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REGULAR ARTICLE

# Video feedback combined with coordination meetings in school to reduce early disruptive behaviour problems (DBP)—A 1-year follow-up randomised controlled trial

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## Abstract

**Aim:** To compare long-term effects of a systemic school-based intervention, Marte Meo and Coordination Meetings (MAC), targeting 3- to 12-year-old children displaying disruptive behaviour problems (DBP) in preschool or school, and service as usual (SAU). In addition, to examine whether social status (SS) affected the outcomes.

**Methods:** In a randomised controlled design, teachers' and parents' ratings of 99 children's DBPs and mental health were collected before intervention and 1 year after post-test.

**Results:** A significant time effect in school was found in both interventions, notably larger than at post-test in an earlier study. There was no difference between groups, SAU catching up with MAC. From teachers' reports, 53–70% of the children showed a positive change. SS did not affect the outcomes.

**Conclusion:** School provides an already established setting to detect and intervene when young children begin to display DBP. Even if a long-term positive change in MAC did show more rapidly than in SAU, both interventions were equivalent for children from diverse social backgrounds.

**KEYWORDS**
disruptive behaviour problems, Marte Meo, randomised controlled trial, systemic school intervention, video feedback

## 1 | INTRODUCTION

Children spend a lot of time in school, which is an important arena for socialisation. When children display problems related to mental health, school can serve as a detector as well as an arena for treatment.[1] It is established that children that display early disruptive behaviour problems (DBP) such as aggressiveness, truancy, non-compliance, defiance, impulsiveness or oppositional behaviour, are at high risk of severe long-term problems later in life, such as oppositional defiant disorder, conduct disorder and early adulthood psychiatric and emotional problems.[2] Teachers' observations have shown to accurately identify children displaying risk behaviour.[3] In addition, relying on teachers' observations also makes it possible to target children who display DBP in school, but do not display high levels of DBP at home.[3] Children displaying DBPs are most commonly referred to child mental health services,[4] and often receive

**Abbreviations:** CM, coordination meetings; DBP, disruptive behaviour problems; MAC, Marte Meo and coordination meetings; SAU, service as usual; SS, social status.

professional care located outside the school context, mostly group parent training.[5] However, the drop-out rates have proven to be high, both in recruitment and in the treatment of families with children displaying DBPs.[6] This calls for interventions within the school context,[7] and it is well-established that interventions in school can be effective for improving children's mental health.[1] Since children's behaviour is a major societal concern in school, a great number of interventions have been developed to prevent and reduce children's behaviour problems.[1] The relationship between pupil and teacher has proved to be of importance, as well contributing to a positive classroom environment.[8] In addition, school achievement is related to earlier peer acceptance and classroom participation.[9] For children's well-being, it is important that they can be able to learn, play in a group and synchronise their behaviour with others, skills that besides being developed in early infancy in interaction with parents, often further develop when interacting with peers and teachers in school.[1,9] Peer relationships are important for a healthy social and cognitive development and provide self-worth that serve as a protective function for later emotional and adjustment problems.[10] Thus, interventions containing interaction support in the classroom might be important for children displaying early DBP. Classroom in our study refers to both preschool and school. School-based interventions have shown to enhance social adjustment, such as positive relationships with classmates and teachers, for children in need of support.[11] Furthermore, psychosocial interventions have proved to be better in reducing children's DBP than service as usual (SAU),[12] and when a parent component is added to other components the effects seem to especially increase.[13] Marte Meo and Coordination Meetings (MAC) is a systemic school-based intervention that includes a parent component targeting children that display early DBP in school at age 3–12 years.[14] MAC has shown promising short-term results in reducing children's DBP in school compared to SAU.[7,15] Even if short-term effects might be valuable for those directly involved, for example the teacher's experience of reduction of the child's displayed DBPs, as well as positive changes in the child's self-image or interaction with peers, it is of value to investigate whether the results will endure. Less is known about the maintenance of the effects months or years after completed interventions, and we need a better understanding of when and why sustainability is stronger.[16] The present study examines in a randomised controlled trial (RCT) whether the results endure and if any effects generalise from the school to the family.

Except for children's interaction with different individuals, individual (e.g. genetic factors) and environmental factors, might also affect the child, for example the socioeconomic status (SS) of the family. Generally, children that display DBPs have lower SES than other children,[17] which is related to school achievement.[9] In addition, children from disadvantaged families might benefit less from interventions than children from more advantaged families, and as a consequence there is a risk that even effective interventions might increase social inequalities.[18] Thus, it is of importance to, in addition to examining long-term effects, examine potential differences in effects for children living under different social status (SS).

**Key Notes**

- Not all children displaying disruptive behaviour problems are reached by social and mental health services. School might provide a setting for early detection and intervention.
- A systemic school-based intervention, Marte Meo and Coordination meetings, was compared with service as usual.
- The present study supports that it is possible to intervene in school by using low-intensive, individual and structured school-based interventions.

## 2 | AIM

The aim of this study is to compare long-term effects of the MAC and SAU for children 3–12 years old, displaying DBPs in school, in a 1-year follow-up. In addition, any potential difference in effects between children of families with different SES was examined.

## 3 | METHOD

A 1-year follow-up of a pre-post-randomised controlled trial was carried out between 2009 and 2012 to examine MAC vs. SAU. The research was a collaboration between the Universities of Lund and Gothenburg and four municipalities in western Sweden. The municipalities, with between 1,000–38,000 inhabitants, are made up of smaller urban areas where the main sectors are public service, small and medium enterprises (SMEs) and industry.[19] The study was reviewed and approved by the Central Ethical Board (www.epn.se) in Sweden (Dnr. 2009/323).

### 3.1 | Procedure

All preschools and schools in the four municipalities were invited to participate in the study and children were recruited if they displayed DBP in school. The study was performed in a natural setting where the children and their families were referred through already existing structures within the school system. Teachers' observations of, and thus concern about, the children and their need of support led to referral to the school health service and the children became subjects for the study. To be eligible for inclusion in the interventions, at least one of three criteria had to be identified (social exclusion, behavioural problems and child's own wellbeing), for more details, see.[7] Children were not included in the study if they were already subject to treatment in social services or child psychiatry. Randomisation took place through pre-sealed envelopes and the randomisation result to one of the two groups was unknown to research team, school personnel, and families until after pre-test.

The reason for this was to keep MAC unaffected from treatments outside school context. Participation in the study was voluntary and informed consent was obtained from the parents. At any time, the participating families could cease their participation in research but still complete the intervention. A specially trained teacher and a research assistant collected the data from teachers and parents who rated the children's DBPs at baseline and at 1-year follow-up. To ensure programme fidelity, several actions were taken during the implementation and intervention process. One person monitored MAC implementation. Marte Meo staff received Marte Meo licensed supervision that included filmed interaction and reviews, and completed self-administered programme adherence schedules. Also, the coordinators received supervision and completed adherence schedules after each meeting. Efforts were made to conceal which intervention group participation the families were involved in.

### 3.2 | Participants

One-hundred-and-one children from the (pre-)schools were assessed for eligibility (see Figure 1). Two families withdrew from the study before pre-test. At pre-test teachers and parents of 99 children (80 boys and 19 girls) participated. The primary parental informants were mainly mothers, even if both mothers and fathers were informants. However, three of the primary parental informants were fathers. The mean age for children was 6.6 years (SD = 2.5), while the mean age for primary parental informants was 35.8 years (SD = 6.4). Sociodemographic variables, such as parent's and child's sex and age, parent's education and marital status, moving home, and benefits received from social services in the last year, were controlled for showing no significant differences in pre-test between the two groups. Between 25% and 67% of the children displayed clinical levels of DBP at pre-test (teachers, 36–67% and parents, 25–51%). Equally many children were reported as having clinical problems regardless of group (Chi-square test, non-significance). The teachers reported higher frequencies of children displaying clinical levels of DBP than the primary parental informants.

### 3.3 | Interventions

Marte Meo and Coordination Meetings (MAC) is a systemic school-based intervention that was developed from a clinical perspective.[9] The intervention is conceived as a single systemic intervention that consists of two integrated parts, Marte Meo and Coordination meetings.[20] In a previous study, MAC has proven to be effective in reducing children's' DBP in school in short term.[7] The key concepts of MAC are cooperation and coordination to help teachers and parents in their shared responsibility to support the psychosocial development of the child. A MAC team was formed in each of the participating schools. The team was formed through cooperation between school and social services and consisted of teachers trained as Marte Meo consultants, and coordinators (social caseworkers) recruited from social services. Parent(s), classroom teacher(s) and the Marte Meo consultant met at coordination meetings on school premises. If the families so wished, they could receive Marte Meo consultation in their home. MAC is a systemic intervention that consists of two core parts, a normative part, Marte Meo, and a non-normative part, Coordination Meetings (CMs). Marte Meo was developed by Maria Aarts as a tool to help children and adults restore or build a supportive dialogue when communication is marked by perturbation and disturbances.[21] The intervention is within the tradition of video feedback where carers are filmed when interacting with a child and then invited to watch an edited film under guidance of a professional.[22] The purpose is to support the carer to explore and reflect on the specific child's developmental needs and thus be able to adapt their own interaction to promote the child's psychosocial development. The overarching goals of the CMs is to maintain the lines of communication between the school and the family respecting the integrity of both systems with focus on supporting the specific child's developmental needs. This presupposes (a) clarifying and agreeing of the context and intervention goals, (b) coordination of Marte Meo at school with possible Marte Meo at home; and (c) exploration of different 'narratives' about the child. The coordinator's role is to facilitate communication and affirmation between the teachers and the parents.[9] MAC included CMs every second week, (an average of five meetings), Marte Meo in school (an average of five films and review sessions per child), and possibly Marte Meo in the family (on average three films and review sessions per child). The number of consultations or CMs were not predetermined but adapted to the child's specific need of support. However, no MAC lasted longer than 6 months. Finally, on average one film was shown at the CMs.

Service as usual (SAU) for children displaying DBP varied from more to less extensive intervention, e.g. supervision ($n = 11$), teacher consultation ($n = 20$), and classroom observation of the child ($n = 21$). For some children, assessment was performed by psychologists or social services ($n = 5$), some families received counselling ($n = 3$), and some families received treatment ($n = 2$). Specific content or duration was not specified in SAU, nor systematically registered. However, professionals involved experienced anecdotally that SAU generated more meetings than MAC.

### 3.4 | Instruments

In this study, teachers' and parents' ratings of the children's disruptive behaviour together with the social status of the families was in focus. Since MAC is a school-based intervention, a time effect in reduced DBPs was expected primarily in school. Thus, the teachers' ratings are the primary- and the parents' ratings secondary outcome measures. To measure the children's displayed DBPs we used a Swedish translation of the Sutter-Eyberg Student Behaviour Inventory – Revised (SESBI-R, for teachers) and Eyberg Child Behaviour Inventory (ECBI, for parents).[23] The instruments are frequently used clinically as well as in research and consist of

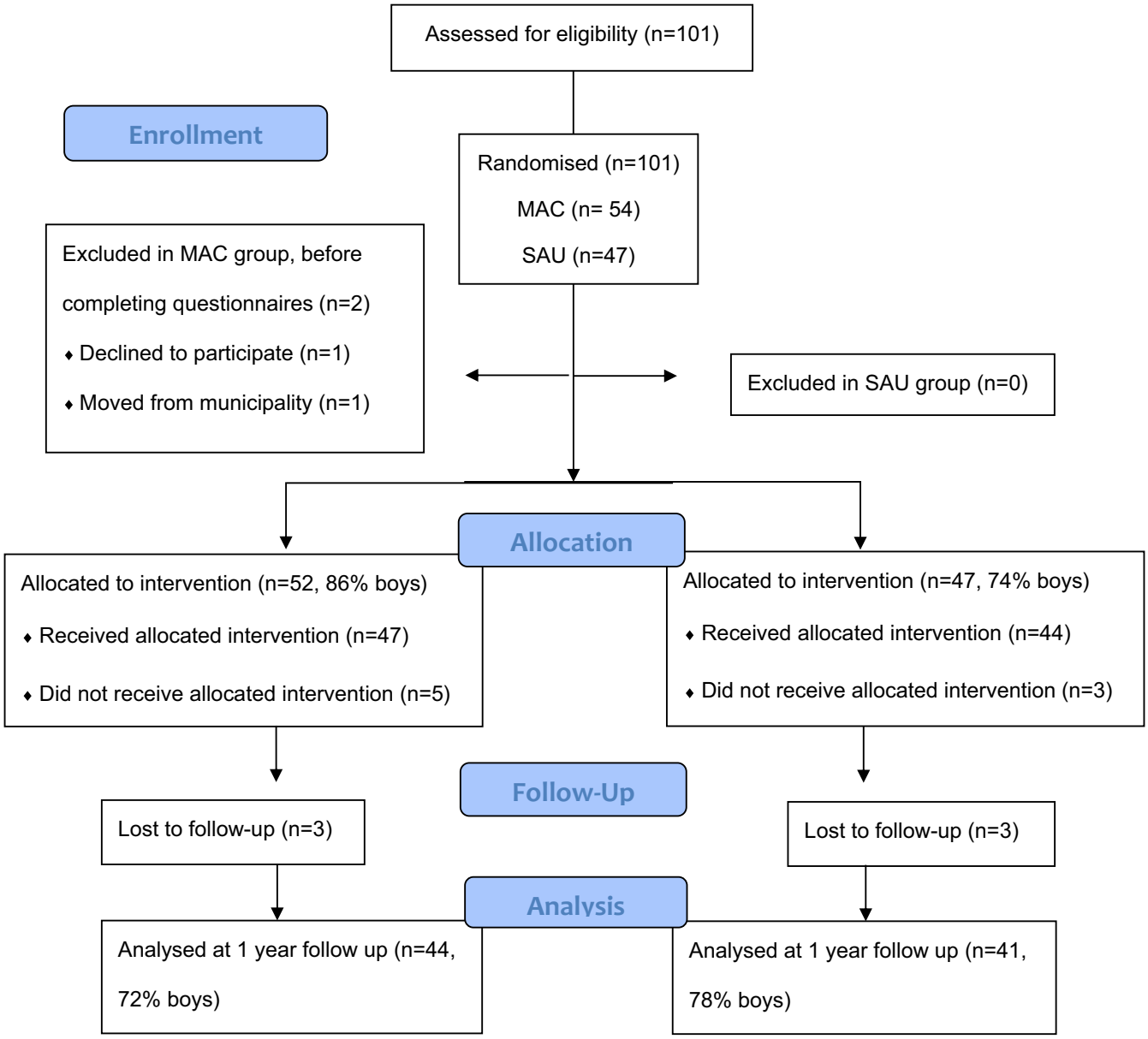


**FIGURE 1** Flow diagram presenting the sample through the study, the numbers of children who received allocated intervention, and the percentage of boys in the analyses. (Modified template retreived from http://www.consort-statement.org/consort-statement/flow-diagram)

two parts, the Intensity Scale (IS), which is the summed frequency of specific DBP, and the Problem Scale (PS), which reflects whether the teacher/parent perceives the specific behaviour as "a problem" or not. The IS consists of a seven-point scale ranging from 1 = "never happens" to 7 = "always happens", while the PS is based on dichotomous ratings on each item (1 = "yes", it is a problem, or 0 = "no", it is not a problem). The Cronbach's alpha for the SESBI-R IS and SESBI-R PS was 0.97 and 0.96 respectively, and on the ECBI IS and ECBI PS it was 0.81 and 0.75.

To measure teachers' and parents' perceptions of children's general mental health, three well-known-in research instruments from the Achenbach System of Empirically Based Assessment (ASEBA) were used,[24] the Teacher Report Form (TRF) and the two Child Behaviour Checklist (CBCL) forms, age 1.5–5, and age 6–18 (total problem scales). The Cronbach's' alpha for the CBCL scales in the present study was between 0.91–0.95. To particularly catch potential changes in the target behaviours of the interventions, a disruptive behaviour problems scale (TRF-DBP and CBCL-DBP) was constructed. In the current study, the Cronbach's alpha for the two syndrome's scales on TRF was between 0.93 and 0.95 and between 0.91 and 0.95 on CBCL scales. TRF and CBCL have been translated into Swedish and normative Swedish data. The clinical cut-off level corresponded to the 90th percentile.

To examine the family's SS and its potential impact on the results, the parent's social status was investigated using the Hollingshead Four Factor Index of Social Status.[25] As one of the most frequently

**TABLE 1** Square-root-transformed teachers' ratings of children before and 1 year after post-test

| | | Pre-test | | | Follow-up | | | Paired samples *t* test | | ITT-LOCF | | MAC-SAU |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Measure | Group | *N* | M | SD | *N* | M | SD | *p* | d (95% CI) | *p* | d (95% CI) | d (95% CI) |
| TRF DBP | MAC | 52 | 5.66 | 1.79 | 42 | 4.21 | 2.32 | <0.00 | 0.58 (0.25–0.91) | <0.00 | 0.58 (28–87) | −0.02 (−0.46–0.42) |
| | SAU | 47 | 5.36 | 1.93 | 40 | 3.96 | 2.17 | <0.00 | 0.68 (0.33–1.02) | <0.00 | 0.59 (28–90) | |
| TRF TOT | MAC | 52 | 7.28 | 1.67 | 42 | 5.61 | 2.62 | <0.00 | 0.55 (0.22–0.87) | <0.00 | 0.54 (0.25–0.83) | −0.04 (−0.54–0.46) |
| | SAU | 47 | 7.10 | 1.72 | 40 | 5.42 | 2.34 | <0.00 | 0.67 (0.33–1.02) | <0.00 | 0.58 (0.26–0.88) | |
| SESBI-R IS | MAC | 52 | 12.22 | 1.77 | 44 | 10.36 | 3.27 | <0.00 | 0.57 (0.25–0.88) | <0.00 | 0.55 (25–84) | 0.10 (−0.35–0.56) |
| | SAU | 47 | 11.86 | 2.14 | 41 | 10.40 | 2.62 | <0.00 | 0.64 (0.30–0.98) | <0.00 | 0.60 (0.29–0.92) | |
| SESBI-R PS | MAC | 51 | 3.89 | 1.48 | 42 | 2.64 | 2.27 | <0.00 | 0.47 (0.15–0.79) | <0.00 | 0.49 (19–78) | −0.01 (−0.51–0.50) |
| | SAU | 45 | 3.67 | 1.76 | 41 | 2.52 | 1.97 | <0.00 | 0.60 (0.26–0.94) | <0.00 | 0.52 (21–84) | |

Abbreviations: CI, confidence intervals; DBP, disruptive behaviour problem scale; IS, intensity scale; ITT-LOCF, intention-to-treat, with last obeservation carried forward; PS, problem scale; SESBI-R, Sutter-Eyberg Behaviour Inventory—Revised; TOT, total problem score; TRF, teacher report form.

used measures, the degree of inter reliability has yielded similar results when examined. The score, calculated on four factors (education, occupation, sex and marital status) were for each family dichotomized into low or medium-high groups.

### 3.5 | Data analysis

First, the missing data was replaced, taking into account the guidelines from the manuals of the different measures. Less than 1% was missing on single items on all measures. Secondly, since a few outliers were found in addition to a non-normal distribution, a square root transformation of the data was performed to reduce the impact of outliers and non-normality.[26] Third, a control of the randomisation process was made showing no statistically significant differences between the MAC and SAU groups. Fourth, statistical analyses of primary and secondary outcomes (teachers' and parents' reports) were performed to investigate time effects, that is the difference between pre- and follow-up ratings for the MAC and SAU group respectively. In-group differences were calculated by using pairwise *t* test. To examine outcome differences between the MAC and SAU groups an analysis of covariance (ANCOVA) was performed, with group as a fixed factor, follow-up scores as dependent variable, and pre-scores as covariate controlling for age and sex.

To avoid overestimation of the improvement rates, an Intention-To-Treat (ITT), with a Last Observation Carried Forward (LOCF) approach, was used.[27] This means that in cases where the families dropped out (see Figure 1), their ratings were unchanged from pre-test. The standardised mean difference effect size for within-subjects design was used, referred to as Cohen's d. A value of 0.20 is considered a small effect, 0.50 medium and 0.80 large.[28] The Campbell collaboration effect-seize on-line calculator,[29] was used to calculate the effect sizes of between-group differences.

Because CBCL forms for younger and older children were used, the results from the two forms were merged by doing a z-transformation of the total CBCL score as well as of the constructed DBP score. This allowed us to investigate the pooled outcome for these scales. Potential differences between preschoolers and schoolchildren were controlled for using independent *t* test.

In addition to describing results as statistically significant or non-significant, the interpretation of changes in reported outcome scores also considers clinical relevance, especially when the sample is small. Therefore, a person-centered approach to calculating meaningful change suggested by Jacobson and Truax (Reliable Change Index, RCI)[30] was used to assess clinical significance, which has proven to be an appropriate way to report change at an individual level.[31] The standard deviation of pre-test values was used as a reference yardstick, which made it possible to determine the proportion of children who had a positive change, no change or a negative change.[30] Finally, we performed a linear regression analysis on primary and secondary outcomes to explore if a family's SS affected the outcomes, controlling for children's sex and age. A difference score of the follow-up values (T3) minus the pre-test values (T1)

**TABLE 2** Square-root-transformed parents' ratings of children before and 1 year after post-test

| | | Pre-test | | | Follow-up | | | Paired samples *t* test | | ITT-LOCF | | MAC-SAU |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Measure | Group | *N* | M | SD | *N* | M | SD | *p* | d (95% CI) | *p* | d (95% CI) | d (95% CI) |
| CBCL DBP | MAC | 52 | 0.14 | 0.94 | 40 | 0.16 | 0.86 | 0.62 | −0.08 (−0.39–0.23) | 0.87 | −0.03 (−0.36–0.30) | −0.05 (−0.44–0.34) |
| | SAU | 46 | −0.16 | 1.05 | 38 | −0.17 | 1.10 | 0.89 | 0.02 (−0.35–0.30) | 0.63 | −0.10 (−50–0.30) | |
| CBCL TOT | MAC | 52 | 0.14 | 0.95 | 37 | 0.20 | 0.92 | 0.30 | −0.17 (−0.50–0.15) | 0.40 | −0.12 (−0.39–0.16) | −0.21 (−0.56–0.14) |
| | SAU | 45 | −0.16 | 1.03 | 37 | −0.20 | 1.04 | 0.53 | 0.11 (−0.22–0.43) | 0.34 | 0.15 (−0.15–0.44) | |
| ECBI IS | MAC | 51 | 10.56 | 1.61 | 39 | 9.95 | 1.25 | 0.03 | 0.36 (0.03–0.69) | 0.01 | 0.37 (0.08–0.65) | 0.14 (−0.26–0.54) |
| | SAU | 46 | 10.05 | 1.69 | 35 | 9.52 | 1.73 | 0.15 | 0.25 (−0.09–0.59) | 0.03 | 0.33 (0.03–0.62) | |
| ECBI PS | MAC | 48 | 2.90 | 1.53 | 39 | 2.22 | 1.44 | 0.02 | 0.41 (0.07–0.75) | <0.00 | 0.47 (17–0.77) | 0.26 (−0.16–0.69) |
| | SAU | 44 | 2.30 | 1.55 | 35 | 1.85 | 1.69 | 0.47 | 0.13 (−0.22–0.48) | 0.18 | 0.20 (−0.10–0.50) | |

*Note*: CBCL values were *z*-transformed after square-root transformations, which explains negative mean values.

Abbreviations: CBCL, child behaviour checklist; CI, confidence intervals; DBP, disruptive behavior problem scale; ECBI, Eyberg child behavior inventory; IS, intensity scale; ITT-LOCF, intention-to-treat, with last observation carried forward; PS, problem scale; TOT, total problem score.

from the respective outcome measures was used as the dependent variable, whereas social status (low or medium-high), sex and age were used as independent variables. Statistical analyses were made in IBM SPSS statistics 27.

### 3.6 | Attrition analysis

To be included in the analysis there had to be at least one informant for each child (e.g., teacher and/or parent). The attrition is presented in a flowchart (Figure 1). At 1-year follow-up, the attrition was 14.1%, significantly larger in the MAC group compared to the SAU group ($Chi^2 = 4.27$; df = 1; $p = 0.04$). However, there was no significant difference between teachers' and the parents' attrition in ratings. There was no significant difference between MAC and SAU in children who had an input value over cut-off compared to those under cut-off. Reasons for attrition were withdrawal of consent, replacing of teachers, children's move to another school or informants being impossible to reach.

When examining the attrition rate within MAC and SAU there was a significant difference in both age and sex; significant more older children in MAC ($Chi^2 = 23.02$; df = 1; $p = 0.00$) and SAU ($Chi^2 = 27.90$; df = 1; $p = 0.00$) were lost to attrition, and significantly more boys in MAC ($Chi^2 = 22.98$; df = 1; $p = 0.00$) and more girls in SAU ($Chi^2 = 27.90$; df = 1; $p = 0.00$) were lost to attrition. Thus, we controlled for age and sex of the children in our analysis.

## 4 | RESULTS

The pre to follow-up effects from the two interventions MAC and SAU respectively for the primary and secondary outcomes are presented in Tables 1 and 2 below.

At 1-year follow-up, the results revealed that the primary as well as the secondary outcome variables showed a symptom reduction over time, e.g., time effect, in both intervention groups (Tables 1 and 2). Results from paired samples *t*-tests showed that there was a statistically significant symptom reduction in the teachers' ratings in all the primary outcome variables (TRF and SESBI-R) for both MAC and SAU group. Concerning the secondary outcome variables (Table 2), the parents' ratings showed a significant symptom reduction only in the MAC group, on ECBI IS.

The next step was to examine the group effect at 1-year follow-up, e.g., whether the effects were due to intervention, controlling for age and sex. When undertaking groupwise comparison, we found no significant difference between the groups.

The results from the ITT-analyses were in line with the completer analyses, with only smaller changes in effect seizes on primary as well as secondary outcome variables (Tables 1 and 2). Altogether the results showed that there was a symptom reduction in both intervention groups over time, but neither MAC nor SAU was preferable from the teachers' or the parents' reports.

We calculated reported change by doing RCI analyses of the primary and secondary outcomes, which are presented in Tables 3 and 4 below.

The teachers in both intervention groups reported altogether a positive change in more than half of the children on all scales at 1-year follow-up. The teachers in the MAC group reported a positive change in 54–62% of the children, whereas teachers in the SAU group reported 53–70%. The parents in the MAC group reported 7–36% of the children having a positive change, whereas 4–30% in the SAU group. No change at all was reported by the teachers in the MAC group in 19–33% of the children, whereas in 53–90% by the parents. The corresponding numbers in the SAU group were 17–42% from teachers' reports and 60–96% from parents' reports. Negative change was reported from the teachers in the MAC group in 13–21% of the children, whereas 5–15% was reported in the SAU group. The corresponding figures from the parents' reports in the MAC group were 3–23% and 0–20% in the SAU group. Taken together, the teachers' and the parents' report mostly revealed similar distribution regardless of outcome and intervention group. The exception was one outcome reported by the parents, ECBI PS scale favouring MAC ($Chi^2 = 6.85$; df = 2; $p = 0.03$).

Finally, when the parents' social status was investigated 59% of the families were categorised as having a low social status, and 41% of the families a medium-high social status. A linear regression analysis on primary and secondary outcomes showed that the social status of the family had no statistically significant effect on any of the outcome variables. Hence, no statistical analyses are presented here.

## 5 | DISCUSSION

In this study we examined if children's (age 3–12) behaviour, in terms of displayed DBP was changed at 1-year follow-up, and if there was any significant difference in effect between MAC vs. SAU, according to teachers' and parents' observations. Further we investigated meaningful change on an individual level and if the social status of the family affected the outcome.

First, regardless of MAC or SAU, it is noteworthy that the time effects on teachers' ratings at follow-up (ranging from 0.47 to 0.68) were notably higher than the effect sizes (ranging from 0.10 to 0.49) at post-test.[7] This is encouraging since former meta-analyses of school-based interventions have shown mean effect sizes of 0.21–0.30.[32,33] Besides, research on interventions to reduce DBPs in children has shown fading out effects over time.[16] However, the time effect was larger in SAU compared to MAC, this making SAU catch up with MAC. Consequently, the time effect was still there at 1-year follow-up and even stronger from the teachers' perspectives, while the group effect favouring MAC in the short term was no longer significant.

Secondly, the RCI results from teachers' reports that showed a positive change ranging from 53–70% is encouraging. This study's natural setting makes results in terms of meaningful change especially valued. Few studies of child and adolescent outcomes in usual services use reliable change indices to estimate the percentage of cases that fall into various outcome categories.[34] The RCI revealed no clear results that favoured MAC over SAU, with one minor exception (ECBI PS) in favour of MAC. However, in both groups we found a considerably high percentage of reported meaningful change on an individual level. This is notable since effects are usually stronger when children display more DBP in a clinical sample than in a non-clinical school sample.[24,32] At pre-test, the level of clinical DBPs reported by the teachers ranged from 36 to 67%, while parents reported from 25 to 51% in our sample. In a meta-analytic study of children (age 4–17) in outpatient community mental services it was found that <50% of the children displayed a statistically significant improvement.[34] It is also important to note that interventions providing even minor reductions of DBP most likely are of importance for the child's daily life, especially in school but also for her peers, and the teaching context generally, as they lead to increased opportunities for learning.[8,32] Reports of negative change in both groups seem to be in line with findings in outpatient community mental

**TABLE 3** Proportion of clinical change (RCI) according to teacher's ratings in numbers and percent

| | | Sign. positive change | | No change | | Sign. negative change | |
|---|---|---|---|---|---|---|---|
| Measure | Group | *N* | % | *N* | % | *N* | % |
| TRF DBP | MAC | 24 | 57 | 11 | 26 | 7 | 16.5 |
| | SAU | 25 | 62.5 | 10 | 25 | 5 | 12.5 |
| TRF TOT | MAC | 25 | 59.5 | 8 | 19 | 9 | 21.5 |
| | SAU | 32 | 55 | 12 | 30 | 6 | 15 |
| SESBI-R IS | MAC | 26 | 62 | 8 | 19 | 8 | 19 |
| | SAU | 28 | 70 | 7 | 17.5 | 5 | 12.5 |
| SESBI-R PS | MAC | 21 | 54 | 13 | 33 | 5 | 13 |
| | SAU | 20 | 53 | 16 | 42 | 2 | 5 |

Abbreviations: DBP, disruptive behaviour problem scale; IS, intensity scale; PS, problem scale; RCI, reliable clinical change index; SESBI-R, Sutter-Eyberg Behaviour Inventory—Revised; TOT, total problem score; TRF, teacher report form.

**TABLE 4** Proportion of reliable clinical change (RCI) according to parent's ratings in numbers and percent

| | | Sign. positive change | | No change | | Sign. negative change | |
|---|---|---|---|---|---|---|---|
| Measure | Group | *N* | % | *N* | % | *N* | % |
| CBCL DBP | MAC | 2 | 6.9 | 26 | 89.7 | 1 | 3.4 |
| | SAU | 1 | 3.8 | 25 | 96.2 | 0 | 0 |
| CBCL TOT | MAC | 7 | 23.3 | 16 | 53.3 | 7 | 23.3 |
| | SAU | 5 | 20 | 15 | 60 | 5 | 20 |
| ECBI IS | MAC | 14 | 36 | 22 | 56.5 | 3 | 7.5 |
| | SAU | 10 | 29.5 | 21 | 61.5 | 3 | 9 |
| ECBI PS | MAC | 13 | 34 | 21 | 55 | 4 | 10.5 |
| | SAU | 6 | 19 | 20 | 62.5 | 6 | 18.5 |

Abbreviations: CBCL, child behaviour checklist; DBP, disruptive behaviour problem scale; ECBI, Eyberg child behaviour inventory; IS, intensity scale; PS, problem scale; RCI, reliable clinical change index; TOT, total problem score.

services.[34] However, since no intervention at all increases the risk of deterioration for children displaying DBP,[12,13] the result strongly supports the importance of intervening in school to enhance the development of a positive school environment.

Third, both interventions can be considered to be low-intensive. At least MAC aims to change the teacher's behaviour when interacting with the child instead of directly targeting the child, which might lead to an enduring effect that is even strengthened over time. It should also be noted that the positive change in children's DBPs was earlier according to teachers in MAC.[7] This might be of importance since besides decreasing suffering for the children themselves, peers and teachers, it gives them more opportunities for learning and other developmental tasks that are of importance in the early school years. Another benefit from the interventions was the low attrition rate. Since this target group tends to be hard to reach and the attrition rate is usually high,[6] the attrition rate in this study can be considered as low at 1-year follow-up, which is a positive result.

Fourth, generalisation effects from school to home seem to be limited. However, a significant time effect was found on the parents' ratings, on ECBI for MAC, but not for SAU, but it should be noted that there were no significant group effects. Generalisation effect has in previous research been found to be limited in terms of externalising symptoms.[3] In addition, it should be remembered that the identification of the children as displaying DBPs, was made in the school context by teachers asking for support, and that the parents to a lesser extent reported displayed DBPs at home. Thus, the scope of change might be limited.

Finally, although many children (almost 60%) came from families having an estimated low SS, this did not affect the outcomes in this study. These findings are in line with previous research on parent training.[18] Thus, we suggest that both MAC and SAU can be effective for families from different backgrounds, without increasing social disparities. As the socioeconomic differences in Sweden can be expected to be generally rather small when compared to other countries, this might be reflected in the result. It is important to note that it was the teachers taking the initiative to seek help in the present study. Thus, there might have been a selection bias in the referral process.

### 5.1 | Limitations

Since this was an effectiveness study conducted in a natural setting, a more traditional control group design was not possible. As a consequence of the chosen study design spill-over effect could be assumed, e.g. MAC teachers might have handled situations with children in a new way and thereby have influenced their SAU colleagues. Additionally, some of the teachers worked with children in both intervention groups at the same time and therefore it was not possible to keep the intervention in real life perfectly unaffected from environmental impact. On the other hand, it can be assumed that SAU, even if it might be infrequently and less structured, was easier for teachers to use on an ongoing basis without reminders since it was already embodied in their everyday work. Further, the teachers might have leaned back on previously used strategies, more similar to those in SAU, after MAC was completed. It is also notable that that underlying neurodevelopmental problems/disorders could have affected the outcomes. However, since this was a non-clinic study in a school setting, assessments of psychiatric disorders were not performed. In addition, the RCT design evened out the effects of this limitation between the study groups.

## 6 | CONCLUSION

This study supports the idea that school provides an already established setting to detect and intervene when young children begin to display DBP and that it is possible to enhance children's DBP in school in the long-term by using a low-intensive, individual and structured school-based intervention. Problems sometimes occur in school but not at home. However, many children that display DBP in school are not found in diagnostic systems or child psychiatry. To be able to support children in a non-clinic context, as near the natural

setting as possible, school can provide such context. The results show that a long-term positive change in MAC did show more rapidly than in SAU. Both MAC and SAU were equivalent for children from diverse social backgrounds.

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## CONFLICT OF INTEREST

Part of the research group (U.A. and I.W.) designed MAC but have no economic interest in the model. Other authors have no conflict of interest to declare.

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