



What Works for  
**Children's  
Social Care**



# **INTERVENTIONS FOR CHILDREN WITH FETAL ALCOHOL SPECTRUM DISORDERS**

**EMMIE Summary**





# What Works for Children's Social Care

## Acknowledgements

We thank our research colleagues at CASCADE, Cardiff University, who supported the preparation of this EMMIE summary report: Pierce, Adam; and Maxwell, Nina.

## This evidence summary is based on the following systematic review

Peadon, E., Rhys-Jones, B., Bower, C. and Elliott, E. (2009). Systematic review of interventions for children with Fetal Alcohol Spectrum Disorders. *BMC Pediatrics*, 9:35.

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## About What Works for Children's Social Care

What Works for Children's Social Care seeks better outcomes for children, young people and families by bringing the best available evidence to practitioners and other decision makers across the children's social care sector. We

generate, collate and make accessible the best evidence for practitioners, policy makers and practice leaders to improve children's social care and the outcomes it generates for children and families.

## About CASCADE

The Children's Social Care Research and Development Centre (CASCADE) at Cardiff University is concerned with all aspects of community responses to social need in children and families, including family support services,

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# Interventions for Children with Fetal Alcohol Spectrum Disorders

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## What is the intervention?

Children exposed to alcohol in utero may have impaired central nervous system structure and/or function problems, birth defects and growth. Children may also develop one of the Fetal Alcohol Spectrum Disorders (FASD). These disorders include neurodevelopmental problems, which can persist into adulthood, and cognitive impairments, such as language development, learning, memory, non-verbal problem solving and social skills (Peadon et al, 2009). Consequently, children with FASD are likely to experience adverse life outcomes such as alcohol and drug related problems, disrupted education, inappropriate sexual behaviours and mental health (Streissguth et al. 2004). However, early diagnosis of FASD is associated with decreased risk of adverse outcomes; this may be because diagnosis helps carers and health professionals to advocate for, and direct children towards appropriate interventions.

Generally, interventions can be divided into pharmacological and non-pharmacological approaches. Non-pharmacological approaches include educational, behavioural, social skills and communication interventions (Kalberg and Buckley 2006; 2007). However, carers of children with FASD report that conventional behavioural and learning approaches often to fail to assist their children (Devries and Waller 2004; Malbin 2005). The systematic review by Peadon and colleagues (2009) sought to identify and evaluate the effectiveness of interventions for children with FASD. This summary is focused on outcomes where three or more studies report findings. As such, the summary presents findings for seven studies relating to six interventions that evaluated outcomes for academic skills and learning strategies:

- Cognitive Control Therapy<sup>1</sup>

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<sup>1</sup> Adnams et al., 2003



- Language and literacy intervention<sup>2</sup>
- Virtual reality game<sup>3</sup>
- Maths intervention<sup>4</sup>
- Rehearsal training<sup>5</sup>
- Videotape intervention<sup>6</sup>

In addition to presenting detailed results for academic skills and learning strategies, a brief summary is provided of the remaining five interventions. While tentative findings are presented, findings must be treated with caution due to limitations in the methodological rigour of the studies reviewed.

### **How strong is the evidence?**

The strength of evidence is restricted by the methodological quality of the seven studies. Due to the limited number of randomised controlled studies in existing reviews, Peadon and colleagues broadened their inclusion criteria to include other studies that employed a control group. Of the seven studies, four studies were randomised controlled trials (Adnams et al., 2003; Adnams et al., 2005; Coles et al., 2007; Kable et al., 2007), two studies were cohort studies with pre- and post test measures (Meyer 1998; Padgett et al., 2006) and one study was a non-randomised controlled trial (Loomes et al., 2008). Of the four randomised controlled trials, one study was reported on by two papers (Adnams et al., 2005; 2007).

The methodological rigour of the four randomised controlled studies was limited due to lack of information regarding randomisation, allocation, concealment and intention to treat (Adnams et al., 2003; 2005; 2007; Coles et al., 2007). The seven studies were limited by the diagnostic criteria used, with a lack of detail regarding the criteria employed. This makes it difficult to compare outcomes and generalise findings to other groups of children suffering from FASD. Finally, the reviewers note that whilst all seven studies employed follow-up measures, ranging from one week to ten months, more longitudinal studies are needed to determine the long-term efficacy of interventions. This is particularly important as FASD can persist into adulthood.

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<sup>2</sup> Adnams et al., 2005; Adnams et al., 2007

<sup>3</sup> Coles et al., 2007; Padgett et al., 2006

<sup>4</sup> Kable et al., 2007

<sup>5</sup> Loomes, et al., 2008

<sup>6</sup> Meyer, 1998



## Which outcomes were studied?

- Academic skills
- Learning strategies

## Effectiveness: how effective are the interventions examined?

### Outcome 1: Academic skills

Effect rating	+/-
Strength of Evidence rating	1



### Outcome 2: Learning strategies

Effect rating	+/-
Strength of Evidence rating	0



Five of the seven studies assessed academic skills. One randomised controlled trial reported in two papers (Adnams et al., 2005; 2007) focused on language and literacy skills, assigning 40 children with FASD to the intervention group and 25 children who did not have FASD to a control group. Overall, the intervention group showed significant improvements in reading, spelling and some pre-literacy domains. However, no differences were found in general academic tests. Kable et al.'s (2007) randomised controlled trial assigned 61 children to a maths intervention adapted for children with FASD or a control group comprising a standard psychoeducational intervention. The intervention group showed significant improvement in maths knowledge. A randomised controlled trial (Adnams et al., 2003) found mixed findings for the ten children with FASD who received Cognitive Control Therapy as compared to a control group at another school. Improvements were reported in behaviour before and after the intervention for the intervention group. No differences were found regarding children's neuropsychological profiles such as IQ scores.



Regarding safety skills, two studies (Coles et al., 2007; Padgett et al., 2006) used virtual reality games to teach fire and/or street safety. In Coles et al.'s (2007) randomised controlled trial of 32 children with FASD, children either received a fire safety or a street safety virtual reality game. Mixed findings were reported; children's knowledge of fire safety improved post-intervention and at follow-up, whereas improvements in street safety were found post-intervention but this was not significant at follow-up. Padgett et al.'s (2006) pre- and post-test intervention assessed the effectiveness of a virtual reality game to teach home fire safety to four children. Children's knowledge of home fire safety improved post-intervention and at one-week follow-up.

Of the two studies that examined learning strategies, Loomes et al.'s (2008) controlled trial examined rehearsal training to improve memory for numbers. Thirty-three children with FASD were allocated to either a rehearsal training or a control group. Both groups completed a digital span memory task at baseline, immediately post-intervention and at an average of 10.6 days following the intervention. While no significant differences were found at post-intervention, there was a significant difference at follow-up. Finally, Meyer (1998) examined modelling of perceptual tasks with four boys. None of the children were able to imitate the building tasks.

## **Other interventions**

Findings from the two pharmacological studies (Oesterheld et al., 1998; Snyder et al., 1997) found that while hyperactivity scores improved following medical intervention, no significant findings were reported for attention, as compared to placebo. In O'Connor's (2006) quasi-randomised controlled trial, 100 children were recruited to evaluate parent assisted child friendship training (CFT). The study reported significant improvement in knowledge of appropriate behaviour post-intervention and at three-month follow-up. While parents reported improved social skills and fewer behaviour problems, teachers did not report any significant improvement. Finally, a randomised controlled trial with 20 children (Vernescu, 2007) examined Attention Process Training. Mixed findings were reported, with significant improvements on measures of sustained attention and non-verbal reasoning ability of the children. No improvement was reported for executive functions.

## **Mechanisms: how does it work?**

Due to the heterogeneity of interventions, the review did not report any mechanisms.



## **Moderators: When, where and who does it work for?**

Of the seven studies, four were undertaken in the US, two in South Africa and one study in Canada. Consequently, it is not possible to ascertain whether, or how some of these studies are applicable to the UK context.

Children ranged from 3 to 12 years. While one study (Meyer, 1998) was explicitly aimed at boys, no details regarding gender were given for the remaining studies.

The studies recruited children from a range of settings including clinics, schools and the community. All three studies by Adnams et al. (2003; 2005; 2007) selected children from a larger study although there was no information provided regarding how children were selected. Diagnosis varied across studies and in some cases it was not stated. Hence, children were included with a broad range of diagnosis but where alcohol related problems could not be otherwise explained than alcohol exposure in utero.

## **Implementation: How do you do it?**

Due to the heterogeneity of interventions, implementation varied across the seven studies. Two studies involved weekly one hour sessions (Adnams et al., 2003; 2005; 2007) one study (Kable et al., 2007) involved six weeks of tutoring and one study involved showing children a four minute videotape of block building (Meyer, 1998). Coles et al. (2007). Padgett et al. (2006) did not specify the virtual reality game duration and no details were given regarding the rehearsal training (Loomes et al., 2008).

## **Economics: What are the costs and benefits?**

No economic analysis was included in the review.

## **What are the strengths and limitations of the review?**

The review adopted a comprehensive search strategy to identify and evaluate the effectiveness of interventions for children with FASD. Due to the paucity of evidence in this area, heterogeneity of interventions and outcomes measured, the reviewers noted at the outset that they were unable to conduct a meta-analysis.

Methodological limitations were reported for the included studies. These included the quality of study design, lack of information regarding randomisation, group allocation, blinding and concealment. Further, the diagnostic criteria for FASD varied or was not stated making it difficult to compare study outcomes as study populations may differ.



This review presents mixed findings regarding a number of interventions aimed at improving academic skills and learning strategies for children with FASD. The authors report that early diagnosis for children with FASD can reduce the risk of adverse outcomes, highlighting the need for robust studies focusing on the needs of these children.

### Summary of key points

- Seven studies reported six interventions which evaluated the efficacy of interventions on a range of academic skills and learning strategies. Of these, four randomised controlled trials reported findings for academic skills.
- While the systematic review reports findings from randomised controlled trials, differences in the quality of study design and reporting of studies limited the extent to which effectiveness could be determined.
- Mixed findings were reported for academic skills. There was some evidence to suggest that language and literacy, maths and knowledge acquisition improved on some domains following intervention.
- Due to the heterogeneity of interventions, setting and diagnosis it is difficult to determine the extent to which findings can be generalised to different groups of children with FASD.
- More research is needed to identify and evaluate interventions for children with FASD in a UK context.



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