use a multiple single case experimental design (MSced) with a randomized baseline according to the Single-Case Reporting guideline In BEhavioural interventions (SCRIBE) 2016 Statement.
Parents of 12 children with ADHD will receive a single session of behavioral parent training of three hours. The dependent variables will be measured repeatedly in each phase using EMA. The duration of the baseline period will vary between 9 and 14 days and participants will be randomly assigned to one of six baseline conditions (i.e., 9, 10, 11, 12, 13 resp. 14 days), resulting in two participants in each baseline condition. The randomization will be done by a researcher not involved in the data collection or intervention.
The entire MSced spans a period of up to nine weeks, in which daily measurements will be conducted twice a day; one measurement in the morning and one in the afternoon. By varying the length of baseline randomly, the length of post-intervention measurements will be between 49 and 54 days (total 63 days). Parents will fill in the daily measures twice a day using the m-path app, resulting in 126 measurements in total (baseline phase varying between 18 and 28 measurements, post-intervention phase varying between 98 and 108 measurements). The exact time of the measurements will be personalized, depending on what time for both the morning and afternoon measurements is suitable for parents. They will receive a notification for each measurement, and, if necessary, they will receive reminders. Each measurement is open for two hours. Parents will receive feedback about completing their measurements at least weekly by one of the researchers, but if necessary, a research assistant will provide daily support. Parents will receive a financial compensation of €2,50 for each measurement, plus a 10% bonus if at least 90% of the measurements are completed, resulting in a maximum compensation of €350.

Analyses
1. Confirmatory analyses
To test whether parenting behaviors, parental cognitions, parental emotions, and child behaviors change after the intervention, we will conduct a multilevel autoregression analysis for single-subject analysis for each outcome variable (see Maric et al. 2015 for a detailed description of this method). With this method, we will analyze the general trend in the temporal data separately for parenting behaviors, parental cognitions, parental emotions, and child behaviors by means of the regression lines of those outcome variables. We will test differences between two different phases (after baseline and after intervention) and provide a reliable change index for each family on parenting behaviors, parental cognitions, parental emotions, and child behaviors separately, testing whether the change in these variables during the post intervention phase is significantly different from the change during the baseline phase.

2. Exploratory analyses
Temporal associations between parenting behaviors, parental cognitions, parental emotions and children's behaviors will be analyzed using Time-Varying Vector Autoregressive (TV-VAR) models, which originate from idiographic network models (Epskamp, 2018). TV-VAR models extend the well-established stationary VAR models to study how time-varying parameters change due to interventions. The planned exploratory analysis will result in (i) a network analysis and visualization per family based on how changes in outcome measures (i.e., parenting behaviors, parental cognitions, parental emotions, children's behaviors) follow each other and relate to each other, and (ii) a comparative analysis of temporal (auto-) regression parameters between the families that change after the training and the families that do not change. Through network analysis, we will create temporal networks per family, mapping the patterns of change per family. With these analyses we will explore the following research questions:
• Do changes in parenting behaviors, parental cognition and/or parental emotions mediate changes in child behaviors?
• Are changes in parenting behaviors, parental cognitions, and parental emotions associated, and do these subsequently influence changes in children's behaviors?
• When do changes in children's behaviors occur: after changes in parenting behaviors and/or after changes in parental cognitions and/or parental emotions?
• Are changes in children's behaviors followed by changes in parenting behaviors, parental cognitions and/or parental emotions?

A power calculation shows that the inclusion of 12 families is sufficient, allowing for optimal variation in the timing of the intervention during the EMA measurement phase over 63 days (9 weeks). With twelve participating families and 126 datapoints per family, it is possible to retrieve a network structure for six variables. By measuring up to two weeks before the intervention, we can optimally vary the timing of the intervention by randomizing the baseline period for each family. With our 126 measurements (2 per day, for 63 days) per family, we meet the minimum requirements for using Idiographic Network Models (Epskamp, 2018), the aforementioned analysis technique that can test temporal relationships within and between parent and child behaviors.

Intervention Type
Behavioural

Primary outcome(s)
1. Parenting behavior measured using the Ecological momentary assessment (EMA) at personalised time-points, twice a day (morning and afternoon) during 63 days (i.e. 126 measurement points)

2. Parental cognitions measured using the Ecological momentary assessment (EMA) at personalised time-points, twice a day (morning and afternoon) during 63 days (i.e. 126 measurement points)

3. Parental emotions measured using the Ecological momentary assessment (EMA) at personalised time-points, twice a day (morning and afternoon) during 63 days (i.e. 126 measurement points)

4. Child behaviors measured using the Ecological momentary assessment (EMA) at personalised time-points, twice a day (morning and afternoon) during 63 days (i.e. 126 measurement points)

Key secondary outcome(s)

Completion date
04/05/2026

Eligibility

Key inclusion criteria
1. Parents have a child diagnosed with ADHD, confirmed by the Diagnostic Interview Schedule for Children [DISC-IV].
2. The child is aged between 6 and (up to and including) 10 years old.
3. Parents have a question for help with respect to the daily occurring noncompliant behavior of their child.

Healthy volunteers allowed
No

Age group
Child

Lower age limit
6 Years

Upper age limit
10 Years

Sex
All

Total final enrolment
12

Key exclusion criteria
1. The child is diagnosed with an autism spectrum disorder (as reported by parents).
2. The child used psychotropic medication in the present or past month, or starting medication is planned during the measurement period.
3. Parents have received behavioral parent training in the past year, behavioral support at home in the past three months, or any other actual parent support.

Date of first enrolment
10/02/2025

Date of final enrolment
24/02/2026

Locations

Countries of recruitment
Netherlands

Study participating centre
Accare Child Study Center
-
Groningen
Netherlands
-

Sponsor information

Organisation
Accare

ROR
https://ror.org/02h4pw461

Funder(s)

Funder type

Funder Name
ZonMw

Alternative Name(s)
Netherlands Organisation for Health Research and Development

Funding Body Type
Private sector organisation

Funding Body Subtype
Other non-profit organizations

Location
Netherlands

Results and Publications

Individual participant data (IPD) sharing plan

IPD sharing plan summary
Not expected to be made available

Study outputs

Output type	Details	Date created	Date added	Peer reviewed?	Patient-facing?
Other files			15/04/2026	No	No
Participant information sheet			15/04/2026	No	Yes
Statistical Analysis Plan			15/04/2026	No	No