

Case Study 1: Are parent/carer implemented joint attention interventions effective in increasing responses to joint attention bids, and/or initiation of joint attention in young children with ASD?

Summary

Joint attention interventions are designed to address a core non-verbal social communicative impairment in young children with autism spectrum disorders (ASD). Many joint attention interventions use either behaviourist approaches such as naturalistic behaviour modification or relationship-based approaches from the social interactionist tradition in order to promote and increase the characteristics of joint attention that have failed to develop naturally in the child with ASD (Prelock, Calhoun, Morris & Platt, 2011). Although much of the existing research on interventions to promote joint attention has relied upon an interventionist to be the primary change agent, more recently there has been a move towards parent implemented interventions. Parent mediated interventions utilise and build upon the already established parent-child relationship and provide the opportunity for interaction styles to become more entrenched and thus offer longer lasting outcomes. This systematic literature review aims to investigate whether parent/caregiver mediated joint attention interventions are effective in increasing joint attention in children with ASD. The findings offer some early indications that these interventions can be effective, however further research with sufficient sample sizes and rigorous methodology must be conducted in order to increase confidence in this intervention option.

Introduction

Autism spectrum disorder (ASD) is a type of pervasive developmental disorder, which impacts upon multiple areas of functioning. Individuals with ASD experience impairments in the three areas of psychopathology: reciprocal social interaction, communication, and restricted, stereotyped, repetitive behaviour (WHO, 2015); although there is significant variability with regards to the individual presentation of the characteristics of ASD, including traits and severity of functional impairment. There is a general agreement that the number of children being diagnosed with ASD has risen considerably over recent years, with an estimated prevalence of 1.1% of the UK population at this time (NAS, 2014). Children are also being diagnosed at a younger age, with recent research indicating that by looking at social anomalies or repetitive actions, ASD can be reliably diagnosed in children as young as 18 months old (Glicksman, 2012).

With the growing number of children being diagnosed with ASD and the increasing possibility of children gaining a diagnosis at a younger age, the need for effective early intervention has become a high priority. Recent research has shown that early intervention that focuses on the core deficits associated with ASD can significantly improve functional outcomes (Glicksman, 2012; Kasari et al. 2005). Interventions that focus on improving joint attention for young children with ASD have become increasingly common in recent years, with researchers suggesting that joint attention is a pivotal skill that will produce positive improvements in multiple related areas, it seems that this should be an area of high importance with regards to early intervention (Jones, Carr & Feeley, 2006).

Joint attention is a social interaction skill that relates to the ability to coordinate and share attention with others. It involves showing mutual engagement through a range of modes such as pointing, gesturing and coordinating visual gazes between people and objects in a social context. In typical development, two forms of joint attention begin to emerge between the ages of 9 and 15 months; responding to joint attention bids, and initiating joint attention (Jones et al. 2006). Previous research has shown that joint attention does not develop naturally in children with ASD, and that this disruption is unique to autism (Prelock et al. 2011; Schertz & Odom, 2007). As joint attention holds a social function and is believed to be crucial to social, language and cognitive development (Rocha, Schreibman & Stahmer, 2007; Baron-Cohen, Allen & Gillberg, 1992), deficits in this skill are likely to produce significant impairment to social communicative functioning in children with ASD, therefore successful intervention to target this skill is critical.

A range of strategies have been used by autism interventionists to promote joint attention, including applied behaviour analysis (ABA), naturalistic behaviour modification and relationship-based approaches (Jones et al. 2006; Prelock et al. 2011; Qian, 2010; Schertz & Odom, 2007). Initially, joint attention interventions were predominantly mediated by an interventionist, who would work with the child in a clinical setting to teach them a specific joint attention skill. Although this research often demonstrated improvements in this skill when interacting with the interventionist, this skill could not be generalised to interactions with other untrained adults, such as the child's parents (Whalen & Schreibman, 2003). Several reasons for this lack of generalisability have been hypothesised, one of which is that the artificial and unnatural context in which the intervention took place may not provide

the opportunity for the child to generalise the skill to naturally occurring situations (Kasari, Gulsrud, Wong, Kwon & Locke, 2010).

Joint attention interventions are ideally delivered as an early intervention for children under the age of 5 years. As young children and toddlers are likely to spend most of their time in the home environment with their parents, interventions that use the child's natural environment and build upon the parent-child relationship to promote learning may be the most successful. Parent-mediated interventions that take place in the home environment may be the ideal teaching environment for learning a new skill that would then be more easily generalisable to other naturally occurring situations (Kasari et al. 2010; Schertz & Odom, 2007).

There are many advantages to parent-mediated models of early intervention, one of which being that they help families to acquire the skills to help them to support and facilitate the development of their child with ASD. It has been documented that parents play a critical role in the development of non-verbal social communication (Bruner, 1978), therefore intervention that trains parents to promote this skill with their child with ASD may bring about effective positive behaviour change (Rocha et al. 2007). Parent mediated approaches are an ideal opportunity for socially based learning in early development, which is likely to lead to greater child motivation, self-efficacy and desire for learning (Haywood, Brooks & Burns, 1992). They also create the opportunity for early caregiver scaffolding, which may relate to the child's later ability to initiate joint attention successfully (Vaughan et al. 2003).

Although the specifics of parent mediated joint attention interventions can vary between studies, there are elements of consistency. Interventions begin with a period of parent training before the intervention takes place, which consists of an

initial period of observation of interaction between the parent-child dyad, followed by a period of training for parents delivered by trained interventionists. The training teaches the parents to facilitate interactions that promote joint attention, and provides them with techniques to teach the child to respond appropriately to joint attention bids. Principles include responding to the child's interests in activities, imitating the child's actions, talking about what the child is doing and copying what the child said. Parents are given a framework to follow throughout the intervention phase, they are then requested to spend time engaged in activities designed to promote joint attention and increase opportunities for joint attention. The intervention takes place within a naturalistic environment in order to increase the chance of generalisability and to promote this skill within day to day interactions.

It has also been noted that incorporating rapport building into joint attention interventions can help to increase the child's social motivation for carrying out these behaviours (Jones et al. 2006). Parents may be ideally placed to introduce these skills to their child, as opportunities to engage in social interaction will be greater with the parent than with anybody else. By using activities or events that have an element of desirability for the child, the desire to engage in social interaction with their parents may also be reinforced.

With this in mind, joint attention interventions that are delivered by parents seem to be the best way forward. The current SEND code of practice supports this way of working, highlighting the importance of parental involvement by stating that, 'effective parent participation can lead to a better fit between families' needs and the services provided, higher satisfaction with services, [and] reduced costs' (SEND code of practice, 2014, p. 63).

Deficits in joint attention are evident in children and young people with ASD from early infancy into adolescence, and have been observed to be associated with social, affective and language development. Therefore equipping parents with the skills to target and develop these skills in young children with ASD is highly important to reduce the impact of these difficulties when the child reaches school age. Without the ability to coordinate joint attention, educational contexts become very challenging, for example coordinating attention with the teacher in a learning environment. Also following and participating with exchanges of shared attention in social interactions may be impaired. Early intervention may reduce the need for Educational Psychology involvement as the child reaches school age, where deficits in this area may begin to become apparent and impact on their daily functioning.

In light of the information presented above, the review question for this paper is:
Are parent/carer implemented joint attention interventions effective in increasing responses to joint attention bids, and/or initiation of joint attention in young children with ASD?

Literature search

A comprehensive literature search was carried out in December 2014 using the electronic databases PsychINFO and ERIC (EBSCO). The following search terms were used to identify studies that were relevant to the review question:

Table 1: Search terms

Databases:	Search terms:
PsychINFO/ERIC	Joint attention or joint engagement (title)
	Parent* or caregiver (title)
	Parent* or care* (title)
	Autism (title)
	Intervention (abstract)
	Autism intervention (abstract)

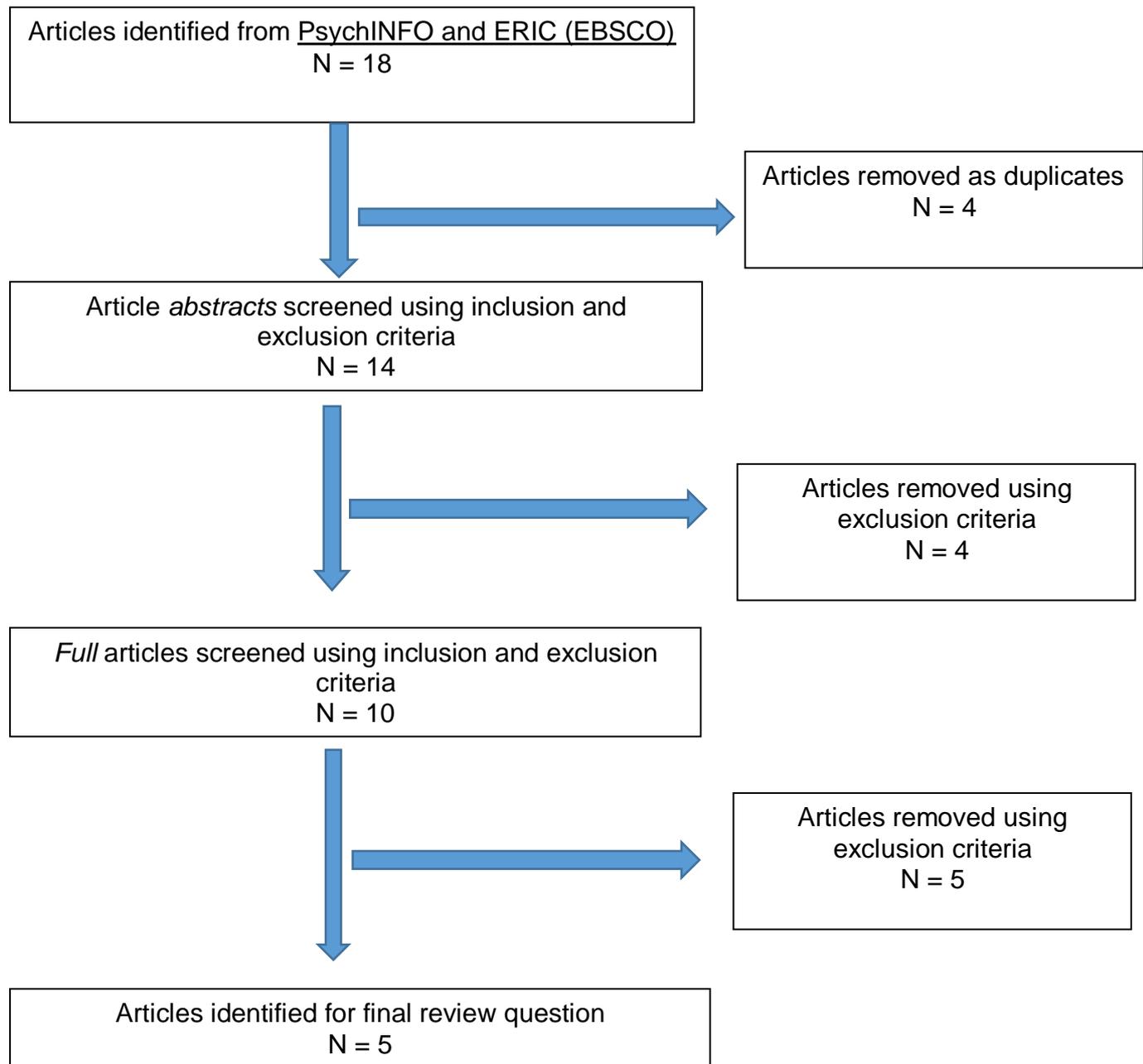
The database search initially identified 18 papers that were relevant to this review. 4 articles were removed immediately as duplicates. The inclusion and exclusion criteria (Appendix 1) were then applied to the titles and abstracts of the studies; 4 studies were excluded using the exclusion criteria. The 10 remaining studies were then screened using the inclusion and exclusion criteria on the full text, 5 of these studies were excluded. The 5 remaining studies were identified for inclusion in the final review. Figure 1 shows a flow diagram of the literature screening process.

Ancestral searches were also carried out on the selected papers in order to identify any additional papers that may have been relevant to this review. No further papers were selected for full text screening or inclusion into the review.

For a full list of studies excluded at full text and rationale, please refer to Appendix 2.

Figure 1: Literature screening process

Database search:



Critical Review

The five studies that were selected for review were appraised using the Weight of Evidence (WoE) approach (Gough, 2007). WoE is a framework used to appraise studies based on 3 areas; methodological quality (WoE A), methodological relevance (WoE B) and topic relevance (i.e. the relevance of the study focus to the review question) (WoE C). The weightings for each area are then averaged to provide an overall WoE for the study (WoE D). The ratings received by each study are presented below, see Table 2.

The methodological quality (WoE A) of each study was rated using a coding protocol designed for evaluating evidence; either Horner et al. (2005) or Kratochwill (2003). The protocol selected for use was dependent on the research design (either single case study or group design). Full coding protocols can be found in Appendix 6. The methodological relevance (WoE B) and topic relevance (WoE C) criteria were review specific and were weighted according to the rationale described in Appendix 5.

Table 2: Summary of Weight of Evidence Judgements

Authors	Methodological Quality (WoE A)	Methodological Relevance (WoE B)	Topic Relevance (WoE C)	Overall Weight Of Evidence (WoE D)
Shertz & Odom (2007)	Medium 2.2	Medium 2	High 3	Medium 2.4
Rocha et al. (2007)	High 2.7	Medium 2	Low 1	Medium 1.9
Qian (2010)	High 2.8	Medium 2	Medium 2	Medium 2.3
Klass (2012)	Medium 2.3	Low 1	Medium 2	Medium 1.8
Kasari et al. (2010)	Medium 1.6	Medium 2	Medium 2	Medium 1.9

Participants

The number of participants in each study ranged from 3 to 5 in the single case design studies and 38 participants in the group design study (intervention group n=19, control group n=19). Power analysis of the RCT showed that the sample was not large enough, therefore the fact that there was no effect of intervention on initiation of joint attention could be due to the study being under powered. The age of the children in this review ranged from 21 months to 4 years, 9 months. All children that were recruited to the study had a clinical diagnosis of ASD. Further screening measures to establish ASD traits and/or stage of development were also conducted prior to baseline.

There was an uneven gender representation within the studies selected for review, with 83% of the total number participants being male. Although this may be reflective of the fact that ASD tends to be more prevalent in males than females, with current estimates of male/female ratios ranging from 2:1 to 16:1 (NAS, 2015). All studies in this review were conducted in the USA. Demographic information around ethnicity and socioeconomic status of participants was only provided by Kasari et al. (2010), which may make the generalisability of the other studies more difficult.

Research Design and Measures

This review included both single case design (SCD) (Shertz & Odom, 2007; Rocha et al., 2007; Qian, 2010; Klass, 2012) and randomised control design (Kasari et al., 2010) studies. Single case design research is a rigorous, scientific methodology that enables investigation using small sample sizes. Single case design research can be

used to establish causal inferences and due to documenting experimental control, can be used to establish evidence based practices in the same way as randomised control trials (Horner et al., 2005). However due to small sample sizes used in single case design research, results must be generalised with caution, therefore RCTs are the only design that could have been weighted 'high' in WoE B ratings of methodological relevance. For an RCT to achieve a 'high' rating the study must also have an active comparison control group, to ensure that any effects observed are due to the specific intervention, rather than a result of receiving any form of additional support. The RCT in this review had a waitlist control group, therefore a rating of 'medium' was awarded. The SCD studies all used a multiple baseline design, however the particular design varied across studies; with some using a multiple baseline across participants design (Rocha et al. 2007; Qian, 2010), whilst others used a multiple baseline across behaviours or targeted outcomes design (Schertz & Odom, 2007; Klass, 2012). Within the WoE B ratings, studies with multiple baseline across participants were rated 'medium', as there is less chance of contamination. With the multiple baseline across behaviours design, it is harder to observe discrete behaviours and there is the possibility that any effects have been carried over across behavioural conditions, therefore Klass (2012) was rated as 'low' for WoE B. Schertz & Odom (2007) was rated as 'medium' for WoE B, as although they used a multiple baseline across behaviours approach, their study did show at least three demonstrations of experimental effect.

Each study in the review was rated for methodological quality (WoE A) using a coding protocol relevant to the study design (Horner et al., 2005 for SCD and Kratochwill, 2003 for RCT). Within SCD studies the baseline condition acts as a

within-participant control, similar to how a control group is used within a group design study (Horner et al. 2005). Three out of the four single case design studies were rated highly for baseline, as they had clearly described the baseline condition and collected a minimum of three data points in this period. The remaining SCD study (Shertz & Odom, 2007) was rated slightly lower, as although a sufficient number of data points were collected at baseline, the baseline conditions were not explained.

It is important to assess whether the effects of intervention are generalised or maintained beyond the point of intervention delivery. This was a particularly pertinent point for this review, due to the nature of restrictive and repetitive behaviours that are characteristic of ASD (Howlin, 2006). The overall aim of this intervention is to generalise the joint attention skill in order to produce positive improvements in overall social communicative functioning, which would only be possible if the effects of intervention were maintained. Four out of the five reviewed studies did investigate generalisation and maintenance, with Klass (2012) being the only study that did not have any follow up data; this is due to her study conducting secondary analysis on pre-existing data. As a result, this study was rated 'low' for methodological relevance.

Various coding systems were used to record the occurrence of target behaviours. In four out of the five reviewed studies, video recordings were taken of the parent-child interactions which were then coded by independent observers. In the remaining study (Qian, 2010), the parents identified and coded behaviours as they occurred. To ensure there was no bias in recording, the primary investigator acted as a reliability partner for parents who collected and recorded data independently. All five

studies were rated highly for dependent variables and outcome measures, as all designs provided a clearly operationalized definition of the target behaviours to be measured and each dependent variable was quantifiable. All five studies used more than one rater to record observations in order to minimise bias and increase reliability, and reported inter-observer agreement rates of at least 80% or Kappa higher than 60% (Horner et al., 2005).

Intervention

The studies selected for this review used a range of interventions, including Joint Attention Mediated Learning (JAML) (Schertz & Odom, 2007; Klass, 2012), Joint attention training - using Discrete Trial Training (DTT) and Pivotal Response Training (PRT) (Rocha et al. 2007), Initiating Joint Attention (IJA) intervention (Qian, 2010) and Mediated Joint Engagement (Kasari et al. 2010). These interventions all aimed to improve the child's response to and/or initiation of joint attention, with the parent or primary caregiver implementing the intervention and therefore acting as the primary change agent. Whilst these interventions clearly had similar aims, the variation in specific intervention and implementation do make comparison of efficacy challenging, however detailed descriptions of the parent training and intervention have been provided by all studies, therefore key components could be identified to ensure that the studies were comparable.

Fidelity of implementation is important to ensure that all participants have followed the intervention plans closely. Implementation fidelity was assessed in four out of the five studies reviewed, however it was not assessed in Klass (2012), therefore a 'medium' rating was given to this study according to the WoE A criteria. A 'medium'

rating was also given to the Schertz and Odom (2007) study, as although fidelity of implementation was measured, there was variability in how closely the parents adhered to the phases of intervention, with only 2 out of the 3 parent-child dyads found to show close fidelity with the intervention plans.

Studies that collected outcomes relating to both the child's response to joint attention bids and initiation of joint attention were rated higher according to the WoE C criteria, as they were more relevant to answering the review question. This was followed by studies that only collected data on initiation of joint attention, and finally by studies that only collected data on response to joint attention.

Schertz & Odom (2007) was the only study that received a 'high' rating for WoE C, as although two other studies also had outcomes on both response to, and initiation of joint attention, these studies did not meet other criteria, such as measuring implementation fidelity (Klass, 2012) or a small age range of children taking part in the study (Kasari et al. 2010).

Findings

The studies selected for this review used different methods for calculating effect sizes (ES). Table 3 below summarizes the equivalent effect sizes that should be interpreted as small (questionable), medium (effective) and large (very effective). Anything below these thresholds should be considered ineffective (Scruggs & Mastropieri, 1998).

Table 3: Indicators of a small, medium or large ES depending on the method used for calculation

Type of effect size	Small	Medium	Large
Percent Non-Overlapping Data points (PNDs) (Scruggs & Mastropieri, 1998)	50-69%	70-89%	90-100%
Cohen's <i>d</i> (Cohen, 1988)	0.20	0.50	0.80

Effect sizes for each outcome (response to joint attention and initiation of joint attention), are presented in Table 4 and 5 below. Percentage of non-overlapping data (PND) was used to evaluate the effect size measure for each case in the single case design studies in this review, and Cohen's *d* was calculated by the author using the pre and post test scores for the intervention and control groups, in order to give the effect size measure for the intervention in the RCT.

Table 4: Primary outcome: Response to joint attention

Study	Case/Group	Type of effect size	Effect size	Effect size interpretation	Study quality rating (WoE D)
1	Case 1	PND	0%	No effect	
	Case 2	PND	64%	Small	Medium
	Case 3	PND	88%	Medium	
2	Case 1	PND	75%	Medium	
	Case 2	PND	26%	No effect	Medium
	Case 3	PND	39%	No effect	
4	Case 1	PND	83%	Medium	
	Case 2	PND	92%	Large	Medium
	Case 3	PND	75%	Medium	

	Case 4	PND	67%	Small	
	Case 5	PND	17%	No effect	
5	Intervention group	Cohen's <i>d</i>	0.87	Large*	Medium

*= Statistical analyses significant to $p < .05$

Overall, these studies indicate that joint attention interventions can be effective in improving response to joint attention skills in young children with autism. However, as you can see from Table 4, interpretations of effectiveness of intervention in these studies ranges from ineffective to very effective, therefore several factors must be considered when evaluating the results.

There was large variance both between the studies in this review and also within the single case design studies, with PND effect sizes for response to joint attention ranging from 0% to 88% in Schertz & Odom (2007), 26% to 75% in Rocha et al. (2007) and 17% to 92% in Klass (2012). This shows that despite all studies containing medium or large effect size for some participants, all of the SCD studies also contained data that showed no effect. In Schertz & Odom (2007) 'case 1' was found not to have adhered to the intervention appropriately, which may explain why the intervention was ineffective for that child.

The Klass (2012) research showed the most within study variance, with intervention effectiveness ranging from no effect to very effective. This study conducted secondary analysis of pre-existing data which may account for some of the variability in results, as the current researcher did not systematically manipulate the independent variable in accordance with her own research question.

Although there is large variance in the range of data, the PND scores from Klass (2012) do suggest higher overall effectiveness of intervention for increasing response to joint attention the other two single case design studies, with three out of the five cases achieving a PND score of effective or very effective. However, this should be interpreted with caution as there was no follow up conducted and therefore no way to establish whether intervention effects were maintained beyond the active intervention phases.

Kasari et al. (2010) showed the most promising results for this outcome, with data suggesting a large effect for response to joint attention ($d=0.87$), and also reporting follow up data that suggested convincing maintenance effects a year after the intervention had concluded.

Table 5: Primary outcome: Initiating joint attention

Study	Case/Group	Type of effect size	Effect size	Effect size interpretation	Study quality rating
1	Case 1	PND	0%	No effect	
	Case 2	PND	71%	Medium	Medium
	Case 3	PND	100%	Large	
3	Case 1	PND	100%	Large	
	Case 2	PND	83%	Medium	Medium
	Case 3	PND	77%	Medium	
4	Case 1	PND	83%	Medium	
	Case 2	PND	75%	Medium	
	Case 3	PND	0%	No effect	Medium

	Case 4	PND	67%	Small	
	Case 5	PND	67%	Small	
5	Intervention group	Cohen's <i>d</i>	0.18	No effect	Medium

Overall, these studies indicate intervention effectiveness on improving initiation of joint attention. However the RCT (Kasari et al. 2010) did not show a significant effect for initiating joint attention ($d=0.18$). This could be due to the fact that the study was under powered as a result of the small number of participants in this study.

There was large variance both between and within the single case design studies for this outcome also, with PND effect sizes for initiation of joint attention ranging from 0% to 100% in Schertz & Odom (2007), 77% to 100% in Qian (2010) and 0% to 83% in Klass (2012). The discrepancy in Schertz & Odom (2007) again can be explained by lack of implementation fidelity by 'case 1'.

Klass (2012) had variable results for this outcome also, with data ranging from no effect to effective. Again, the lack of follow up data makes it difficult to draw any solid conclusions. Interestingly, 'case 3' who showed no effect for this outcome, actually showed a medium effect for response to joint attention. As fidelity of implementation was not measured in this study it is difficult to establish the reason behind this anomaly.

Qian (2010) showed the most solid results for initiation of joint attention with all of her cases achieving data of medium or large effect. This study only investigated

initiation of joint attention, rather than investigating both outcomes. This may explain the higher results, as the researcher was only focused on one primary outcome.

Conclusions and Recommendations

This review examined five studies, four single case design studies and one randomised control trial, in order to explore the effectiveness of joint attention interventions on increasing this skill in young children with ASD. Overall, the reviewed studies provided promising evidence to support the effectiveness of joint attention interventions for both increasing the child's response to joint attention bids, and also increasing child initiated joint attention, however the variability in data does raise questions regarding how meaningful the results are.

To start with the generalisability of the results of the SCD studies must be considered. Whilst all of the SCD studies in this review showed medium or large effect sizes for the outcomes mentioned, the small number of participants in these studies makes it hard to establish whether other participants would experience the same results. This is especially true when within the same study there are participants who are achieving small effects or no effect at all from the intervention.

Although none of the studies achieved a 'high' rating for WoE D, all studies achieved a 'medium' for WoE D, thus indicating that despite some considerations that should be kept in mind, all of the studies in this review show promising evidence with regards to the quality of joint attention interventions. Some methodological limitations that were identified in these studies included, low power in the RCT, lack of implementation fidelity in some studies and no follow up in one study, which

makes it hard to identify if any observed results were due to the intervention alone, or any confounding variables. Therefore it would be recommended that high quality randomised control trial studies with large sample sizes and active comparison groups be undertaken before confidently being able to ascertain the effectiveness of these interventions on joint attention skills.

While these interventions do show promising evidence with regards to early intervention, as they utilise the home environment and the role of the primary carer in developing social communication skills in young children (Bruner, 1978), there are some factors to bear in mind when delivering interventions in this way.

Implementation fidelity is of course crucial when administering the intervention, however when the intervention includes training a parent to deliver the components, fidelity with regards to training must also be assessed in order to establish whether all trainers were delivering equal instructions to parents, which was only done in one of these studies (Rocha et al. 2007). Therefore further research should ensure that this is considered.

Improvements in joint attention may produce significant benefits to the child/young person's education. Therefore, the promotion and development of joint attention skills appears to be a promising avenue for targeted intervention for young people either with, or at high risk of developing ASD. This has strong implications for Educational Psychology practice, as an emphasis is placed on family-centred approaches. Recommendations towards this style of intervention should be promoted in early autism intervention as there are initial signs of potential efficacy. Frequent engagement in joint attention has been shown to have significant benefits

to language and IQ (Rocha et al. 2007; Baron-Cohen et al. 1992), therefore it would seem advisable for Educational Psychologists to offer the parents of young children with ASD training on increasing opportunities for joint attention within the home and in naturally occurring environments. Educational psychologists should have a supportive and advisory capacity within this intervention, as the main objectives are not only around reducing the core deficits associated with ASD, but also around facilitating a positive parent-child relationship. This is an especially pertinent point considering the high levels of stress that is often experienced by families during the initial stages of diagnosis.

In conclusion, whilst the current evidence suggests that parent implemented intervention to improve joint attention skills can be effective for individual children with ASD, due to small sample sizes, more evidence will be needed in order to see whether these results can be generalised to other children with ASD.

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Whalen, C., & Schreibman, L. (2003). Joint attention training for children with autism using behavior modification procedures. *Journal of Child Psychology and Psychiatry and Allied Disciplines*, 44, 456–468.

Appendix 1

Inclusion and exclusion criteria

<u>Inclusion Criteria</u>	<u>Exclusion Criteria</u>	<u>Rationale</u>
1. Publication Type		
Study has been through external validation (e.g. peer reviewed journals or dissertations)	Studies that are not in peer reviewed journals or have not been externally examined	Studies that have been externally verified should have met minimum quality standards
2. Language		
Study is written in English	Study is not written in English	Resources are not available for translation
3. Type of Study		
a. Study must contain primary empirical data	Study does not contain primary empirical data (e.g. duplicate data, 'how to' guides or reviews)	There must be primary data available for this review to synthesise
b. Study must include outcome data on child initiation of JA or child response to JA	Outcome data is not on children's response to joint attention bids or child's initiation of joint attention	This review focuses on whether intervention impacts on how children with ASD respond to and initiate joint attention
c. The intervention must not be run concurrently with other interventions	The intervention is run combined with or at the same time as another intervention	This review aims to explore the effects of joint attention interventions alone
4. Participants and setting		
a. All children included in the studies must be under 5 years of age	Children are outside of this age bracket	This review focuses on early intervention, as JA interventions are ideally targeted at children from 2 to 4 years old.

b. All studies must contain parents or primary caregivers as the change agent

The intervention is carried out by a person other than a parent or primary caregiver (e.g. a researcher or teacher)

Learned skills may be more generalisable with parent mediated interventions

c. All children must have a diagnosis of ASD

Not all participants have an ASD diagnosis

This review focuses specifically on the effectiveness of joint attention interventions for children with ASD

5. Analysis

Quantitative data only will be analysed in this report

Studies reporting qualitative data or qualitative data in mixed methods designs will not be analysed in this report

This review will focus on quantitative data as it shows the highest methodological rigour

Appendix 2

Studies excluded at full text

Excluded paper	Rationale for exclusion
Schertz, H., & Robb, M. (2006). Interventions for Toddlers With Autism: Building on the Parent-Child Relationship to Promote Joint Attention. <i>Young Exceptional Children</i> , 9(3), 20–28.	Exclusion criteria: 3a Study did not contain primary empirical data.
Casenhiser, D. M., Shanker, S. G., & Stieben, J. (2013). Learning through interaction in children with autism: preliminary data from asocial-communication-based intervention. <i>Autism : The International Journal of Research and Practice</i> , 17(2), 220–41.	Exclusion criteria: 4b Intervention was delivered by a therapist.
Kasari, C., Freeman, S., & Paparella, T. (2006). Joint attention and symbolic play in young children with autism: a randomized controlled intervention study. <i>Journal of Child Psychology and Psychiatry, and Allied Disciplines</i> , 47(6), 611–20.	Exclusion criteria: 4b Intervention was not implemented by a parent or carer.
Jones, E. a, Carr, E. G., & Feeley, K. M. (2006). Multiple effects of joint attention intervention for children with autism. <i>Behavior Modification</i> , 30(6), 782–834.	Exclusion criteria: 3c Intervention was run concurrently with another intervention.
Riojas-Cortez, M. (2011). Culture, Play, and Family: Supporting Children on the Autism Spectrum. <i>Young Children</i> , 66(5), 94-99.	Exclusion criteria: 3a Not empirical data, a 'how to' guide.

Appendix 3

Reviewed Studies

Klass, A. V. (2012) Joint attention interventions for young children with autism spectrum disorders: Caregiver and child actions and transactions. *Dissertation Abstracts International Section A: Humanities and Social Sciences*, 72(7-A), pp. 2368.

Qian, C. M. (2010) Effects of a parent-implemented intervention on initiating joint attention in children with autism. *Dissertation Abstracts International: Section B: The Sciences and Engineering*, 70(7-B), pp. 4490.

Kasari, C., Gulsrud, A. C., Wong, C., Kwon, S., & Locke, J. (2010). Randomized controlled caregiver mediated joint engagement intervention for toddlers with autism. *Journal of Autism and Developmental Disorders*, 40(9), 1045–56.

Rocha, M. L., Schreibman, L., & Stahmer, a. C. (2007). Effectiveness of Training Parents to Teach Joint Attention in Children With Autism. *Journal of Early Intervention*, 29(2), 154–172.

Schertz, H. H., & Odom, S. L. (2007). Promoting joint attention in toddlers with autism: a parent-mediated developmental model. *Journal of Autism and Developmental Disorders*, 37(8), 1562–75.

Appendix 4: Summary of the 5 studies selected for review

<u>Author</u>	<u>Sample</u>	<u>Design</u>	<u>Measures</u>	<u>Outcome</u>	<u>Follow up</u>
Shertz & Odom (2007)	<p><u>Age of children:</u> 22 to 33 months</p> <p><u>Number of participants:</u> 3 parent-child dyads</p> <p><u>Gender of children:</u> 3 boys</p>	<p><u>Design:</u> Multiple baseline across behaviours design</p> <p><u>Intervention:</u> Joint Attention Mediated Learning (JAML).</p> <p><u>Delivery:</u> Individual format (parent and child)</p> <p><u>Sessions:</u> Number of sessions ranged from 11-16 (weekly). Duration ranged from 9-26 weeks.</p>	<p>Measures were taken across the intervention and follow up.</p> <p>Interval recording method used to record occurrence of targeted outcomes at 10 second intervals.</p>	<p>For child 1, there was no effect (0%) of the joint attention intervention on response to joint attention and no effect (0%) on initiation of joint attention – derived from Percentage of Non-overlapping Data (PND). For child 2, there was a small effect (64%) on response and a medium effect on initiation (71%). For child 3, there was a medium effect (88%) on response and a large effect (100%) on initiation.</p>	<p>The effects of the joint attention intervention on response and initiation of joint attention was maintained at the 5-week follow up for child 2 and 3, as demonstrated by the mean performance scores.</p>
Rocha, Schreibman & Stahmer (2007)	<p><u>Age of children:</u> 26 to 42 months</p> <p><u>Number of participants:</u> 3 parent – child dyads</p>	<p><u>Design:</u> Multiple baseline across participants design</p> <p><u>Intervention:</u> Joint attention training - using Discrete Trial Training (DTT)</p>	<p><u>Measures:</u> <i>Unstructured Joint Attention Assessment</i> (an adaptation of the joint attention assessment used by Loveland and Landry, 1986).</p>	<p>For child 1, there was a medium effect (75%) of the joint attention intervention on response to joint attention – derived from Percentage of Non-overlapping Data (PND). For child 2, there was no effect (26%) on response to joint</p>	<p>Child 1 and 2 maintained increased rates of responding to joint attention bids at the 3-month follow up. Child 3 did not maintain any changes at follow up, as demonstrated by the mean performance scores.</p>

	<p><u>Gender of children:</u> 2 boys and 1 girl</p>	<p>and Pivotal Response Training (PRT) to teach the child to respond to joint attention bids.</p> <p><u>Delivery:</u> Individual format (parent and child)</p> <p><u>Sessions:</u> All 3 participants received at least 17 hours of intervention (51, 20 minute sessions) over 6 weeks.</p>	<p>Measures were taken across the intervention and follow up.</p> <p>Interval recording method used to record occurrence of targeted outcomes at 30 second intervals.</p>	<p>attention. For child 3, there was no effect (39%) on response to joint attention.</p>	
Qian, C. M. (2010)	<p><u>Age of children:</u> 2 years, 10 months to 4 years, 9 months.</p> <p><u>Number of participants:</u> 3 parent-child dyads</p> <p><u>Gender of children:</u></p>	<p><u>Design:</u> Multiple baseline across participants design</p> <p><u>Intervention:</u> Initiating Joint Attention (IJA) intervention.</p> <p><u>Delivery:</u> Individual format (parent and child)</p> <p><u>Sessions:</u> Sessions carried</p>	<p>Measures were taken across the intervention and follow up.</p> <p>Occurrences of IJA recorded by parents using recording sheet.</p>	<p>For child 1, there was a large effect (100%) of the joint attention intervention on initiation joint attention – derived from Percentage of Non-overlapping Data (PND). For child 2, there was a medium effect (83%) on joint attention initiation. For child 3, there was a medium effect (77%) on joint attention initiation.</p>	<p>Child 1 maintained IJA at a 32 day follow up (independent IJA = 75%). Child 2 did not maintain IJA at a 25 day follow up (independent IJA = 25%). Child 3 did maintain IJA at a 13 day follow up (independent IJA = 75%).</p>

	3 boys	out across four regular routines in the home. Sessions continue until child has achieved 'mastery in IJA'.			
Klass, A. V. (2012)	<p><u>Age of children:</u> 22 to 27 months.</p> <p><u>Number of participants:</u> 5 parent-child dyads</p> <p><u>Gender of children:</u> 5 boys</p>	<p><u>Design:</u> Multiple baseline across targeted outcomes.</p> <p><u>Intervention:</u> Joint Attention Mediated Learning (JAML).</p> <p><u>Delivery:</u> Individual format (parent and child)</p> <p><u>Sessions:</u> 30 minutes to an hour daily.</p>	<p>Researcher developed observational coding scheme called the Caregiver-Child Joint Attention (CCJA) Coding System.</p> <p>Measures were taken across the intervention and follow up.</p> <p>10-15 minute video recorded parent-child interaction sessions were taken weekly and coded.</p>	<p>For child 1, there was a medium effect (83%) of the joint attention intervention on response to joint attention and a medium effect (83%) on initiation of joint attention – derived from Percentage of Non-overlapping Data (PND). For child 2, there was a large effect (92%) on response and a medium effect on initiation (75%). For child 3, there was a medium effect (75%) on response and no effect (0%) on initiation. For child 4, there was a small effect (67%) on response and a small effect on initiation (67%). For child 5, there was no effect (17%) on response and a small effect (67%) on initiation.</p>	None

Kasari, Gulsrud, Wong, Kwon, & Locke (2010)	<p><u>Age of children:</u> 21 to 36 months.</p> <p><u>Number of participants:</u> 38 caregiver-child dyads (intervention group = 19).</p> <p><u>Gender of children:</u> Intervention group = 15 boys and 4 girls. Control group = 14 boys and 5 girls.</p>	<p><u>Design:</u> RCT</p> <p><u>Intervention:</u> Mediated Joint Engagement</p> <p><u>Delivery:</u> Individual format (parent and child)</p> <p><u>Sessions:</u> 24 sessions (3 sessions per week for 8 weeks).</p>	<p>Videotapes were coded for the percentage of time in engagement between caregiver and child.</p> <p>Coding system has been shown to be reliable in previous research (Kasari et al. 2006)</p>	<p>The intervention group showed significant improvements in response to joint attention compared to the control group ($p < 0.05$). Effect size 0.87 (large).</p> <p>There was no improvement in initiation of joint attention for the intervention group.</p>	<p>Improvements were maintained at a 1 year follow up for response to joint attention ($p > 0.05$).</p>
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Appendix 5

Weighting of Studies

A: Methodological Quality

The score for methodological quality (WoE A) is based on the rating given to each of the studies according to the coding protocol for single-participant design (Horner, 2005) and the coding protocol for group design (Kratochwill, 2003). The coding protocols enable the coder to rate the methodological quality of a study according to features such as reliability and validity of measurement, baseline quality and implementation fidelity.

Each section was rated numerically from 0-3 with a score of '0' indicating no evidence, '1' indicating 'weak evidence', '2' indicating 'promising evidence' and '3' indicating 'strong evidence'. The weightings from each section were then averaged to give an overall measure of methodological quality.

To receive a 'High' weighting for 'methodological quality' a study must receive an average rating of 2.5 or above.

To receive a 'Medium' weighting for 'methodological quality' a study must receive an average rating between 1.5 and 2.4.

To receive a 'Low' weighting for methodological quality a study must receive an average rating of 1.4 or below.

Note: If the criteria for a low weighting are not met, a score of 0 (no evidence) is awarded.

Summary of WoE A ratings according to the coding protocols

Group Design Protocol

Study	Measures	Educational significance	Identifiable Components	Comparison Group	Implementation Fidelity	Replication	Site of Implementation	Follow-up	WoE A
Kasari et al. (2010)	2	2	2	2	2	1	0	2	1.6

Single Participant Design Protocol

Study	Description of Participants and Settings	Dependent Variable	Independent Variable	Baseline	Experimental control/internal validity	Social validity	WoE A
Shertz & Odom (2007)	2	3	2	2	2	2	2.2
Rocha et al. (2007)	2	3	3	3	2	3	2.7
Qian (2010)	3	3	3	3	2	3	2.8
Klass (2012)	2	3	2	3	1	3	2.3

B: Methodological Relevance

Methodological relevance (WoE B) considers whether the methodological design was suitable for evaluating the effectiveness of joint attention interventions on children with ASD. For WoE B, criteria are based on evidence hierarchies (Brannan, 1992). These hierarchies typically place studies such as randomised control trials and those with minimal threats to internal validity at the top (e.g. active comparison group), whilst those with high threats to internal validity (e.g. no control group) and single case study designs are placed lower down.

In order to receive a 'High' weighting for methodological the study must have a **group design**. It must be a randomised control trial and have an active comparison group, outcome data collected pre and post intervention, and follow up data collected.

In order to receive a 'Medium' weighting for methodological relevance the **single case design studies** must have made use of a multiple baseline across participants design or included at least three attempts to demonstrate intervention effect (Horner et al., 2005). The study must have included generalisation and maintenance or follow up sessions with at least three data points for each phase. The **group design studies** must have a control group (waitlist/ no treatment) and outcome data collected pre and post intervention. There will be a follow up. There may be random allocation to groups.

In order to receive a 'Low' weighting for methodological relevance the **single case design study** may not have demonstrated intervention effect three times. Generalisation or maintenance data may not be included, or may be less than three data points. There will be no follow up. The **group design study** will have no control group. There may be no pre and post outcome measures or no follow up.

Note: If the criteria for a low weighting are not met, a score of 0 (no evidence) is awarded.

C: Topic Relevance

Topic relevance (WoE C) considers the extent to which the study, and its findings contribute towards answering the review question.

In order to receive a 'High' weighting for relevance the study must have met all of the following criteria. Fidelity of implementation assessed. The joint attention programme is fully described, including parent training and delivery. Outcome measures have been collected on both response to and initiation of joint attention. Studies have a small age range of participants (within a year of each other), as they will be more focused and results will be more generalisable to other children of that age group.

In order to receive a 'Medium' weighting for relevance the study must have met the following criteria. Fidelity of implementation may have been assessed. The joint attention programme will have been described, but full details may not have been provided. Studies will have outcomes on initiation of joint attention, as these results

will be more generalisable due to the child learning how to initiate joint attention, rather than responding to the joint attention bids of a trained parent/carer.

In order to receive a 'Low' weighting for relevance, the study must have met the following criteria. Fidelity of implementation may have been assessed. The joint attention programme will have been described, but full details may not have been provided. Studies will have outcomes on response to joint attention bids from a trained parent/carer.

Note: If the criteria for a low weighting are not met, a score of 0 (no evidence) is awarded.

D. Overall Weight of Evidence

Using the criteria outlined above, each of the 5 studies was given a weighting for WoE A, B and C: 3 'High', 2 'Medium', or 1 'Low'.

These scores were then averaged to provide each study with an overall weight of evidence score (WoE D).

To receive a 'High' overall weighting a study must receive an average score of at least 2.5.

To receive a 'Medium' overall weighting a study must receive an average score of between 1.5 and 2.4.

To receive a 'Low' overall weighting a study must receive an average score of less than 1.4.

Appendix 6: Coding protocols

- *Single case design*: Horner, R. H., Carr, E. G., Halle, J., McGee, G., Odom, S., & Wolery, M. (2005). The use of single-subject research to identify evidence-based practice in special education. *Exceptional Children*, 71(2), 165-179.

Study ID Number: 1
Research Design: Single Case

Name of Coder:

Date:

Full Study Reference in proper format:

Intervention Name (description of study):

Type of publication

- Book/Monograph
- Journal Article
- Book Chapter
- Other (specify):

Description of Participants and Settings

Participants are described with sufficient detail to allow others to select individuals with similar characteristics (e.g. age, gender, disability, diagnosis)

- Yes The participants are 3 children with ASD and their mothers
- No
- N/A
- Unknown/unable to code

The process for selecting participants is described with replicable precision

- Yes
- No
- N/A
- Unknown/unable to code

Critical features of the physical setting are described with sufficient precision to allow replication

- Yes
- No Intervention was carried out in the participants homes. The specific environments were not described.

N/A

Unknown/unable to code

Overall rating of evidence: 2 - This score was given as the participants and selection procedure were explained, but there was no description of the specific conditions under which the intervention took place.

Dependent Variable

Dependent variables are described with operational precision

Yes A clear definition for the four targeted outcomes were reported.

No

N/A

Unknown/unable to code

Each dependent variable is measured with a procedure that generates a quantifiable index

Yes Occurance of targeted outcomes were coded according to coding criteria.

No

N/A

Unknown/unable to code

Measurement of the dependant variable is valid and described with replicable precision

Yes Interval recording method used at 10 second intervals.

No

N/A

Unknown/unable to code

Dependent variables are measured repeatedly over time

Yes DV measured at baseline, throughout intervention and at follow up.

No

N/A

Unknown/unable to code

Data are collected on the reliability or inter-observer agreement associated with each dependent

Yes The inter-observer agreement (Kappa) was calculated for all 4 phases of intervention (ranging from 0.80 - 0.87), with a mean Kappa agreement of 0.84.

No

N/A

Unknown/unable to code

Overall rating of evidence: 3 - This score was given as there was a clear operationalized definition given for each DV. Each DV was also quantifiable, 3+ data points were recorded and and inter-rater reliability was high (kappa higher than 60%).

Independent Variable

Independent variable is described with replicable precision

Yes Parent learning (based on the Joint Attention Mediated Learning manual) and intervention described.

- No
- N/A
- Unknown/unable to code

Independent variable is systematically manipulated and under the control of the experimenter

- Yes Intervention manipulated so that phases are delivered in sequence.
- No
- N/A
- Unknown/unable to code

Overt measurement of the fidelity of implementation for the independent variable is highly desirable

- Yes Fidelity of intervention measures were carried out, however only 2 out of the 3 parent-child dyads were found to show close fidelity with the intervention plans.
- No
- N/A
- Unknown/unable to code

Overall rating of evidence: 2 - This score was given as, although a structured programme is outlined, there is variability in how closely the parents adhered to the phases of intervention.

Baseline

The design provides a baseline phase that gives repeated measurements (3+) of a dependent variable

- Yes There are 3+ measurements of the DV at baseline.
- No
- N/A
- Unknown/unable to code

Baseline conditions are described with replicable precision

- Yes
- No Baseline period referred to, but not described.
- N/A
- Unknown/unable to code

Overall rating of evidence: 2 - This score was given as a sufficient number of data points were collected at baseline, however the baseline conditions were not explained.

Experimental control/internal validity

The design provides at least three demonstrations of experimental effect at three different points in time

- Yes This study had a multiple baseline design, the staggered implementation of the intervention demonstrated 3+ examples of experimental effect.
- No
- N/A

Unknown/unable to code

The design controls for common threats to internal validity (e.g. permits elimination of rival hypotheses)

Yes

No The programme was not delivered consistently to the children by parents, and the study was implemented and reported by a single researcher.

N/A

Unknown/unable to code

The results document a pattern that demonstrates experimental control

Yes There was little overlap between baseline and intervention conditions in the 2 cases that showed high fidelity to the implementation programme.

No

N/A

Unknown/unable to code

Overall rating of evidence: 2 - This score was given as experimental effect was demonstrated, however possible extraneous variables may be impacting upon results.

Social validity

Experimental effects are replicated across participants, settings, or materials to establish external validity

Yes 2 out of the 3 children showed improvements in responding to joint attention and initiating joint attention.

No

N/A

Unknown/unable to code

The dependent variable is socially important

Yes Disruption in the development in joint attention is unique to autism, and is one of the earliest markers of ASD in

No toddlers. This research aims to improve joint attention.

N/A

Unknown/unable to code

Implementation of the independent variable is practical and cost effective

Yes

No

N/A

Unknown/unable to code

The magnitude of change in the dependent variable resulting from the intervention is socially important

Yes

No

N/A

Unknown/unable to code

Social validity is enhanced by implementation of the independent variable over extended time periods, by typical intervention agents, in typical physical and social contexts

Yes

No

N/A

Unknown/unable to code

Overall rating of evidence:

Average WoE A across the 6 judgement areas: Sum of X / N =

X = individual quality rating for each judgement area

N = number of judgement areas

Overall rating of evidence:

Coding Protocol: Group-Based Design

- Domain:
- School- and community-based intervention programs for social and behavioral problems
 - Academic intervention programs
 - Family and parent intervention programs
 - School-wide and classroom-based programs
 - Comprehensive and coordinated school health services

Name of Coder(s): _____

Date: _____

M / D / Y

Full Study Reference in APA format: _____

Intervention Name (description from study): _____

Study ID Number (Unique Identifier): _____

Type of Publication: (Check one)

- Book/Monograph
- Journal article
- Book chapter
- Other (specify):

I. General Characteristics

A. General Design Characteristics

A1. Random assignment designs (if random assignment design, select one of the following)

- A1.1 Completely randomized design
- A1.2 Randomized block design (between-subjects variation)
- A1.3 Randomized block design (within-subjects variation)
- A1.4 Randomized hierarchical design

A2. Nonrandomized designs (if nonrandom assignment design, select one of the following)

- A2.1 Nonrandomized design
- A2.2 Nonrandomized block design (between-participants variation)
- A2.3 Nonrandomized block design (within-participants variation)
- A2.4 Nonrandomized hierarchical design
- A2.5 Optional coding of Quasi-experimental designs (see Appendix C)

A3. Overall confidence of judgment on how participants were assigned (select one of the following)

- A3.1 Very low (little basis)
- A3.2 Low (guess)
- A3.3 Moderate (weak inference)
- A3.4 High (strong inference)
- A3.5 Very high (explicitly stated)
- A3.6 N/A
- A3.7 Unknown/unable to code

B. Statistical Treatment/Data Analysis (answer B1 through B6)

- B1. Appropriate unit of analysis yes no
- B2. Familywise error rate controlled yes no N/A
- B3. Sufficiently large *N* yes no

Statistical Test: _____
 _ level: _____
 ES: _____
N required: _____

Medium chosen as the researchers have not stated what effect size they were looking for.

B4. Total size of sample (start of the study): _____
N

B5. Intervention group sample size: _____
N

B6. Control group sample size: _____
N

~~For studies using qualitative research methods, code B7 and B8~~

Section removed due to no qualitative data.

~~B7. Coding~~

~~B7.1 Coding scheme linked to study's theoretical-empirical basis (select one) yes no~~

~~B7.2 Procedures for ensuring consistency of coding are used (select one) yes no~~

~~Describe procedures: _____~~

~~B7.3 Progression from abstract concepts to empirical exemplars is clearly articulated (select one) yes no~~

~~B8. Interactive process followed (select one) yes no~~

~~Describe process: _____~~

C. Type of Program (select one)

- C1. Universal prevention program
- C2. Selective prevention program
- C3. Targeted prevention program
- C4. Intervention/Treatment
- C5. Unknown

D. Stage of the Program (select one)

- D1. Model/demonstration programs
- D2. Early stage programs
- D3. Established/institutionalized programs
- D4. Unknown

E. Concurrent or Historical Intervention Exposure (select one)

- E1. Current exposure
- E2. Prior exposure
- E3. Unknown

II. Key Features for Coding Studies and Rating Level of Evidence/ Support

(3=Strong Evidence 2=Promising Evidence 1=Weak Evidence 0=No Evidence)

A. Measurement (answer A1 through A4)

A1. Use of outcome measures that produce reliable scores for the majority of primary outcomes. The table for Primary/Secondary Outcomes Statistically Significant allows for listing separate outcomes and will facilitate decision making regarding measurement (select one of the following)

- A1.1 Yes
 A1.2 No
 A1.3 Unknown/unable to code

A2. Multi-method (select one of the following)

- A2.1 Yes
 A2.2 No
 A2.3 N/A
 A2.4 Unknown/unable to code

A3. Multi-source (select one of the following)

- A3.1 Yes
 A3.2 No
 A3.3 N/A
 A3.4 Unknown/unable to code

A4. Validity of measures reported (select one of the following)

- A5.1 Yes validated with specific target group
 A5.2 In part, validated for general population only
 A5.3 No
 A5.4 Unknown/unable to code

Rating for Measurement (select 0, 1, 2, or 3): 3 2 1 0

B. Comparison Group

B1. Type of Comparison Group (select one of the following)

- B1.1 Typical contact
 B1.2 Typical contact (other) specify:
 B1.3 Attention placebo
 B1.4 Intervention elements placebo
 B1.5 Alternative intervention
 B1.6 Pharmacotherapy
 B1.7 No intervention
 B1.8 Wait list/delayed intervention
 B1.9 Minimal contact
 B1.10 Unable to identify comparison group

Rating for Comparison Group (select 0, 1, 2, or 3): 3 2 1 0

B2. Overall confidence rating in judgment of type of comparison group (select one of the following)

- B2.1 Very low (little basis)
- B2.2 Low (guess)
- B2.3 Moderate (weak inference)
- B2.4 High (strong inference)
- B2.5 Very high (explicitly stated)
- B2.6 Unknown/Unable to code

B3. Counterbalancing of Change Agents (answer B3.1 to B3.3)

- B3.1 By change agent
- B3.2 Statistical
- B3.3 Other

B4. Group Equivalence Established (select one of the following)

- B4.1 Random assignment
- B4.2 Posthoc matched set
- B4.3 Statistical matching
- B4.4 Post hoc test for group equivalence

B5. Equivalent Mortality (answer B5.1 through B5.3)

- B5.1 Low Attrition (less than 20% for Post)
- B5.2 Low Attrition (less than 30% for follow-up)
- B5.3 Intent to intervene analysis carried out
Findings _____

~~**C. Primary/Secondary Outcomes Are Statistically Significant**~~

Section removed due to lack of relevance to research question.
Question focuses on effect size of Primary outcome measures.

~~C1. Evidence of appropriate statistical analysis for **primary outcomes** (answer C1.1 through C1.3)~~

- ~~C1.1 Appropriate unit of analysis (rate from previous code)~~
- ~~C1.2 Familywise/experimenterwise error rate controlled when applicable (rate from previous code)~~
- ~~C1.3 Sufficiently large N (rate from previous code)~~

~~G2. Percentage of **primary outcomes** that are significant (select one of the following)~~

- ~~G2.1 Significant primary outcomes for at least 75% of the total primary outcome measures for each key construct~~
- ~~G2.2 Significant primary outcomes for between 50% and 74% of the total primary outcome measures for each key construct~~
- ~~G2.3 Significant primary outcomes for between 25% and 49% of the total primary outcome measures for any key construct~~

~~**Rating for Primary Outcomes Statistically Significant** (select 0, 1, 2, or 3): 3 2 1 0~~

~~C3. Evidence of appropriate statistical analysis for **secondary outcomes** (answer C3.1 through C3.3)~~

- ~~C3.1 Appropriate unit of analysis~~
- ~~C3.2 Familywise/experimenterwise error rate controlled when applicable (rate from previous code)~~

~~C3.3~~ Sufficiently large *N* (rate from previous code)

~~C4. Percentage of secondary outcomes that are significant (select one of the following)~~

~~C4.1~~ Significant secondary outcomes for at least 75% of the total secondary outcome measures for each key construct

~~C4.2~~ Significant secondary outcomes for between 50% and 74% of the total secondary outcome measures for each key construct

~~C4.3~~ Significant secondary outcomes for between 25% and 49% of the total secondary outcome measures for any key construct

~~Rating for Secondary Outcomes Statistically Significant (select 0, 1, 2, or 3):~~ 3 2 1 0

~~C5. Overall Summary of Questions Investigated~~

~~C5.1 Main effect analyses conducted (select one) yes no~~

~~C5.2 Moderator effect analyses conducted (select one) yes no~~

~~Specify results: _____~~

~~C5.3 Mediator analyses conducted (select one) yes no~~

~~Specify results: _____~~

~~C. Primary/Secondary Outcomes Statistically Significant (only list $p \leq .05$)~~

~~(list primary outcomes first in alphabetical order, followed by secondary outcomes in alphabetical order)~~

Outcomes	Primary vs. Secondary	Who Changed	What Changed	Source	Treatment Information	Outcome Measure Used	Reliability	ES	(1-)
Outcome #1:	<input type="checkbox"/> Primary <input type="checkbox"/> Secondary <input type="checkbox"/> Unknown	<input type="checkbox"/> Child <input type="checkbox"/> Teacher <input type="checkbox"/> Parent/sign. adult <input type="checkbox"/> Ecology <input type="checkbox"/> Other <input type="checkbox"/> Unknown	<input type="checkbox"/> Behavior <input type="checkbox"/> Attitude <input type="checkbox"/> Knowledge <input type="checkbox"/> Other <input type="checkbox"/> Unknown	<input type="checkbox"/> Self-Report <input type="checkbox"/> Parent Report <input type="checkbox"/> Teacher Report <input type="checkbox"/> Observation <input type="checkbox"/> Test <input type="checkbox"/> Other <input type="checkbox"/> Unknown					
Outcome #2	<input type="checkbox"/> Primary <input type="checkbox"/> Secondary <input type="checkbox"/> Unknown	<input type="checkbox"/> Child <input type="checkbox"/> Teacher <input type="checkbox"/> Parent/sign. Adult <input type="checkbox"/> Ecology <input type="checkbox"/> Other <input type="checkbox"/> Unknown	<input type="checkbox"/> Behavior <input type="checkbox"/> Attitude <input type="checkbox"/> Knowledge <input type="checkbox"/> Other <input type="checkbox"/> Unknown	<input type="checkbox"/> Self-Report <input type="checkbox"/> Parent Report <input type="checkbox"/> Teacher Report <input type="checkbox"/> Observation <input type="checkbox"/> Test <input type="checkbox"/> Other <input type="checkbox"/> Unknown					
Outcome #3:	<input type="checkbox"/> Primary <input type="checkbox"/> Secondary <input type="checkbox"/> Unknown	<input type="checkbox"/> Child <input type="checkbox"/> Teacher <input type="checkbox"/> Parent/sign. Adult <input type="checkbox"/> Ecology <input type="checkbox"/> Other <input type="checkbox"/> Unknown	<input type="checkbox"/> Behavior <input type="checkbox"/> Attitude <input type="checkbox"/> Knowledge <input type="checkbox"/> Other <input type="checkbox"/> Unknown	<input type="checkbox"/> Self-Report <input type="checkbox"/> Parent Report <input type="checkbox"/> Teacher Report <input type="checkbox"/> Observation <input type="checkbox"/> Test <input type="checkbox"/> Other <input type="checkbox"/> Unknown					
Outcome #4:	<input type="checkbox"/> Primary <input type="checkbox"/> Secondary <input type="checkbox"/> Unknown	<input type="checkbox"/> Child <input type="checkbox"/> Teacher <input type="checkbox"/> Parent/sign. Adult <input type="checkbox"/> Ecology <input type="checkbox"/> Other <input type="checkbox"/> Unknown	<input type="checkbox"/> Behavior <input type="checkbox"/> Attitude <input type="checkbox"/> Knowledge <input type="checkbox"/> Other <input type="checkbox"/> Unknown	<input type="checkbox"/> Self-Report <input type="checkbox"/> Parent Report <input type="checkbox"/> Teacher Report <input type="checkbox"/> Observation <input type="checkbox"/> Test <input type="checkbox"/> Other <input type="checkbox"/> Unknown					
Outcome #5:	<input type="checkbox"/> Primary <input type="checkbox"/> Secondary <input type="checkbox"/> Unknown	<input type="checkbox"/> Child <input type="checkbox"/> Teacher <input type="checkbox"/> Parent/sign. Adult <input type="checkbox"/> Ecology <input type="checkbox"/> Other <input type="checkbox"/> Unknown	<input type="checkbox"/> Behavior <input type="checkbox"/> Attitude <input type="checkbox"/> Knowledge <input type="checkbox"/> Other <input type="checkbox"/> Unknown	<input type="checkbox"/> Self-Report <input type="checkbox"/> Parent Report <input type="checkbox"/> Teacher Report <input type="checkbox"/> Observation <input type="checkbox"/> Test <input type="checkbox"/> Other <input type="checkbox"/> Unknown					

Null Findings/Negative Outcomes Associated with the Intervention (listed alphabetically by outcome)

Outcomes	Primary vs. Secondary	Who Was Targeted for Change	What Was Targeted for Change	Source	Note null/negative outcomes	Outcome Measure Used	Reliability	ES
Outcome #1:	<input type="checkbox"/> Primary <input type="checkbox"/> Secondary <input type="checkbox"/> Unknown	<input type="checkbox"/> Child <input type="checkbox"/> Teacher <input type="checkbox"/> Parent/sign. Adult <input type="checkbox"/> Ecology <input type="checkbox"/> Other <input type="checkbox"/> Unknown	<input type="checkbox"/> Behavior <input type="checkbox"/> Attitude <input type="checkbox"/> Knowledge <input type="checkbox"/> Other <input type="checkbox"/> Unknown	<input type="checkbox"/> Self Report <input type="checkbox"/> Parent Report <input type="checkbox"/> Teacher Report <input type="checkbox"/> Observation <input type="checkbox"/> Test <input type="checkbox"/> Other <input type="checkbox"/> Unknown				
Outcome #2	<input type="checkbox"/> Primary <input type="checkbox"/> Secondary <input type="checkbox"/> Unknown	<input type="checkbox"/> Child <input type="checkbox"/> Teacher <input type="checkbox"/> Parent/sign. Adult <input type="checkbox"/> Ecology <input type="checkbox"/> Other <input type="checkbox"/> Unknown	<input type="checkbox"/> Behavior <input type="checkbox"/> Attitude <input type="checkbox"/> Knowledge <input type="checkbox"/> Other <input type="checkbox"/> Unknown	<input type="checkbox"/> Self Report <input type="checkbox"/> Parent Report <input type="checkbox"/> Teacher Report <input type="checkbox"/> Observation <input type="checkbox"/> Test <input type="checkbox"/> Other <input type="checkbox"/> Unknown				
Outcome #3:	<input type="checkbox"/> Primary <input type="checkbox"/> Secondary <input type="checkbox"/> Unknown	<input type="checkbox"/> Child <input type="checkbox"/> Teacher <input type="checkbox"/> Parent/sign. Adult <input type="checkbox"/> Ecology <input type="checkbox"/> Other <input type="checkbox"/> Unknown	<input type="checkbox"/> Behavior <input type="checkbox"/> Attitude <input type="checkbox"/> Knowledge <input type="checkbox"/> Other <input type="checkbox"/> Unknown	<input type="checkbox"/> Self Report <input type="checkbox"/> Parent Report <input type="checkbox"/> Teacher Report <input type="checkbox"/> Observation <input type="checkbox"/> Test <input type="checkbox"/> Other <input type="checkbox"/> Unknown				
Outcome #4:	<input type="checkbox"/> Primary <input type="checkbox"/> Secondary <input type="checkbox"/> Unknown	<input type="checkbox"/> Child <input type="checkbox"/> Teacher <input type="checkbox"/> Parent/sign. Adult <input type="checkbox"/> Ecology <input type="checkbox"/> Other <input type="checkbox"/> Unknown	<input type="checkbox"/> Behavior <input type="checkbox"/> Attitude <input type="checkbox"/> Knowledge <input type="checkbox"/> Other <input type="checkbox"/> Unknown	<input type="checkbox"/> Self Report <input type="checkbox"/> Parent Report <input type="checkbox"/> Teacher Report <input type="checkbox"/> Observation <input type="checkbox"/> Test <input type="checkbox"/> Other <input type="checkbox"/> Unknown				
Outcome #5:	<input type="checkbox"/> Primary <input type="checkbox"/> Secondary <input type="checkbox"/> Unknown	<input type="checkbox"/> Child <input type="checkbox"/> Teacher <input type="checkbox"/> Parent/sign. Adult <input type="checkbox"/> Ecology <input type="checkbox"/> Other <input type="checkbox"/> Unknown	<input type="checkbox"/> Behavior <input type="checkbox"/> Attitude <input type="checkbox"/> Knowledge <input type="checkbox"/> Other <input type="checkbox"/> Unknown	<input type="checkbox"/> Self Report <input type="checkbox"/> Parent Report <input type="checkbox"/> Teacher Report <input type="checkbox"/> Observation <input type="checkbox"/> Test <input type="checkbox"/> Other <input type="checkbox"/> Unknown				

Type of Data Effect Size is Based On	Confidence Rating in ES Computation
(check all that apply) <input type="checkbox"/> Means and SDs <input type="checkbox"/> <i>t</i> - value or <i>F</i> - value <input type="checkbox"/> Chi-square (<i>df</i> = 1) <input type="checkbox"/> Frequencies or proportions (dichotomous) <input type="checkbox"/> Frequencies or proportions (polytomous) <input type="checkbox"/> Other (specify): <input type="checkbox"/> Unknown	(select one of the following) <input type="checkbox"/> Highly estimated (e.g., only have <i>N p</i> value) <input type="checkbox"/> Moderate estimation (e.g., have complex but complete statistics) <input type="checkbox"/> Some estimation (e.g., unconventional statistics that require conversion) <input type="checkbox"/> Slight estimation (e.g., use significance testing statistics rather than descriptives) <input type="checkbox"/> No estimation (e.g., all descriptive data is present)

D. Educational/Clinical Significance

Outcome Variables:	Pretest	Posttest	Follow Up
D1. Categorical Diagnosis Data	Diagnostic information regarding inclusion into the study presented: <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Unknown	Positive change in diagnostic criteria from pre to posttest: <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Unknown	Positive change in diagnostic criteria from posttest to follow up: <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Unknown
D2. Outcome Assessed via continuous Variables		Positive change in percentage of participants showing clinical improvement from pre to posttest: <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Unknown	Positive change in percentage of participants showing clinical improvement from posttest to follow up: <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Unknown
D3. Subjective Evaluation: The importance of behavior change is evaluated by individuals in direct contact with the participant.	Importance of behavior change is evaluated: <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Unknown	Importance of behavior change from pre to posttest is evaluated positively by individuals in direct contact with the participant: <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Unknown	Importance of behavior change from posttest to follow up is evaluated positively by individuals in direct contact with the participant: <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Unknown
D4. Social Comparison: Behavior of participant at pre, post, and follow up is compared to normative data (e.g., a typical peer).	Participant's behavior is compared to normative data <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Unknown	Participant's behavior has improved from pre to posttest when compared to normative data: <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Unknown	Participant's behavior has improved from posttest to follow up when compared to normative data: <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Unknown

Rating for Educational/Clinical Significance (select 0, 1, 2, or 3): 3 2 1 0

E. Identifiable Components (answer E1 through E7)

E1. Evidence for primary outcomes (rate from previous code): 3 2 1 0

E2. Design allows for analysis of identifiable components (select one) yes no

E3. Total number of components: $\frac{1}{N}$ Parent component

E4. Number of components linked to primary outcomes: 1
N

Additional criteria to code descriptively:

E5. Clear documentation of essential components (select one) yes no

E6. Procedures for adapting the intervention are described in detail (select one) yes no

E7. Contextual features of the intervention are documented (select one) yes no

Rating for Identifiable Components (select 0, 1, 2, or 3): 3 2 1 0

F. Implementation Fidelity

F1. Evidence of Acceptable Adherence (answer F1.1 through F1.3)

F1.1 Ongoing supervision/consultation

F1.2 Coding intervention sessions/lessons or procedures

F1.3 Audio/video tape implementation (select F1.3.1 or F1.3.2):

F1.3.1 Entire intervention

F1.3.2 Part of intervention

F2. Manualization (select all that apply)

F2.1 Written material involving a detailed account of the exact procedures and the sequence in which they are to be used

F2.2 Formal training session that includes a detailed account of the exact procedures and the sequence in which they are to be used

F2.3 Written material involving an overview of broad principles and a description of the intervention phases

F2.4 Formal or informal training session involving an overview of broad principles and a description of the intervention phases

F3. Adaptation procedures are specified (select one) yes no unknown

Rating for Implementation Fidelity (select 0, 1, 2, or 3): 3 2 1 0

G. Replication (answer G1, G2, G3, and G4)

G1. Same Intervention

G2. Same Target Problem

G3. Independent evaluation

Rating for Replication (select 0, 1, 2, or 3): 3 2 1 0

H. Site of Implementation

H1. School (if school is the site, select one of the following options)

H1.1 Public

- H1.2 Private
- H1.3 Charter
- H1.4 University Affiliated
- H1.5 Alternative
- H1.6 Not specified/unknown

H2. Non School Site (if it is a non school site, select one of the following options)

- H2.1 Home
- H2.2 University Clinic
- H2.3 Summer Program
- H2.4 Outpatient Hospital
- H2.5 Partial inpatient/day Intervention Program
- H2.6 Inpatient Hospital
- H2.7 Private Practice
- H2.8 Mental Health Center
- H2.9 Residential Treatment Facility
- H2.10 Other (specify): _____
- H2.11 Unknown/insufficient information provided

Rating for Site of Implementation (select 0, 1, 2, or 3): 3 2 1 0

I. Follow Up Assessment

- Timing of follow up assessment: specify _____
- Number of participants included in the follow up assessment: specify _____
- Consistency of assessment method used: specify _____

Rating for Follow Up Assessment (select 0, 1, 2, or 3): 3 2 1 0

III. Other Descriptive or Supplemental Criteria to Consider

A. External Validity Indicators

- A1. Sampling procedures described in detail yes no
 Specify rationale for selection: _____
 Specify rationale for sample size: _____
- A1.1 Inclusion/exclusion criteria specified yes no
- A1.2 Inclusion/exclusion criteria similar to school practice yes no
- A1.3 Specified criteria related to concern yes no

A2. Participant Characteristics Specified for Treatment and Control Group

Participants from Treatment Group	Grade/age	Gender	Ethnicity or Multi-ethnic	Ethnic Identity	Race(s)	Acculturation	Pri - mary Lan- guage	SES	Family Struc- ture	Locale	Disability	Functional Descriptors
<input type="checkbox"/> Child/Student <input type="checkbox"/> Parent/caregiver <input type="checkbox"/> Teacher <input type="checkbox"/> School <input type="checkbox"/> Other												
<input type="checkbox"/> Child/Student <input type="checkbox"/> Parent/caregiver <input type="checkbox"/> Teacher <input type="checkbox"/> School <input type="checkbox"/> Other												
<input type="checkbox"/> Child/Student <input type="checkbox"/> Parent/caregiver <input type="checkbox"/> Teacher <input type="checkbox"/> School <input type="checkbox"/> Other												
<input type="checkbox"/> Child/Student <input type="checkbox"/> Parent/caregiver <input type="checkbox"/> Teacher <input type="checkbox"/> School <input type="checkbox"/> Other												

Participants from Control Group	Grade/age	Gender	Ethnicity or Multi-ethnic	Ethnic Identity	Race(s)	Acculturation	Pri - mary Lan- guage	SES	Family Struc- ture	Locale	Disability	Functional Descriptors
<input type="checkbox"/> Child/Student <input type="checkbox"/> Parent/caregiver <input type="checkbox"/> Teacher <input type="checkbox"/> School <input type="checkbox"/> Other												
<input type="checkbox"/> Child/Student <input type="checkbox"/> Parent/caregiver <input type="checkbox"/> Teacher <input type="checkbox"/> School <input type="checkbox"/> Other												
<input type="checkbox"/> Child/Student <input type="checkbox"/> Parent/caregiver <input type="checkbox"/> Teacher <input type="checkbox"/> School <input type="checkbox"/> Other												
<input type="checkbox"/> Child/Student <input type="checkbox"/> Parent/caregiver <input type="checkbox"/> Teacher <input type="checkbox"/> School <input type="checkbox"/> Other												

A3. Details are provided regarding variables that:

A3.1 Have differential relevance for intended outcomes yes no

Specify: _____

A3.2 Have relevance to inclusion criteria yes no

Specify: _____

Section removed as no satisfaction information was gathered

~~A4. Receptivity/acceptance by target participant population (treatment group)~~

Participants from Treatment Group	Results (What person reported to have gained from participation in program)	General Rating
<input type="checkbox"/> Child/Student <input type="checkbox"/> Parent/caregiver <input type="checkbox"/> Teacher <input type="checkbox"/> School <input type="checkbox"/> Other		<input type="checkbox"/> Participants reported benefiting overall from the intervention <input type="checkbox"/> Participants reported not benefiting overall from the intervention
<input type="checkbox"/> Child/Student <input type="checkbox"/> Parent/caregiver <input type="checkbox"/> Teacher <input type="checkbox"/> School <input type="checkbox"/> Other		<input type="checkbox"/> Participants reported benefiting overall from the intervention <input type="checkbox"/> Participants reported not benefiting overall from the intervention
<input type="checkbox"/> Child/Student <input type="checkbox"/> Parent/caregiver <input type="checkbox"/> Teacher <input type="checkbox"/> School <input type="checkbox"/> Other		<input type="checkbox"/> Participants reported benefiting overall from the intervention <input type="checkbox"/> Participants reported not benefiting overall from the intervention

A5. Generalization of Effects:

A5.1 Generalization over time

A5.1.1 Evidence is provided regarding the sustainability of outcomes after intervention is terminated yes no

Specify: _____

A5.1.2 Procedures for maintaining outcomes are specified yes no

Specify: _____

A5.2 Generalization across settings

A5.2.1 Evidence is provided regarding the extent to which outcomes are manifested in contexts that are different from the intervention context yes no

Specify: _____

A5.2.2 Documentation of efforts to ensure application of intervention to other settings yes no

Specify: _____

A5.2.3 Impact on implementers or context is sustained yes no

Specify: _____

A5.3 Generalization across persons

Evidence is provided regarding the degree to which outcomes are manifested with participants who are different than the original group of participants for with the intervention was evaluated

yes no

Specify: _____

B. Length of Intervention (select B1 or B2)

B1. Unknown/insufficient information provided

B2. Information provided (if information is provided, specify one of the following:)

B2.1 weeks _____
N

B2.2 months _____
N

B2.3 years _____
N

B2.4 other _____
N

C. Intensity/dosage of Intervention (select C1 or C2)

C1. Unknown/insufficient information provided

C2. Information provided (if information is provided, specify both of the following:)

C2.1 length of intervention session _____
N

C2.2 frequency of intervention session _____
N

D. Dosage Response (select D1 or D2)

D1. Unknown/insufficient information provided

D2. Information provided (if information is provided, answer D2.1)

D2.1 Describe positive outcomes associated with higher dosage: _____

E. Program Implementer (select all that apply)

- E1. Research Staff
- E2. School Specialty Staff
- E3. Teachers
- E4. Educational Assistants
- E5. Parents
- E6. College Students
- E7. Peers
- E8. Other
- E9. Unknown/insufficient information provided

F. Characteristics of the Intervener

- F1. Highly similar to target participants on key variables (e.g., race, gender, SES)
- F2. Somewhat similar to target participants on key variables
- F3. Different from target participants on key variables

G. Intervention Style or Orientation (select all that apply)

- G1. Behavioral
- G2. Cognitive-behavioral
- G3. Experiential
- G4. Humanistic/interpersonal
- G5. Psychodynamic/insight oriented
- G6. other (specify): _____
- G7. Unknown/insufficient information provided

H. Cost Analysis Data (select G1 or G2)

- H1. Unknown/insufficient information provided
- H2. Information provided (if information is provided, answer H2.1)

H2.1 Estimated Cost of Implementation: _____

I. Training and Support Resources (select all that apply)

- I1. Simple orientation given to change agents
- I2. Training workshops conducted

of Workshops provided _____

Average length of training _____

Who conducted training (select all that apply)

- I2.1 Project Director
- I2.2 Graduate/project assistants

- 12.3 Other (please specify):
- 12.3 Unknown

- 13. Ongoing technical support
- 14. Program materials obtained
- 15. Special Facilities
- 16. Other (specify):

J. Feasibility

J1. Level of difficulty in training intervention agents (select one of the following)

- J1.1 High
- J1.2 Moderate
- J1.3 Low
- J1.4 Unknown

J2. Cost to train intervention agents (specify if known): _____

J3. Rating of cost to train intervention agents (select one of the following)

- J3.1 High
- J3.2 Moderate
- J3.3 Low
- J3.4 Unknown

Summary of Evidence for Group-Based Design Studies

Indicator	Overall Evidence Rating NNR = No numerical rating or 0 - 3	Description of Evidence Strong Promising Weak No/limited evidence or Descriptive ratings
General Characteristics		
General Design Characteristics		
Statistical Treatment		
Type of Program		
Stage of Program		
Concurrent/Historical Intervention Exposure		
Key Features		
Measurement		
Comparison Group		
Primary/Secondary Outcomes are Statistically Significant		
Educational/clinical significance		
Identifiable Components		
Implementation Fidelity		
Replication		
Site of Implementation		
Follow Up Assessment Conducted		

Descriptive or Supplemental Criteria		
External validity indicators		
Length of Intervention		
Intensity/dosage		
Dosage Response		
Program Implementer		
Characteristics of the Intervener		
Intervention Style/Orientation		
Cost Analysis Data Provided		
Training and Support Resources		
Feasibility		

Average WoE A across the 8 judgement areas: $\text{Sum of } X / N = 8 / 13 = 1.6$

X = individual quality rating for each judgement area

N = number of judgement areas

Overall rating of evidence: 2