

Attention Autism: An academic critique

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Abstract

Attention Autism is an intervention programme that aims to develop children's attention, connection and engagement. This critique considers the intervention from the perspectives of joint attention, social motivation and monotropism. A systematic review examines the effectiveness of Attention Autism on joint attention in pre-school and primary children from (birth to eleven). Findings from five studies are discussed. Whilst all five studies report a positive impact of the programme, issues are identified in both intervention fidelity and methodological rigour. Given these issues, it is difficult to assert confidently that positive results arose specifically from Attention Autism itself. There is a need for further, more rigorous research. Implications for professionals and future research are discussed.

Attention Autism: An academic critique

The prevalence rates of autism amongst children in the UK are increasing. A study by McConkey (2020), analysing UK school census data from 2010/11 to 2018/19, found that the recorded prevalence of autism as a special educational need in formal assessments increased by over 130% in England, Scotland, Wales and Northern Ireland. Autism is now the most commonly identified area of need for children and young people with an Education, Health and Care Plan (EHCP; the statutory plan within the English special educational needs and disabilities [SEND] system; Department for Education [DfE], 2023). Autistic children may have differences in such areas as social communication and interaction, sensory processing and anxiety (National Autistic Society, 2023). Autism is conceptualised within UK professional guidance as a diverse form of neurodivergence which can encompass a range of strengths alongside challenges which may impact learning (British Psychological Society [BPS], 2021). It is therefore important to consider ways to support autistic children to thrive in educational settings.

It is noted that individuals with autism differ in their preference for person-first (person with autism) versus identity-first (autistic person) language (BPS, 2021). Recent research with English speaking adults has found a preference for identity-first language (Keating et al., 2023; Taboas et al., 2023), and this will be used throughout this critique. It is recognised, however, that language preferences are highly personalised.

Attention Autism

The Attention Autism (AA) intervention was developed by Gina Davies, a UK speech and language therapist (SLT). It targets the development of children's attention, connection and engagement (Davies, n.d.). Although there are no published data on the prevalence of its use, practitioner reports and its frequent use in early years settings within the authors' local authorities suggest it has been increasingly adopted in practice. The central tenet of AA is that, by offering children an "irresistible invitation to learn" (Davies, n.d.), they will learn

to sustain their attention for increasing periods of time. AA involves in-person group sessions over a period of six weeks, led by a trained adult. The programme consists of four stages which progress in sequential order, starting with stage one, then stages one and two together, until all four stages are completed in one session. By the end of the intervention, it is intended that children will be able to sustain their attention for 20 minutes.

The first stage of AA centres on developing children's attention by presenting them with a bucket of motivating toys which they can watch the adult interact with but not touch; for example, toys that light-up or make a sound (Davies, n.d.). The second stage teaches children to sustain attention for longer periods by presenting a sequence which builds to an exciting finish, such as watching the adult building and then crushing a sandcastle. Stage three develops shifting attention through interactive games, where only some children in the group are active participants. The final stage aims to teach children to transition from an adult-led to an independent activity (Davies, n.d.).

School staff can learn to deliver AA by attending one of several courses offered on Gina Davies' website, costing around £295 (Davies, n.d.). There are also courses available for parents. There are five levels of training and attendance at level one, led by a licenced trainer, is required in order for adults to be able to deliver AA (Davies, n.d.). The lead author attempted to contact licenced trainers, as well as Gina Davies, to gather additional information and materials but was unsuccessful.

Theoretical underpinnings

The theoretical underpinnings of AA are not explicitly stated (Davies, n.d.) however, there are several models of relevance to the intervention.

Joint attention

One objective of AA is to develop joint attention, a skill which involves the coordination of focus with another person towards an event or object (Baldwin, 1995). In

neurotypical children, joint attention may emerge within the first 6 months (Adamson, 2014), whereas review literature suggests this skill may be more likely to be impaired or delayed in autistic children (Bruinsma et al., 2004).

Joint attention consists of two elements. The first is responding to joint attention (RJA), following the gestures of others to a shared object or activity. The second is initiating joint attention (IJA), whereby one person aims to direct the attention of another (Mundy & Newell, 2007). AA appears to promote RJA for autistic children by creating opportunities for them to focus alongside others. It has been proposed that joint attention is one of the building blocks in developing social communication and language (Toth et al., 2006), highlighting the potential impact of intervention in this area. Skills in RJA have been found to significantly predict later expressive language outcomes in infants who later receive an autism diagnosis (Adamson et al., 2019), suggesting joint attention should be supported prior to language skills. The development of attention and connection with others is central to AA (Davies, n.d.); it appears to fit well within this literature, since adults delivering the intervention must use minimal language (Davies, n.d.), reducing children's need for language skills.

Research suggests some early interventions can be effective in supporting the development of joint attention. Murza et al. (2016) conducted a review of 15 randomised controlled trial studies investigating the impact of a range of interventions on infants up to four years old and concluded these were effective in increasing joint attention. AA was not explicitly mentioned in this review, however, highlighting the need to review the literature around this specific intervention.

Social motivation

Links can also be made between AA and social motivation theory (SMT). It has been proposed that differences in social motivation might underlie some of the challenges experienced by autistic children (Chevallier et al., 2012). SMT suggests that social interaction

may be less intrinsically motivating for some autistic children (Bottini, 2018); thus in AA, motivation is increased by pairing a motivating toy with a social interaction, in line with behaviourist principles of learning (Koegel et al., 2001).

Social motivation may provide an explanation of the first three stages of the intervention. At stage three for example, only some children in the group receive a turn in the activity, and all other children must watch the child who is engaged until they have a turn (Davies, n.d.). AA pairs a motivating activity with turn-taking, with the aim of encouraging connection to others. In the final stage of AA, however, children must engage in an activity independently (Davies, n.d.), though this perhaps prepares them for classroom learning.

Monotropism

An alternative conceptualisation of autism is monotropism, which suggests autistic children have the ability to hold highly focused attention on areas or objects of interest (Murray et al., 2005). AA could be considered to connect to this theory through its focus on an object which is interesting to the child, using this as a method of building attention. Framing AA through a lens of monotropic thinking highlights the importance of basing interventions on children's strengths and interests (Leadbitter et al., 2021) in line with a neurodiversity approach (Dwyer, 2022). During the intervention, it is the responsibility of the adult to gain and sustain children's attention through the use of engaging objects and sequences (McKeown, 2015). The need to consider what will be of interest to the child is present throughout all four stages of the programme; thus, the intervention appears to align well with monotropism theory.

Impact and effectiveness

Whilst previous systematic reviews have considered the impact of a range of joint attention interventions (Murza et al., 2016), to date there has not been a review focusing solely on AA. The current paper includes a systematic review of the literature on the impact

of AA on joint attention, with a focus on the use of AA with pre-school and primary children (birth to eleven), due to the role of early joint attention in language development (Adamson et al., 2019).

Method

The research question identified was: *To what extent can Attention Autism be used to improve joint attention in pre-school and primary-aged children?* Search terms were applied to the PICOS framework (Higgins et al., 2019), shown in table A1 in Appendix A. Titles and abstracts of papers were searched using the following databases: PsycInfo, MEDLINE, CINAHAL, and ProQuest Dissertation and Thesis Global Database. Grey literature was included since this can reduce publication bias and can help to form a more balanced overview of the evidence (Paez, 2017).

This initial search identified 257 records, 19 of which were duplicates. The titles and abstracts of the remaining 238 records were screened for relevance and 33 of these were sought for retrieval, with 29 successfully accessed for screening of full text. Only one of these papers – Turner et al. (2017) – met inclusion criteria (23 did not mention Attention Autism, for example); more details on this process are provided in Appendix A. An additional 18 articles were identified through hand searching the reference lists of identified studies and by applying the search terms from table A1 to two additional websites, Scopus and Google Scholar. One of these reports could not be accessed and 13 others did not meet the inclusion criteria, resulting in the identification of four additional studies and an overall total of five studies for the final review: Buckingham (2012), Courtman (2018), Moore (2020), Turner et al. (2017) and Watson et al. (2007). Please see the appendices for full details of this search, including search strategy, quality appraisal and data extraction.

Characteristics of included studies

Only two of the studies were from peer reviewed journals (Turner et al., 2017; Watson et al., 2017). One study was co-authored by Gina Davies (Watson et al., 2017) and

another lists Davies in the acknowledgements (Buckingham, 2012). All studies reported that AA had positive outcomes on joint attention.

The studies were conducted in the United Kingdom and Ireland. Children who took part in the intervention were aged from 18 months to nine years. One study did not report demographic information (Watson et al., 2017). The selection criteria for children varied, with only three studies stating children had an autism diagnosis. In one of these studies (Moore, 2020), 40% of children had also received a diagnosis of mild or moderate learning disability, which may impact children's response to the intervention (Shaltout et al., 2020). Buckingham (2012) did not clarify whether children had a formal diagnosis. Sample sizes ranged from six to 20 children and all but one of the studies included child outcome measures. Turner and colleagues (2017) assessed the effectiveness of AA through analysis of 90 parental questionnaires.

Across the included studies, joint attention was measured using a range of observational, profile-based, and informant-report approaches. Two studies used the Attention Autism profile as an outcome measure (Buckingham, 2012; Watson et al., 2007). Observational methods were employed in several studies, including structured observations of behaviours associated with joint attention (Courtman, 2018) and event recording or interval and time-sampling procedures to measure joint engagement and joint attention (Moore, 2020; Watson et al., 2007). One study incorporated a standardised measure of early social communication, the Early Social Communication Scales (ESCS), alongside observational data (Moore, 2020). Questionnaire-based measures completed by parents and/or practitioners were also used to capture perceived changes in joint attention (Turner et al., 2017; Watson et al., 2007).

Intervention fidelity

An issue apparent across studies related to intervention fidelity. Mowbray (2003) makes a distinction between fidelity to structure, including staffing, and fidelity to process,

including delivery. AA must be delivered by a person who has been trained by an AA advanced practitioner (Davies, n.d.); this status can be gained by completing nine days of training alongside one-to-one coaching. All studies included in this review had issues with fidelity to structure regarding staffing. In two studies, the researcher, who was not an advanced practitioner, trained school staff to deliver the programme (Buckingham, 2012; Courtman, 2018). Without access to the training materials, it is difficult to ascertain whether it would have been possible for the researchers to effectively train staff and this alteration in the training process may have impacted upon intervention delivery. Two other studies described the intervention as being led by a multi-disciplinary team of professionals, such as Turner and colleagues' (2017) inclusion of a clinical psychologist, occupational therapist and speech and language therapist. This expert model is likely to be challenging for educational settings to replicate in a real-world context. Only in one study (Moore, 2020) did adults receive formal training, although it was unclear from the description whether this was the official training required to run the intervention. Overall, the studies were disadvantaged by a lack of fidelity to the AA training process, which is likely to have impacted the delivery of the intervention.

The studies also showed low levels of process fidelity (Mowbray et al., 2003), with high levels of variation in the way AA was delivered. In Watson and colleagues' (2017) study, the authors reported that children "spent five hours on five consecutive days involved in the AA approach, this being interspersed with Forest School activities, messy play and lunch and snack breaks," (p. 81) which provides little clarity around the exact manner of delivery. This may mean the increases in joint attention were attributable to forest school activities, which have been linked to improved concentration in neurotypical children (Dabaja, 2022). The length of the intervention varied across studies and, although Buckingham (2012) and Courtman (2018) increased the length of sessions over time, none of the interventions documented building to the specified 20 minutes (Davies, n.d.).

The AA intervention consists of four stages, delivered during a six-week programme. The majority of studies reported delivering AA over six weeks, however the intervention in Watson and colleagues' (2017) study took place during five consecutive days (the reasons for which were unclear). Some studies reported delivering only the first three stages of AA (Courtman, 2018; Moore, 2020; Turner et al., 2017), so it is not known how the final stage impacted outcomes. Courtman (2018) cited children not being ready for the final stage as reason for not including this in the study, however it was not clear how long was spent on the other stages. None of the studies detailed the time spent on each stage.

Methodological issues

There was also a lack of methodological rigour in the way the studies were conducted. Only one study included a control group which received the standard curriculum (Moore, 2020), thus it is not possible to know whether any changes in outcome measures in the other studies were due to the intervention or to extraneous variables (Schinka et al., 2013). Furthermore, novel objects can promote the development of joint attention (Gulsrud et al., 2007), so it is unclear whether it may have been this specific aspect of the intervention, rather than the overall intervention itself, which led to the improvements.

With regards to design, three studies were action research projects where children were recruited to take part through their existing relationship with the researcher (Buckingham, 2012; Courtman, 2018; Watson et al., 2007). Across the studies, it was common for results to be presented graphically or by comparing percentage scores on measures pre- and post-intervention. Only one study analysed results statistically (Moore, 2020), using between- and within-subjects ANOVAs to compare groups and to compare scores over time.

Results from studies

All five studies reported increases in joint attention after using AA. For the majority of studies, this was identified through measures taken pre- and post-intervention. Moore

(2020) found a significant difference between pre- and post-intervention for only the intervention group, suggesting AA had a positive impact on joint attention. As this study included a control group and appropriate statistical analyses, it provided the strongest support for the effectiveness of AA to improve joint attention skills. The study did not however, show clear fidelity to the intervention.

All studies included measures of joint attention, though these differed across studies. Turner and colleagues (2017) used subjective parent ratings to determine whether AA had been effective and found 98% of parents felt there had been positive changes in their children. Other studies included observations (Courtman, 2018) or a combination of observational measures with other tools, such as the AA profiling tool (Buckingham, 2012) to measure joint attention. All measures showed progress in children's joint attention, though Buckingham (2012) concluded children with pre-intervention scores below the group average made smaller increases in joint attention than those whose scores were at or above average.

Three studies considered whether the gains could be generalised outside of the intervention. Two of these reported children were able to generalise their joint attention skills (Moore, 2020; Watson et al., 2017) to activities such as circle time. Conversely, Buckingham (2012) found generalisation did not occur for all children, consistent with review literature which has concluded weak or mixed findings regarding generalisation following social communication interventions for young children with autism (Carruthers et al., 2020).

Across the studies, improvements in children's joint attention were reported, despite low levels of fidelity to the intervention. This suggests programmes approximating AA might improve joint attention and therefore, to echo Harn and colleagues (2013), it is important to ascertain the key component within the intervention which may have supported progress. Small-scale research suggests objects which are interesting to children

can promote joint attention (Taylor & Hoch, 2008; Vismara & Lyons, 2007) and, since this was a shared element across the studies reviewed – regardless of fidelity to AA – it may be this that led to the improvements reported.

Due to the high levels of variation in the way AA was implemented, as well as a lack of methodological rigour across studies, it is not yet possible to draw conclusions regarding the effectiveness of AA in improving joint attention for pre-school and primary-aged children. The results from the studies included in this systematic review do suggest it may be effective for some autistic children, though further rigorous research which shows fidelity to the intervention is required.

Implications for professional practice

In recent years, there has been an increasing impetus for schools to engage with research to improve outcomes for children (Slavin, 2020). This has also been reflected in educational policy in England (e.g. DfE & Department of Health [DoH], 2015). Nonetheless, it has been suggested that some schools may adopt interventions despite a limited evidence base (Pegram et al., 2022). The use of empirically unsupported interventions is a particular challenge in the area of autism, where Paynter and colleagues (2020) found the perceived evidence-base for interventions was a significant predictor of their future use. This suggests adults supporting autistic children may continue to use interventions on the basis of perceived, rather than actual evidence. There is therefore a need to conduct rigorous research and effectively disseminate the findings to those supporting autistic children.

This systematic literature review included three action research projects. Action research in education can support the bridging between research and practice (Manfra, 2019) and it is therefore encouraging that this type of research formed a majority in this review. There were, however, limitations surrounding methodological rigour and analysis in these studies. Manfra (2019) suggests teachers could be supported to conduct rigorous

action research through university-based partnerships; this may also be facilitated through working with educational psychologists (EPs), who possess skills in conducting research.

When considering recommendations to schools, EPs should be aware of the existing evidence base. Even in cases where an intervention is evidence-based, EPs should consider the importance of staff training; without this, interventions risk becoming disconnected from the evidence (Spring & Hitchcock, 2010). This appears central in AA, where most studies included in this review appeared to have low process fidelity. Despite this, the studies reported increases in joint attention, suggesting there may be some element of AA which is effective. Researchers and education staff are encouraged to collaborate to consider what this element may be and to harness it to support children's progress.

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Appendix A: Systematic search

Identification of studies

An initial scoping search was conducted using Google Scholar to identify key terms to be used in the systematic search. This also led to the generation of the search question, *To what extent can Attention Autism be used to improve joint attention in pre-school and primary-aged children?* Search terms were applied to the Population, Intervention, Comparison, Outcome, Study design (PICOS) framework (Higgins et al., 2019), shown in table A1. Titles and abstracts of papers were searched on 6 October 2023 using the following databases: PsycInfo, MEDLINE, CINAHAL, and ProQuest Dissertation and Thesis Global Database. Grey literature was included since this can reduce publication bias and can help to form a more balanced overview of the evidence (Paez, 2017).

Table A1: Search terms applied to the PICOS framework

	Search terms
Population (P)	child* OR “young person” OR student* OR school-age* OR primary-age* OR “pre-school”
Intervention (I)	“attention autism” OR “bucket time”
Comparison (C)	N/A
Outcome (O)	attention* OR “joint attention”
Setting (S)	school* OR education OR classroom* OR nursery OR “early years” or “EYFS”

Inclusion and exclusion criteria

Table A2 presents the inclusion and exclusion criteria used to filter the identified literature.

Table A2: Inclusion and Exclusion Criteria

Inclusion criteria	Exclusion criteria
Intervention specified as Attention Autism	Intervention not specified as Attention Autism
Participants aged 11 or below (primary school or pre-school age)	Participants aged above 11
Published in English	Published in a language other than English
Outcome measure was attention or joint attention	Outcome measure was neither attention nor joint attention
Full text available	Full text not available

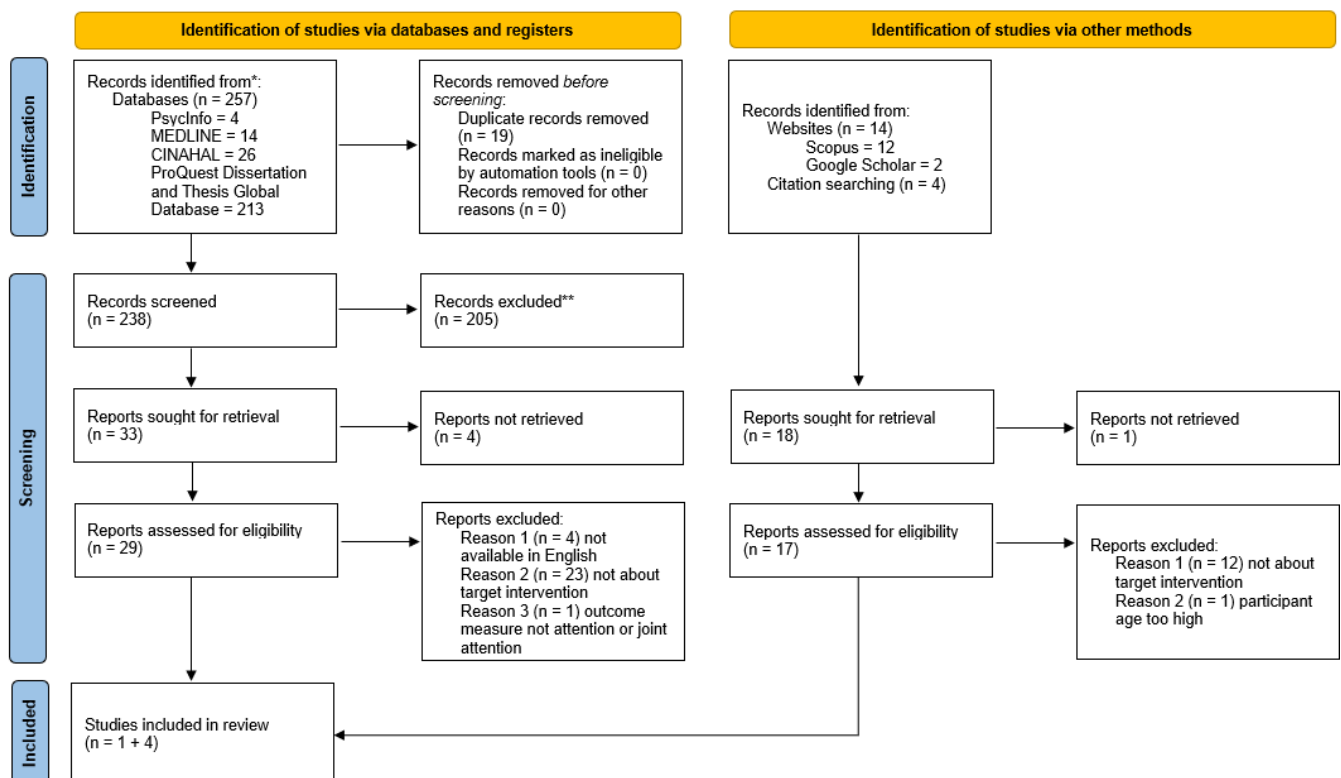
Appendix B: PRISMA diagram

The Preferred Reporting Items for Systematic reviews and Meta-Analyses (PRISMA) (Page et al., 2021) flow diagram has been included to show the flow of studies through this review. The initial search using the terms detailed in table A1 identified 257 records, 19 of which were duplicates. The titles and abstracts of the remaining 238 records were screened for relevance and 33 of these were sought for retrieval. The 29 reports that met the inclusion criteria and could be accessed were read in full.

After reading the 29 reports, 28 of these were excluded. For four of these reports, full texts were not available in English, despite the title and abstract being written in English. In 23 of the reports, the target intervention, was not mentioned in the report. Another report was excluded at this stage as the outcome measure did not meet the inclusion criteria (it was neither attention nor joint attention). This left one report (Turner et al., 2017).

An additional 18 articles were found through hand searching the reference lists of identified studies and by applying the search terms from table A1 to two additional websites, Scopus and Google Scholar. One of these reports could not be accessed and 13 others did not meet the inclusion criteria. This resulted in the identification of four additional studies. In total, five studies were included in the final review.

PRISMA Diagram (Page et al., 2021)



Appendix C: Quality appraisal

The Quality Assessment Tool for Studies with Diverse Design (QATSDD; Sirriyeh et al., 2012) was used to assess the quality of the papers. The QATSDD consists of 16 items and can be used to assess the quality of research which uses different approaches (Sirriyeh et al., 2012). It was deemed appropriate for the current review due to the range of designs used in the studies, such as mixed methods and quasi-experimental designs. Other tools, such as the JBI quality appraisal tool (Aromataris & Munn, 2020) were not well-suited to the current appraisal due to the diverse nature of the designs employed across studies. The five studies included in the review were assessed using this tool (see table below).

Table A3: QATSDD scoring for reviewed studies (0 - absent; 3- complete)

Criteria	Score (0-3)				
	Buckingham (2012)	Courtman (2018)	Moore (2020)	Watson et al. (2017)	Turner et al. (2017)
Explicit theoretical framework	2	2	3	2	0
Statement of aims/objectives in main body of report	3	3	3	1	2
Clear description of research setting	2	2	3	2	2
Evidence of sample size considered in terms of analysis	0	0	0	0	0
Representative sample of target group of a reasonable size	1	1	1	1	1
Description of procedure for data collection	2	1	2	1	1
Rationale for choice of data collection tool(s)	2	1	2	0	0
Detailed recruitment data	3	1	3	0	0
Statistical assessment of reliability and validity of measurement tool(s) (Quantitative only)	0	0	0	0	0

Fit between stated research question and method of data collection (Quantitative only)	2	1	2	0	0
Fit between stated research question and format and content of data collection tool e.g., interview schedule (Qualitative only)	1	N/A	N/A	N/A	0
Fit between research question and method of analysis (Quantitative only)	1	1	3	0	1
Good justification for analytic method selected	1	1	1	0	0
Assessment of reliability of analytic process (Qualitative only)	0	N/A	N/A	N/A	0
Evidence of user involvement in design	0	0	0	0	0
Strengths and limitations critically discussed	2	2	3	1	1
Total	22	16	26	8	8

Appendix D: Data extraction

A summary of the key information from each of the five studies can be seen in the data extraction table below.

Study	Publication type	Sample characteristics	Design	Intervention	Control group	Outcome measures	Findings
Buckingham (2012)	Unpublished master's dissertation	8 children aged 6-7; 3 girls and 5 boys. 7 of the children were described as "on the autism spectrum" (p. 28). Children attended a specialist school. Recruited through convenience sampling and were taught by the researcher.	Mixed methods action research	The researcher trained staff in AA. Children received daily AA sessions for 6 weeks. The length of these sessions increased to 45 minutes over the course of the intervention. Completed all 6 stages. Intervention took place in the children's school.	None included	AA profile	On average, children's joint attention scores increased by 29%. All children showed increases in joint attention. Children with baseline joint attention scores which were below average made smaller increases. Some qualitative data suggested these increases were not generalised to other contexts for all children.
Courtman (2018)	Unpublished master's dissertation	6 children aged 8-9. 4 had an autism diagnosis, 1 had a diagnosis of global developmental delay and 1 downs syndrome. All autistic children were boys. No other demographic	Quasi-experimental action research	The researcher had received training from Gina Davies and gave other staff "basic training" (p.8). AA took place 3 times a week for 6 weeks. Sessions increased in length; no exact timings	None included	Observational data measuring "behaviours associated with the skill of joint attention" (p.4).	All children showed increases in behaviours which were deemed to be associated with joint attention. All children showed increases in sustained attention. Claims made regarding significance however, no statistical analysis conducted to support this.

		information was included.		provided. The intervention only involved the first three stages.			
Moore (2020)	Unpublished doctoral thesis	20 children aged 3-7; 4 girls and 16 boys. All had a diagnosis of autism and 8 also had a diagnosis of intellectual disability. 17 of the children were Irish and all attended a "special class for autistic children" (p.80). Children were recruited from 4 schools. Children were not engaged in any other intervention at the time of the study. 4 teachers also took part.	Quasi-experimental	AA delivered by two teachers, who had received AA continuing professional development (CPD), over a period of 6 weeks. Children received 3 weekly sessions lasting 15 minutes. The intervention involved the first three stages of AA. Intervention took place in the children's schools.	Control group received "regular school curriculum" (p.84).	Early Social Communication Scales (ESCS), British Ability Scales, Third Edition (BAS-3) verbal mental-age measure, observations using event recording to measure joint engagement and joint attention.	Children in the intervention group showed significant increases in initiating joint attention and responding to joint attention. These differences were significant during both assessment and during circle time, suggesting a generalisation of joint attention skills. No significant differences were found for the control group.
Turner et al. (2017)	Peer reviewed journal	98 parents completed feedback on the intervention. Children who received the intervention had a	Quasi-experimental mixed methods	A team including a clinical psychologist, occupational therapists and SALTs delivered an "attention and	None included	Questionnaire	98% of parents reported that they had observed "positive changes" (p.17) in their child, such as increases in attention.

		developmental age of over 18 months and a chronological age of less than 5 years. All children had an autism diagnosis. No other demographic information was included.		engagement group" (p.15) to parents. This was "based on the principles" (p.15) of AA and included sessions over 6 weeks including workshops for parents and sessions for children. The intervention involved the first three stages of AA.			
Watson et al. 2007)	Peer reviewed journal	12 children were selected by a Speech and Language (S&L) therapy team and were chosen based on the likelihood of parental consent. No other demographic information was included.	Quasi-experimental action research	5 hours on 5 consecutive days on AA, with the hours being split up between other activities e.g., forest school. AA was delivered by a team of adults including any three of the following: AA advanced practitioner, teacher, speech and language (S&L) therapist and an early years outreach advisor.	None included, but children were split into two groups: some spoken language, and limited or no language.	AA profile, Social Communication, Emotional Regulation, and Transactional Support (SCERTS) profile, Target Monitoring and Evaluation (TME) forms, interval and time sampling, parent and practitioner questionnaires	Gains in attentional control including orienting, focused attention, sustained attention and shifting attention ability improved for children who had some spoken language. Increased joint attention was also recorded through time and interval sampling and during yoga. Parents perceived improvements in concentration.