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School-based targeted prevention for children with mild intellectual disabilities or borderline intellectual functioning and behaviour problems: A pilot implementation study

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Abstract

Background: We examined the implementation and potential effectiveness of a school-based targeted prevention programme addressing behaviour problems, adapted for children with mild intellectual disabilities or borderline intellectual functioning.

Method: Thirteen children participated. The intervention was implemented in schools. We examined intervention dosage, reach, responsiveness, satisfaction, and comprehension, using questionnaires completed by children and trainers. We assessed child- and teacher-reported behaviour problems before and after the intervention.

Results: Trainers selected both children who did and did not meet the intervention eligibility criteria, suggesting problems in intervention reach. Intervention dosage, responsiveness, satisfaction, and comprehension were satisfactory. There were group-level behaviour problem decreases (i.e., Cohen's *d*). Individual-level behaviour problem changes (i.e., Reliable Change Indices) showed large heterogeneity and little reliable change.

Conclusions: The results provide initial evidence that the intervention has potential for successful implementation in schools, but the current evidence for intervention effectiveness is inconclusive.

KEYWORDS
borderline intellectual functioning, cognitive behaviour therapy, externalising problems, implementation, intellectual disabilities, school intervention

1 | INTRODUCTION

Children with mild intellectual disabilities (IQ between 55 and 70 and impaired adaptive functioning) and borderline intellectual functioning (IQ between 70 and 85 and impaired adaptive functioning; American Psychiatric Association, 2013) display more behaviour problems (e.g., aggressive and oppositional defiant behaviour) than typically

developing children (Dekker et al., 2002). Behaviour problems are also more persistent in children with mild intellectual disabilities or borderline intellectual functioning compared to typically developing children, when exposed to multiple environmental risks (e.g., low socio-economic status, adverse life events; Emerson et al., 2011). Prevention programmes aim to avert the persistence of behaviour problems throughout the life course. Effective targeted prevention programmes for

children with mild intellectual disabilities or borderline intellectual functioning and elevated levels of behaviour problems are thus needed. This calls for adaptation of conventional targeted prevention programmes to the specific needs of children with mild intellectual disabilities or borderline intellectual functioning (Hronis et al., 2017). In this pilot study, we examined the implementation and potential effectiveness of a school-based targeted prevention programme addressing behaviour problems, adapted for children with mild intellectual disabilities or borderline intellectual functioning and behaviour problems.

1.1 | Challenges in treating children with mild intellectual disabilities or borderline intellectual functioning

Historically, conventional forms of psychotherapy, such as cognitive behavioural therapy (CBT), have rarely been used for treating individuals with mild intellectual disabilities or borderline intellectual functioning (Taylor et al., 2008). An important reason is these individuals' high support needs in different areas of functioning, as they face difficulties in intellectual and adaptive functioning, health, participating in society, as well as many broader contextual adversities (Schalock et al., 2021). This makes it difficult to apply standard CBT for individuals with mild intellectual disabilities or borderline intellectual functioning, who may not be able to fully benefit from CBT without specific adaptations to their needs. Consequently, research on CBT in children with mild intellectual disabilities or borderline intellectual functioning is still sparse (Hronis, 2021; Kok et al., 2016). However, in recent years, experts have provided recommendations for adapting conventional CBT and tailoring it for children with mild intellectual disabilities or borderline intellectual functioning, taking these children's unique (cognitive) profiles into account (including their limited attention span, executive functioning deficits, and difficulty with perspective taking and abstract thinking; De Wit et al., 2012; Hronis et al., 2017).

Some pioneering trials of adapted CBT among adults and adolescents with intellectual disabilities have shown promising results for treating mental health problems including anxiety, depression, and aggression (e.g., Hronis et al., 2019; Schuurmans et al., 2018; Unwin et al., 2016). Combined parent-management training and child CBT has also shown promise for reducing behaviour problems in children with mild intellectual disabilities or borderline intellectual functioning in a clinical context (Schuiringa et al., 2017). Moreover, one study that compared standard multisystemic therapy and adapted multisystemic therapy adapted for adolescents with intellectual disabilities, found evidence that the adapted therapy resulted in more positive behavioural outcomes than the non-adapted therapy (Blankestein et al., 2019). However, to our knowledge, no studies have tested the implementation and potential effectiveness of CBT-based targeted prevention programmes adapted for children with mild intellectual disabilities or borderline intellectual functioning and behaviour problems in the school setting. This is unfortunate, given the higher developmental risks in this population, and the promising nature of prevention programmes to mitigate future harm.

1.2 | Implementing CBT adaptions for children with mild intellectual disabilities or borderline intellectual functioning

An important first step for research into new or adapted interventions is to evaluate their implementation. Implementation refers to how an intervention is carried out in practice, which can have substantial effects on intervention outcomes (Berkel et al., 2011; Humphrey et al., 2018). Two levels of implementation can be distinguished: *what* is implemented (i.e., what aspects of the intervention get implemented, and to whom) and *how well* these aspects are implemented (i.e., the perceived quality of the intervention by its recipients; Berkel et al., 2011; Humphrey et al., 2018).

The 'what' level is typically operationalised by assessing dosage (i.e., the number of sessions delivered by trainers and received by participants) and/or reach (i.e., the extent to which the participants are representative of the target population). The 'how well' level typically includes an evaluation of responsiveness (i.e., children's active participation in the intervention) and satisfaction (i.e., the extent to which children and intervention facilitators, or 'trainers', evaluate the intervention positively; Berkel et al., 2011; Humphrey et al., 2018). In addition, among children with mild intellectual disabilities or borderline intellectual functioning, the extent to which children comprehend the intervention content is especially relevant (Fjermestad et al., 2016; Hronis et al., 2017). The intervention tested here was implemented by mental health professionals working at the schools, which allowed us to evaluate the implementation process as it naturally occurs.

1.3 | The present study

The first aim of this pilot study was to evaluate the implementation process of the intervention, which is called *Keeping Control of Anger*. We did so by addressing *what* was implemented (i.e., dosage and reach) and *how well* this implementation occurred (i.e., responsiveness, satisfaction, and comprehension). Our second aim was to conduct a preliminary test of the intervention's effectiveness to reduce behaviour problems in children with mild intellectual disabilities or borderline intellectual functioning. We conducted assessments of behaviour problems before, during and after the intervention, and used group-based and individual analyses to examine whether children showed decreases in behaviour problems.

2 | METHODS

2.1 | Participants

Twenty-four children and their parents consented to participate in the study. Three of them dropped out during the study, resulting in 21 children suitable for analyses. See Figure 1 for a flow-chart of study participation.
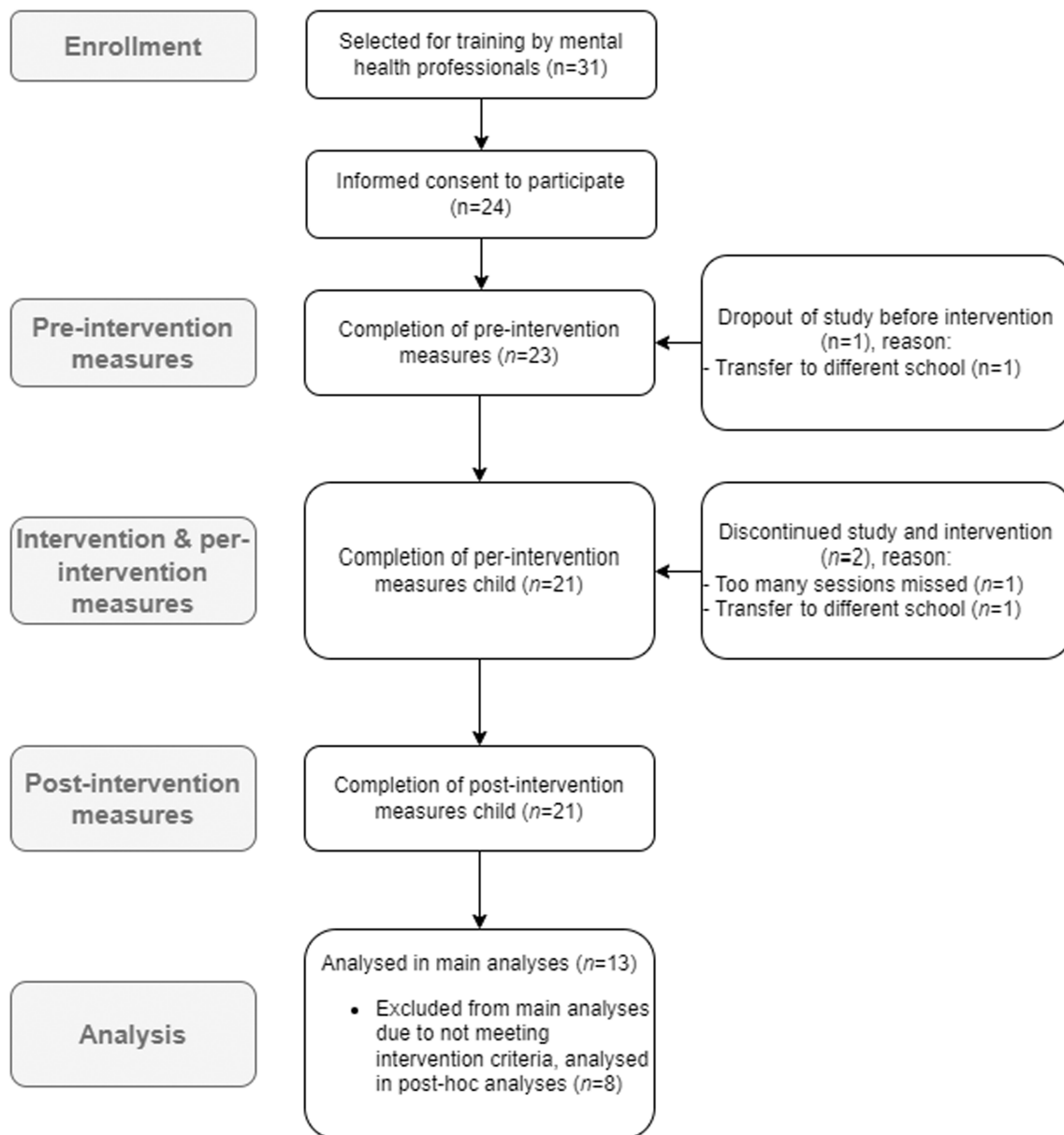
FIGURE 1 Study overview flow-chart.

We used three intervention eligibility criteria: (1) Children should have an IQ between 65 and 85 (i.e., the intervention was specifically tailored for children within the (higher) mild intellectual disabilities to borderline intellectual functioning range); (2) children should be ages 9–14 (i.e., the intervention was tailored to fit the developmental life experiences and behaviour of children in the late elementary school and middle school years), and (3) children should show (sub)clinical behaviour problems at the last baseline measure according to SDQ British norms (Youth in Mind, 2016; representative Dutch norms for children and teachers are currently unavailable), as indexed by either child- or teacher-report. A subset of 8 (out of 21) children who took part in the intervention did not fully meet these eligibility criteria (see section 3.1.1 for more details). Intervention trainers carried out the implementation in the schools and let these children take part in

the intervention and fill out questionnaires, but we did not include data from these children in our main analyses. Descriptive statistics for children who did not meet eligibility criteria are included in the Supporting Information.

The eligible sample for our main analyses consisted of 13 children ages 9–14 ($M_{age} = 12.1$, $SD_{age} = 1.6$, 76.9% male), with IQs ranging from 66 to 85 ($M_{IQ} = 75.5$, $SD_{IQ} = 6.4$). Of them, six attended special primary education, three attended regular secondary vocational education, and four attended regular secondary education. Three children had one parent with a migration background (from the Dominican Republic, Morocco, and Turkey). Seven children were from a single-parent household (six of whom lived with their mothers), three children lived with both parents, one child's parents were separated with joint custody, and two children lived with foster-parents.

Trainers ($n = 10$) were seven child and family specialists (a Dutch registration similar to school psychologist), one school counsellor, and two school intervention specialists. All trainers had either a master's degree or a bachelor degree with additional speciality training. Trainers reported on the implementation of the intervention.

Teachers ($n = 11$) reported on child behaviour. The response rate on the parent survey was low (56.0% missing). There were no significant baseline differences in child- or teacher-reported behaviour problems between children whose parents did ($n = 12$) and did not ($n = 1$) provide any parent data [$t(11)_{child} = 0.166$, $p = .871$; $t(11)_{teacher} = -2.108$, $p = .059$], nor between children with ($n = 4$) and without ($n = 9$) sufficient parent data for imputation (i.e., potentially useable for further analyses), $t(11)_{child} = -0.668$, $p = .545$; $t(11)_{teacher} = 0.715$, p .490. Because of the high proportion of missingness in the parent data, and because this missingness was not associated with child behaviour problems, we did not include parent data in the main analyses.

2.2 | Procedure

As the schools implemented the intervention themselves, they were also responsible for participant recruitment. Trainers employed at the schools enrolled children in the intervention, and were asked to apply our eligibility criteria (described under section 2.1). They also asked enrolled children and their parents if they wanted to take part in the study.

We received written informed consent from parents and children aged 12 or older, and from participating trainers. We obtained teacher- and child-reports on children's behaviour problems across a baseline phase that lasted approximately 4 weeks, an intervention phase that lasted approximately 12 weeks, and a follow-up phase that lasted approximately 4 weeks, starting immediately after the intervention. In each phase, we conducted three repeated assessments. Trainers administered the paper-and-pencil questionnaires to teachers and children (providing help if needed). Shortly after the intervention, children and trainers filled out a questionnaire about the implementation process. The Faculty Ethics Review Committee at Utrecht University, the Netherlands (FETC19-019) approved of the study.

2.3 | Measurements

2.3.1 | Demographics

We obtained information on children's age, gender, IQ, education level, ethnicity, and socio-economic status using a questionnaire filled out by the trainers at baseline.

2.3.2 | Missing data

Missing data on behaviour problems was substantial (i.e., 24.3% of teacher-reported data, 21.7% of child-reported data), partly because data collection was interrupted by COVID-19-related school closure. We therefore only used the last baseline and last follow-up measures of behaviour problems, which had fewer missing data (7.1% for teacher-reported data, 11.9% of child-reported data). We dealt with missing data using the linear interpolation with a noise (LIN) method, which replaces missing scores with the mean of two adjacent observed scores plus random noise (based on a normal distribution with a mean of 0.00 and each individual's SD from the available data; Peng & Chen, 2021). Three children and two trainers did not fill out the implementation questionnaire.

2.3.3 | Implementation

Reach

We assessed to what extent trainers' selection of the original 24 participants matched the intervention eligibility criteria and thus reflected the intervention's target population (see section 2.1). We anticipated that if children did not meet these eligibility criteria, there was a risk of them not recognising or empathising with example situations in the exercises (i.e., they would not be suited for their age), getting cognitively under or overstimulated (i.e., because the exercises would not align with their intellectual ability), or not having enough scope for improvement (i.e., because they would not show elevated behaviour problems to begin with).

Dosage

We distinguished between amount of intervention *delivered* (i.e., average number of sessions delivered by trainers), intervention *density* (i.e., the duration of the time interval across which the 10 intervention sessions were delivered), and amount of intervention *received* (i.e., average number of sessions attended by participants). Trainers registered this information over the course of the intervention.

Responsiveness

The implementation questionnaires were self-developed (no suitable measures were available for our study purposes) and tapped common implementation concepts (Humphrey et al., 2018). We asked children to what extent they engaged with the intervention (five items, e.g., *I worked hard during the intervention*; scale from $1 = $ Completely disagree to $5 = $ Completely agree; Cronbach's alpha = .61). We also included one open ended question: *Do you think the intervention helped you? Why/why not?*

We asked trainers to what extent specific intervention elements contributed to children's engagement (10 items; e.g., *Did you think the session structure helped keeping participants involved?*; scale from $1 = $ Completely disagree to $5 = $ Completely agree; Cronbach's alpha = .79).

Satisfaction

We asked children to what extent they appreciated the intervention (six items; e.g., *I liked the intervention sessions*; scale from $1 = $ Completely disagree to $5 = $ Completely agree; Cronbach's

alpha = .67). We also asked children, using an open-ended format, which three elements of the intervention they liked most and liked least.

We asked trainers about the extent to which they evaluated the intervention positively (four items; e.g., *I think the intervention is user-friendly*; scale from 1 = *Completely disagree* to 5 = *Completely agree*; Cronbach's alpha = .71). We also asked trainers, using an open-ended format, which three intervention elements they found strong and less strong, and which three intervention elements could be improved.

Comprehension

We asked children to what extent they were able to understand the intervention content (nine items; e.g., *The training was too difficult*; scale from 1 = *Completely disagree* to 5 = *Completely agree*; Cronbach's alpha = .68).

We asked trainers whether specific elements of the intervention helped them convey the intervention content (five items; e.g., *I think the structure per session helped convey the intervention content*; scale from 1 = *Completely disagree* to 5 = *Completely agree*). A trainer-reported comprehension scale (i.e., average of the item scores) had low internal consistency (Cronbach's alpha = .41). Removing two items (i.e., *I think the language helped convey the intervention content* and *I think the videos helped convey the intervention content*) improved reliability (Cronbach's alpha = .81). We report on both the reduced scale score and the two pertaining items separately at item level.

2.3.4 | Behaviour problems

We repeatedly administered the child- and teacher-version of the Strength and Difficulties Questionnaire (Goodman, 1997) with children and teachers. We used data from the conduct subscale (five items; e.g., 'Often argumentative with adults') to measure behaviour problems. Internal consistency (alpha) coefficients were .46 and .52 for child-reported and .62 and .59 for teacher-reported pre- and post-intervention measures, respectively. This is lower than previous reports of internal consistency for children with intellectual disabilities (Emerson, 2005) and likely a result of biases inherent to small samples (Charter, 1999).

2.4 | Intervention

In this pilot study, we investigated the implementation and potential effectiveness of *Keeping Control of Anger*. We adapted this intervention from an evidence-based intervention developed for use in children without mild intellectual disabilities or borderline intellectual functioning with behaviour problems in disadvantaged settings, called *Keep cool… start at school*. The latter intervention was found to have positive effects on disruptive behaviour of children without mild intellectual disabilities or borderline intellectual functioning in a randomised controlled trial, which were maintained at follow-up (Liber et al., 2013).

We followed expert recommendations (De Wit et al., 2012; Hronis et al., 2017) to create an adapted intervention suitable specifically for youth with mild intellectual disabilities or borderline intellectual functioning and behaviour problems. We addressed the (neuro)cognitive challenges this population typically faces, such as difficulties with abstract thinking, processing speed, and working memory. Specifically, we adapted the presentation of information by changing sentence length, grammar, terminology, and information density. In adapting the presentation of information, we aimed to simplify exercises and increase fit with children's (neuro)cognitive characteristics. We also visualised key intervention content in the form of 13 brief video clips which were embedded in the sessions. We did so to make the intervention easier to process, to increase attention and motivation, and to increase fit with children's experiences. The intervention was given a set and simple session structure, repeated key concepts within and across sessions, and provided frequent summaries, repetition, and practice of learned materials, in order to increase information uptake. Abstract thinking exercises were further presented as concretely as possible, by including hands-on tasks (e.g., role-play) and by replicating natural settings in the video clips.

Keeping Control of Anger is provided by mental health professionals working at schools. The intervention consists of one individual session, 10 weekly group-sessions with three to five children, and one booster group-session after 1 month. The manualised intervention (Liber & De Boo, 2018) is led by a trainer and a co-trainer working at the school. Children used their own workbooks (child manuals).

Trainers and co-trainers were trained in the correct application of the intervention by means of supervision sessions with one of the intervention's developers and co-author on this paper (J. M. Liber). During the training, five supervision sessions were held, the first before and the remaining four after roughly every two intervention sessions. The goal of the supervision was to foster correct implementation, troubleshoot and prevent therapist-drift, and thus served as a precaution to foster intervention fidelity.

The theoretical framework that guided this intervention was the social information processing model by Crick and Dodge (1994). In the first (individual) session, trainers defined and registered personal treatment goals together with each child. In the following (group) sessions and (group) booster session, each session addressed one or multiple social information processing biases, using CBT-techniques adapted for children with mild intellectual disabilities or borderline intellectual functioning. In doing so, problem solving skills, emotion regulation skills, and social skills were covered. An overview of the intervention sessions is provided in the Supporting Information. The group sessions took a maximum of 90 min. Trainers assigned homework exercises after the group sessions, and discussed them in the following session. Trainers used a reward system throughout the intervention to reinforce children's positive behaviour. In the tenth session, all children received a certificate to positively reinforce newly learned behaviours. Trainers provided the booster session 1 month post-intervention.

2.5 | Statistical analyses

2.5.1 | Implementation

For all implementation concepts, we present means and standard deviations, or percentages. Two independent coders assessed qualitative items (i.e., open-ended) using thematic analysis (Braun & Clarke, 2006). During the coding phase, we organised three reflection sessions on double-coding to reach sufficient agreement.

2.5.2 | Change in behaviour problems

Change at the group level
We analysed group effects for child- and teacher-reported behaviour problems using the within group (i.e., repeated measures) unbiased Cohen's *d* (also known as Hedges *g*). We used the pooled standard deviation as an estimator and calculated the noncentral confidence interval, using R code created by Goulet-Pelletier and Cousineau (2020).

Change at the individual level
We estimated behaviour problem changes at the individual level using the Reliable Change Index (Jacobson & Truax, 1991; Wise, 2004). Each participant's RCI was calculated separately for self-reported and teacher-reported SDQ conduct scores, using their latest baseline and follow-up scores. As the traditional RCI-cut-off for reliable change (1.96, with a 95% confidence level) is often considered to be too strict, we included additional cut-offs with varying levels of confidence (Wise, 2004): 1.28 (i.e., 90% confidence level) and 0.84 (i.e., 80% confidence level). Accordingly, we interpreted RCI-scores above 1.96 as indicating reliable improvement (i.e., reliable decrease of problems), scores above 1.28 but under 1.96 as indicating moderate improvement, scores above 0.84 but under 1.28 as indicating mild improvement, and scores under 0.84 as indicating no change. We used analogous cut-offs for negative RCI-scores to index reliable, moderate, mild deterioration, and no change. Additionally, among the participants who showed mild, moderate, or reliable improvements, we explored how many improved from a score above the sub-clinical cut-off (i.e., score 3 for teacher-report and score 4 for child-report) to a score in the normal range; or from a score above the clinical cut-off (i.e., score 4 for teacher-report and score 5 for child-report; Youth in Mind, 2016) to a score in the normal range.

3 | RESULTS

3.1 | Implementation

3.1.1 | Intervention reach

Of the 24 children who consented to the study, 14 participants (58.3%) met all intervention inclusion criteria (i.e., eligible sample). Ten participants did not (i.e., non-eligible sample), eight of whom remained in the study until the end; their IQ was above 85 ($n = 2$) or below 65 ($n = 1$), their age was too high ($n = 3$), and/or they did not show elevated behaviour problems at the last baseline measure, as indexed by either child- or teacher-report ($n = 6$). Intervention reach, as observed in the school setting, was thus suboptimal. In our main results, we only report on findings for eligible children with suitable data for the analysis ($n = 13$).

3.1.2 | Intervention dosage

Nine children experienced an unanticipated study interruption (some after session 8, others after session 10), when their schools closed due to Dutch COVID-19 regulations. For the three children who experienced this interruption after session 10, this meant that only the booster session was delayed (i.e., the booster session was timed after 7 months rather than 3 months). For the six children who experienced the interruption after session 8, the trainers delivered the remaining two sessions after schools had opened again. As a result, trainers delivered all intervention sessions (100%) to the children. The 10 intervention sessions were delivered within 14–15 weeks, which is within the pre-specified intervention period. For the six children experiencing an interruption after session 8, the delivery of the full intervention took longer, namely 31 weeks. Children attended on average 85% of the 10 group sessions (see Table 1).

3.1.3 | Responsiveness

Children reported mean responsiveness scores higher than the neutral score of 3 (see Table 1). Trainers also reported mean scores for responsiveness higher than 3. Over half of the children perceived the intervention to have helped them (see Table 1). When asked why, these children mostly reported improvements in their behaviour (mentioned five times), such as being more calm, and improved skills to cope with anger (mentioned three times). Children ($n = 2$) who reported the intervention helped 'a little' or 'sometimes' mostly provided no motivation, as did the children ($n = 2$) who reported that the intervention did not help.

3.1.4 | Satisfaction

Children reported mean satisfaction scores higher than the neutral score of 3 (see Table 1). Trainers also reported mean scores for satisfaction higher than 3. Children identified the video materials (mentioned six times), the intervention content (e.g., the exercises; mentioned five times), the treatment format (e.g., the use of a reward system, mentioned five times), and the children's workbooks (mentioned three times), when asked about three intervention elements they liked.

TABLE 1 Descriptive statistics of implementation process variables among the eligible children.

Child variables			
	M	SD	%
Number of attended sessions	8.5	1.6	85%
Responsiveness scale	3.6	0.9	
Satisfaction scale	3.5	0.5	
Comprehension scale	3.7	0.8	
Training perceived as helpful			60.0
Training perceived as sometimes/a little helpful			20.0
Training perceived as not helpful			20.0
Trainer variables			
	M	SD	
Responsiveness scale	3.6	0.5	
Satisfaction scale	3.8	0.6	
Comprehension scale	3.9	0.4	
Comprehension: language	3.5	0.5	
Comprehension: videos	4.3	1.0	

Note: Because of missing data on the implementation questionnaire, $n = 10$ for child variables (except number of attended sessions) and $n = 8$ for trainer variables.

When asked about three elements they liked less, four children still gave an overall positive answer (e.g., 'I liked everything'). Three children described some difficulty engaging with specific intervention elements, for various reasons (e.g., 'the language could be more angry' or 'The videos could be more realistic').

When asked about three strong elements of the intervention, trainers consistently mentioned the intervention content (mentioned 15 times), mostly indicating specific exercises they considered useful (e.g., relaxation and cognitive restructuring exercises). Trainers also identified adjustments for the specific needs of children with mild intellectual disabilities or borderline intellectual functioning as strengths (mentioned seven times), including repetition, alignment with children's ways of thinking, and the set structure. The video materials (mentioned five times) and intervention format (e.g., number of sessions and variety in work format; mentioned three times) were also mentioned as strengths.

When trainers were asked about three weaker elements in the intervention, valuable information was also provided. One area where trainers mentioned weaker elements was the tailoring to children with mild intellectual disabilities or borderline intellectual functioning (mentioned eight times). Specifically, some trainers mentioned they still observed that some children experiences some difficulties with comprehension of specific exercises and tools, although exercises that showed comprehension issues varied across trainers and the children they worked with. Thus, experiences were heterogeneous. Difficulties that were shared by several trainers, were due to the length of the sessions, and the difficulty of the homework and reflection exercises. Second, trainers mentioned specific parts of the intervention format as a less strong element (mentioned six times), but again, trainers varied substantially in which format-aspects they mentioned as being problematic. For instance,

while the use of repetition was mentioned by several trainers as an important strength, one trainer mentioned some repetition to be unnecessary. When asked to provide three suggestions for improvement, trainers mostly mentioned some specific improvements related to tailoring to the needs of children mild intellectual disabilities or borderline intellectual functioning (mentioned nine times). Specifically, reducing session length and simplifying homework and reflection exercises were mentioned several times. As these same elements were also mentioned as weaker elements, this appeared to be an area in which trainers relatively consistently experienced improvement to be needed.

3.1.5 | Comprehension

Children reported mean comprehension scores higher than the neutral score of 3 (see Table 1). Trainers also reported mean scores for comprehension higher than 3. They also rated both the language and videos as beneficial for child comprehension.

3.2 | Change in behaviour problems

3.2.1 | Change at the group level

Table 2 shows descriptive statistics for the SDQ conduct scale at pre- and post-assessment, as well as Cohen's d results. Cohen's d for the teacher- and child-report both indicate effects in the positive direction. While child-reported Cohen's d was significant, teacher-reported Cohen's d was not (i.e., the noncentral confidence interval contained 0).

TABLE 2 Group level change results for the eligible children.

	Last baseline measure		Last follow-up measure		Unbiased Cohen's d	Noncentral CI
	M	SD	M	SD		
Teacher report	4.2	2.2	3.1	2.1	0.47	[−0.02, 1.02]
Child report	3.3	2.0	2.2	1.9	0.57	[0.12, 1.09]

Note: Teacher report = SDQ conduct problems score according to teachers; Child report = SDQ conduct problems score according to children.

TABLE 3 Individual level change results for the eligible children.

	Teacher-report (n = 13)				Child-report (n = 13)			
Participant	Pre	Post	RCI score	RCI category	Pre	Post	RCI score	RCI category
1	3.0	6.0	−1.66	Moderately deteriorated	2.0	1.0	0.51	No change
2	4.0	3.0	0.55	No change	2.0	3.0	−0.51	No change
4	8.0	4.0	2.22	Reliably improved	3.0	5.0	−1.02	Mildly deteriorated
8	4.0	2.0	1.11	Mildly improved**	4.0	3.0	0.51	No change
10	2.0	2.0	0.00	No change	5.0	4.0	0.51	No change
12	5.0	2.0	1.66	Moderately improved**	0.0	1.4	−0.70	No change
13	4.0	0.9	1.74	Moderately improved**	2.3	0.0	1.19	Mildly improved
17	0.0	0.0	0.00	No change	4.0	2.0	1.02	Mildly improved**
18	8.0	7.0	0.55	No change	4.0	0.0	2.05	Reliably improved*
19	4.0	5.0	−0.55	No change	4.0	4.0	0.02	No change
20	3.0	1.0	1.11	Mildly improved*	1.0	0.0	0.51	No change
22	5.0	5.0	0.00	No change	8.0	5.0	1.54	Moderately improved
23	4.0	3.0	0.55	No change	4.0	0.0	2.05	Reliably improved

Note: Pre = SDQ conduct problems score at the first measurement occasion pre-intervention; Post = SDQ conduct problems score at the last measurement occasion post-intervention; RCI = Reliable Change Index.
*Participants who improved from an SDQ score above the sub-clinical cut-off to a score in the normal range.
**Participants who improved from an SDQ score above the clinical cut-off to a score in the normal range.

3.2.2 | Change at the individual level

Table 3 displays individual children's behaviour problem scores and RCIs, according to child- and teacher-reports. Based on teacher-reports, one child (7.7%) showed moderate deterioration, seven children (53.8%) showed no change, five children (38.5%) showed at least some improvement, one of them showing reliable improvement (see Figure 2). Three of the children who showed mild, moderate, or reliable improvement according to teacher-reports, improved from the clinical to the normal range; one improved from the sub-clinical to the normal range. Based on child-reports, one child (7.7%) reported mild deterioration, seven children (53.8%) reported no change, five children (38.5%) reported at least some improvement, two of them reporting reliable improvement. Two of the children who showed mild, moderate, or reliable improvement according to child-report, improved from the clinical to the normal range. However, children and teachers often disagreed on whether or not the child improved, deteriorated, or remained unchanged, with agreement in only three cases (all of them showing no change; see Table 3). Correlations between child- and teacher reported behaviour problems were non-significant at pre-test, $r = .36$, $p = .086$, and at post-test, $r = .13$, $p = 0.612$.

As nine children experienced an unanticipated break in the study due to COVID-19 school closures, and children who did and did not experience such an interruption did not significantly differ in behaviour problems at baseline ($t(11)_{child} = 0.649$, $p = .530$; $t(11)_{teacher} = −0.684$, $p = .508$), we explored whether these children differed in RCI scores. Children who experienced a study interruption did not significantly differ in RCI scores, compared to those who did not. This was the case for both child-report ($M_{interrupted} = 1.067$ $SD_{interrupted} = 1.067$, $M_{uninterrupted} = −0.133$, $SD_{uninterrupted} = 0.800$; $t(10) = −1.971$, $p = .077$), and teacher-report ($M_{interrupted} = 0.381$, $SD_{interrupted} = 0.651$, $M_{uninterrupted} = 0.508$, $SD_{uninterrupted} = 1.494$; $t(10) = 0.211$, $p = .837$).

3.3 | Post hoc analyses of non-eligible sample

Because we found that a substantial subset of the children who were selected by schools to take part in the intervention did not fully meet our eligibility criteria, we conducted additional exploratory analyses to test whether non-eligible children's behaviour changed after taking part an in intervention that was not designed for them. The results
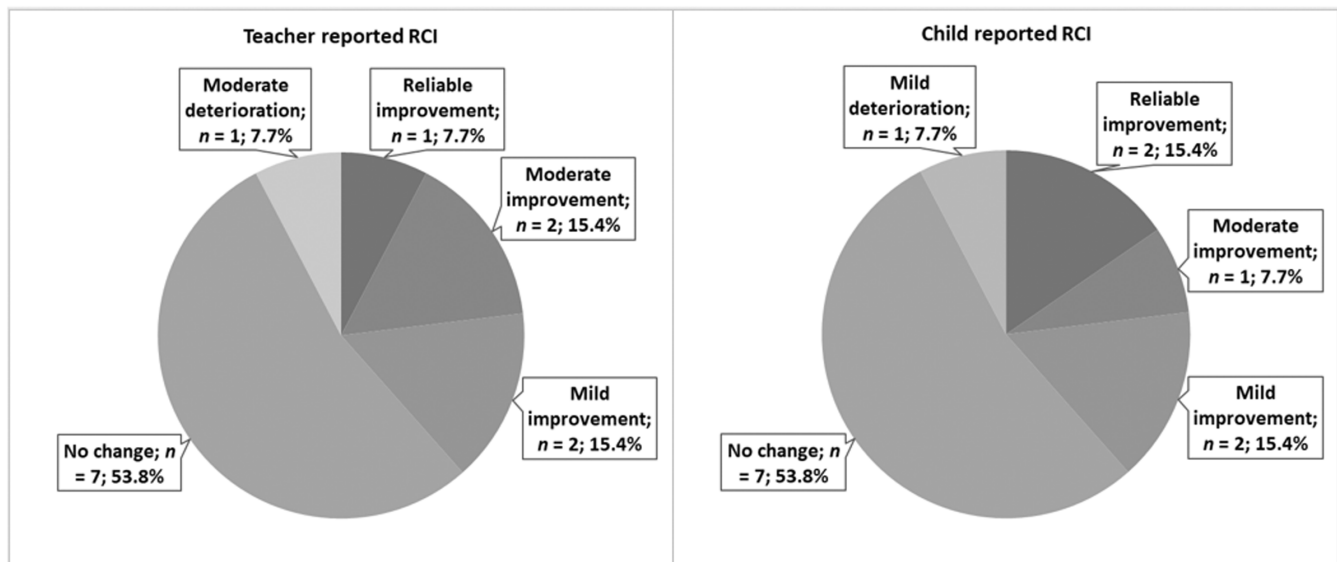
FIGURE 2 Distribution of types of behaviour changes for the eligible children according to RCI.

TABLE 4 Exploratory group level change results for the non-eligible children.

| | Exploratory group-level results | | | | | |
| | Last baseline measure | | Last follow-up measure | | | |
	M	SD	M	SD	Unbiased Cohen's d	Noncentral CI
Teacher report	2.3	2	2.9	2.9	−0.22	[−0.34, 0.85]
Child report	2.6	1.8	3	1.9	−0.16	[−0.28, 0.66]

Note: Two of the 10 non-eligible children dropped out of the study before follow-up and were therefore excluded for these analyses.

TABLE 5 Exploratory individual level change results for the non-eligible children.

| | Child-report (n = 8) | | | | Teacher-report (n = 8) | | | |
Participant	Pre	Post	RCI score	RCI category	Pre	Post	RCI score	RCI category
5	1	2	−0.51	No change	2	5	−1.66	Moderately deteriorated
6	3	3	0	No change	2	0	1.11	Mildly improved
9	6	4.5	0.77	No change	7	8.2	−0.65	No change
11	0	0	0	No change	2.5	1	0.83	No change
14	2	1	0.51	No change	2	2	0	No change
16	2	3	−0.51	No change	0	0	0	No change
21	3	4.5	−0.71	No change	2	2	0	No change
24	4	5.7	−0.85	Mildly deteriorated	1	5	−2.22	Reliably deteriorated

Note: Pre = SDQ conduct problems score at the first measurement occasion pre-intervention; Post = SDQ conduct problems score at the last measurement occasion post-intervention; RCI = Reliable Change Index.

from these analyses are shown in Tables 4 and 5. We found small negative effects for this group of non-eligible children. RCI analyses showed that most non-eligible children displayed no change, some children displayed deterioration, and only one child showed mild improvement (only according to teacher-report).

4 | DISCUSSION

In this pilot study, we investigated *Keeping Control of Anger*, a school-based targeted preventive intervention adapted for children with mild intellectual disabilities or borderline intellectual

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functioning and behaviour problems. We examined *what* was implemented (i.e., dosage and reach) and *how well* implementation occurred. We also evaluated the intervention's potential effectiveness to reduce behaviour problems, by evaluating changes in behaviour problems both at the group level and at the individual level.

4.1 | Implementation

Our results concerning *what* was implemented were mostly positive, with good intervention dosage, an implementation aspect commonly associated with better intervention outcomes (Berkel et al., 2011). However, as for intervention reach, not all children enrolled by trainers matched intervention eligibility criteria (i.e., pertaining to age, IQ, and severity of behaviour problems). Given the tailored nature of the prevention programme, enrolled children who did not meet these criteria might have had a harder time empathising with the intervention content (e.g., because the content was not suited for children's age, or they did not experience behaviour problems). It is also possible that the pace of the intervention was not aligned with these children's intellectual abilities (e.g., if their IQ was too low or too high). Accordingly, our results suggest that non-eligible children may not benefit from the intervention; group-level effect sizes were in a negative direction and only one these children showed a potentially meaningful reduction in behaviour problems (mild improvement). In fact, several non-eligible children even showed increases in behaviour problems during the intervention. These findings highlight the importance of adhering to an adequate screening protocol (Kamphaus et al., 2014), before enrolling children into a targeted prevention programme in school settings. Strict enrolment policies also help to ensure cost-effectiveness, one of the major benefits of targeted prevention programmes (Le et al., 2021).

As for *how well* the intervention was implemented, children and trainers indicated acceptable responsiveness, satisfaction, and comprehension. Over half of the children indicated the intervention helped them, and both children and trainers were mostly satisfied with the intervention content, tailoring to mild intellectual disabilities or borderline intellectual functioning needs, intervention format, and video materials. While trainers and children did mention points for improvement when asked, these appeared to be quite idiosyncratic, heterogeneous, and sometimes contradictory. However, simplifying homework and reflection exercises, and reducing session length, were mentioned several times, indicating a need for further tailoring. Our results, for the first time, provide an indication that school-based targeted prevention can be successfully implemented among children with mild intellectual disabilities or borderline intellectual functioning and behaviour problems, although some minor changes may be needed to optimise successful implementation. These indications of good quality implementation form an important precondition for positive intervention outcomes to be possible (Berkel et al., 2011).

4.2 | Potential effectiveness

At the group level, we found overall decreases in behaviour problems among children who were eligible for the intervention, which were significant for child-report, but not for teacher-report. While the group-level behaviour problem decreases we found are not large (ds = 0.47 and 0.57), they are in line with the literature: effect sizes typically found in meta-analysis on targeted (i.e., d = 0.29; Wilson & Lipsey, 2007) and universal (i.e., ds = 0.11–0.23; Barnes et al., 2018; Dymnicki et al., 2011) prevention programme for children without mild intellectual disabilities or borderline intellectual functioning are similar. The fact that the group-level effects we found are generally positive is encouraging, though it would be premature to interpret our findings as evidence for intervention effectiveness.

When looking at individual level changes, only few children showed reliable improvements: one according to teacher-report and two according to child-report. When considering varying levels of confidence (i.e., mild to moderate change), the number of children showing potentially meaningful improvements increased to five according to teacher report or four according to child-report, with six of these children also moving from the (sub)clinical to the normal range. However, there remained substantial heterogeneity in individual-level intervention effects. While some children decreased in behaviour problems, others did not, or even increased in behaviour problems. These findings are consistent with the view that children with mild intellectual disabilities or borderline intellectual functioning form a heterogeneous group with differential needs (Hronis et al., 2017; Schalock et al., 2021). It should also be noted that agreement between children and teachers on the degree and direction of behaviour change was fairly low. We attach somewhat more gravitas to the teacher-reported findings, given their higher reliability. However, given that the current evidence for potential intervention effectiveness is still inconclusive, we have reason to further scrutinise its effectiveness for reducing behaviour problems in children with mild intellectual disabilities or borderline intellectual functioning.

4.3 | Strengths and limitations

One strength of our study is that we examined the implementation and potential effectiveness of the intervention in a regular health care setting at school. This allowed us to evaluate the intervention's implementation process as it would normally occur. For instance, we were able to investigate intervention reach by letting trainers enrol children based on the trainers' own expertise. Another strength is our in-depth evaluation of implementation through qualitative questions for the children and trainers, which helps estimate the potential applicability of the intervention for this specific target group.

One limitation of the study is the lack of a control group, which means we cannot be certain that decreases in behaviour problems were due to the intervention. Furthermore, our sample was small, which limited statistical power for the group-level analyses and

prevented us from examining moderators of effectiveness. The large individual differences in behaviour changes that we found suggest a need to test moderating effects and learn *for whom* the intervention is more or less effective (La Greca et al., 2009). Another limitation is that we did not include an objective measurement of intervention fidelity. While anecdotal information from the supervision sessions did not point to major fidelity difficulties, we cannot rule out the possibility that fidelity issues impacted our effectiveness findings. Lastly, part of our study took place during the COVID-19 pandemic. Previous studies have suggested that COVID-19 negatively impacted youth's mental health (Luijten et al., 2021), which may have influenced our effectiveness findings. Although children who did and did not experience COVID-disruptions during the intervention did not differ in behaviour problems change, this still limits the conclusiveness of our study.

5 | CONCLUSION

The results of this pilot study illustrate that CBT-based approaches can be successfully adapted and implemented for the treatment of children with mild intellectual disabilities or borderline intellectual functioning in a school setting. However, the evidence for the effectiveness of the intervention we piloted is still inconclusive, with small (to moderate) and heterogeneous effects. Our study also highlights the importance for mental health professionals to strictly adhere to screening procedures to ensure that only children who can benefit from intervention participate in it. Moving forward with the optimisation of *Keeping Control of Anger*, adaptations to simplify homework and reflection exercises, and reduce session length will be important. In addition, a follow-up pilot study, preferably with a control group, would be necessary to more accurately estimate the programmes potential for behaviour problem change, and a more formal evaluation of intervention fidelity. Despite its limitations, the current study highlights the feasibility of using CBT school-based prevention programmes for children with mild intellectual disabilities or borderline intellectual functioning and serves as a stepping stone for continued research into this area.

AUTHOR CONTRIBUTIONS

E. Kühl: Conceptualisation; methodology; investigation; formal analysis; data curation; writing—original draft. **M. Deković:** Conceptualisation; methodology; supervision; writing—review and editing. **S. Thomaes:** Conceptualisation; methodology; supervision; writing—review and editing. **I. Koning:** Conceptualisation; methodology; supervision; writing—review and editing. **J. M. Liber:** Conceptualisation; methodology; investigation; resources; data curation; supervision; writing—review and editing.

DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available on request from the corresponding author. The data are not publicly available due to privacy or ethical restrictions.

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