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Appendix A

Systematic Search Strategy

Following the recommendation of the Cochrane Handbook for Systematic Reviews of Interventions (Higgins et al., 2023), the PICO (Higgins et al., 2023) framework was used to create a specific systematic literature review question. Table A1 shows key terms determined through the PICO framework. These resulted in the specific literature review question: 'Can school based therapy dog interventions support the well-being of autistic children and young people?'

Table A1

PICO (Higgins et al., 2023) Systematic Review Question Formulation and Related Search Terms

PICO Term	What This Means for School Therapy Dogs for autistic pupils	Search Terms with Boolean Operators
Population	• School aged pupils: primary, secondary, or post-16 school/college • Children and young people identified as or diagnosed as autistic	(pupil* OR student* OR adolescent* OR youth OR child* OR "young people" OR "young person" OR teenage*)AND(autistic OR autism OR Aspergers OR ASC OR ASD OR Neurodiverse OR Neurodivergent) AND
Intervention	Having a dog in school on a regular basis to play with, talk to, provide care for, or take part in specific activities and/or interventions led by adults	(Dog OR canine OR puppy OR hound OR Labrador OR "golden retriever" OR beagle OR Cockapoo OR terrier OR animal) AND (school OR education OR college OR teach* OR academy OR institution) AND
Comparison(s)	N/A or could be other interventions to promote wellbeing in autistic pupils or having no dog in school	
Outcome	Improved wellbeing, feeling more calm or relaxed or generally having a more positive experience in school	(calm* OR relax* OR wellbeing OR "well being" OR "mental health" OR emotion* OR therapy OR support* OR regulation OR regulate OR worry OR worries OR anxiety OR positive OR happy)

Following the creation of the specific search question, a search was carried out in the databases: APA PsychInfo; ERIC; and Web of Science, using search terms identified from synonyms of key terms (Table A1) and Boolean operators OR and AND. Grey literature was also searched to minimise publication bias (Paez, 2017). Additional potentially relevant studies were also included through a search using Google Scholar and the reading of included papers reference lists. Records were searched for and then subsequently screened based on the inclusion criteria listed in Table A2. The PRISMA (Page et al., 2021) flow diagram (Figure A1) shows the process through which records were discovered, screened, and retrieved.

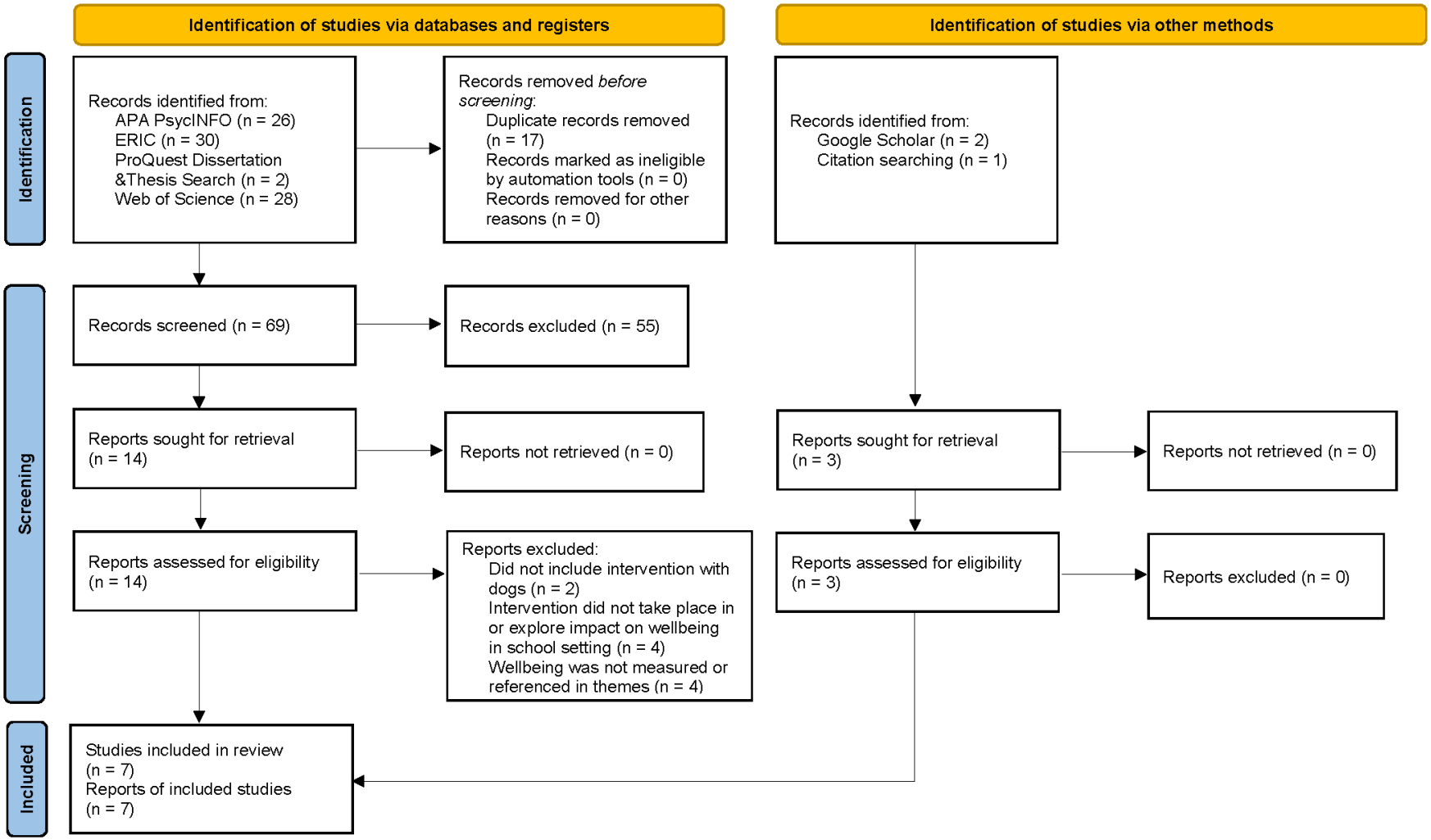
Table A2

Systematic Literature Review Inclusion Criteria

Inclusion Criteria	Exclusion Criteria
Study written in English	Study written in language other than English
Study must be published within the past 20 years	Study older than 20 years
Must be an empirical paper or doctorate thesis	Not an empirical paper or doctorate thesis, e.g., review article or undergraduate dissertation
Must focus on animal assisted intervention including a dog or dogs	Does not focus on animal assisted intervention including a dog or dogs
Must measure or have themes related to impact on autistic children and young people	Does not measure or have themes related to impact on autistic children and young people
Impact measured must relate to wellbeing (e.g., emotional, or behavioural impact)	Does not measure or assess the impact on wellbeing (e.g., studies focused on learning outcomes or physical health)
Must focus on school-based intervention or measure impact of intervention on pupil in school	Does not include school-based intervention or consider impact upon pupil in school

Figure A1

PRISMA (Page et al., 2021) Flow Diagram



From: Page MJ, McKenzie JE, Bossuyt PM, Boutron I, Hoffmann TC, Mulrow CD, et al. The PRISMA 2020 statement: an updated guideline for reporting systematic reviews. BMJ 2021;372:n71. doi: 10.1136/bmj.n71.

The seven reports of seven studies included in the review were assessed for quality using an adapted version of the Downs and Black (1998) checklist (Korakakis et al., 2018), for quantitative studies; the CASP qualitative studies checklist (Critical Appraisal Skills Programme, 2018) for qualitative studies; and the Mixed Methods Appraisal Tool (MMAT; Hong et al., 2018) for mixed-methods studies. A summary of the findings of these quality assessments can be found in Appendix B. Lastly, a data extraction table was completed to enable the synthesis of the information from each study in support of answering the systematic literature review question (Appendix C).

Appendix B

Quality Appraisal of Included Studies using Downs and Black (1998) Checklist Adapted by Korakakis et al., (2018)

"In the present version of the checklist we modified the scoring of item 27 that refers to the power of the study. Instead of rating according to an available range of study powers, we rated whether the study or not performed power calculation. Accordingly the maximum score for item 27 was 1 (a power analysis was conducted) instead of 5 and thus the highest possible score for the checklist was 28 (instead of 32). Downs and Black score ranges were given corresponding quality levels as previously reported (Hooper, Jutai, Strong, & Russell-Minda, 2008): excellent (26-28); good (20-25); fair (15-19); and poor (≤14)." (Korakakis et al., 2018)

	Becker et al. (2017)	**Ben-Itzchak and Zachor (2021)**	**Jesionowicz (2016) – Doctoral Thesis**
1. Is the hypothesis/aim/objective of the study clearly described?	Yes	Yes	Yes
2. Are the main outcomes to be measured clearly described in the Introduction or Methods section?	Yes	Yes	Yes
3. Are the characteristics of the patients included in the study clearly described?	Yes	Yes	Yes
4. Are the interventions of interest clearly described?	Yes	Yes	Yes
5. Are the distributions of principal confounders in each group of subjects to be compared clearly described?	Yes	Yes	N/A
6. Are the main findings of the study clearly described?	Yes	Yes	Yes
7. Does the study provide estimates of the random variability in the data for the main outcomes?	Yes	Yes	Unclear
8. Have all important adverse events that may be a consequence of the intervention been reported?	Unclear	Unclear	Unclear
9. Have the characteristics of patients lost to follow-up been described?	Unclear	Unclear	N/A
10. Have actual probability values been reported (e.g. 0.035 rather than <0.05) for the main outcomes except where the probability value is less than 0.001?	Yes	Yes	N/A
11. Were the subjects asked to participate in the study representative of the entire population from which they were recruited?	No	No	No
12. Were those subjects who were prepared to participate representative of the entire population from which they were recruited?	No	No	No
13. Were the staff, places, and facilities where the patients were treated, representative of the treatment the majority of patients receive?	Yes	Yes	No
14. Was an attempt made to blind study subjects to the intervention they have received?	No	No	No
15. Was an attempt made to blind those measuring the main outcomes of the intervention?	Yes	No	No
16. If any of the results of the study were based on "data dredging", was this made clear?	Unclear	Unclear	Unclear
17. In trials and cohort studies, do the analyses adjust for different lengths of follow-up of patients, or in case-control studies, is the time period between the intervention and outcome the same for cases and controls?	Yes	Yes	No
18. Were the statistical tests used to assess the main outcomes appropriate?	Yes	Yes	Yes
19. Was compliance with the intervention/s reliable?	Yes	Yes	Yes
20. Were the main outcome measures used accurate (valid and reliable)?	Yes	Yes	Yes

	Becker et al. (2017)	**Ben-Itzchak and Zachor (2021)**	**Jesionowicz (2016) – Doctoral Thesis**
21. Were the patients in different intervention groups (trials and cohort studies) or were the cases and controls (case-control studies) recruited from the same population?	Yes	Yes	N/A
22. Were study subjects in different intervention groups (trials and cohort studies) or were the cases and controls (case-control studies) recruited over the same period of time?	Yes	Yes	N/A
23. Were study subjects randomised to intervention groups?	Yes	Yes	N/A
24. Was the randomised intervention assignment concealed from both patients and health care staff until recruitment was complete and irrevocable?	Unclear	Unclear	N/A
25. Was there adequate adjustment for confounding in the analyses from which the main findings were drawn?	Unclear	Unclear	N/A
26. Were losses of patients to follow-up taken into account?	Unclear	Unclear	N/A
27. Did the study have sufficient power to detect a clinically important effect where the probability value for a difference being due to chance is less than 5%? **Sample sizes have been calculated to detect a difference of x% and y%.**	No	Yes	No
Total Score based on Korakakis et al., (2018)	**18**	**18**	**8**
Overall Rating based on Korakakis et al., (2018)	**Fair**	**Fair**	**Poor**

CASP Checklist: 10 questions to help you make sense of a Qualitative research

Critical Appraisal Skills Programme. (2018). CASP Qualitative Studies Checklist. https://casp-uk.net/casp-tools-checklists/

Critical Appraisal Skills Programme (CASP) part of Oxford Centre for Triple Value Healthcare www.casp-uk.net

	Anderson and Olson (2006)	**Wodder (2014) – Doctoral Thesis**
1. Was there a clear statement of the aims of the research?	In part	Yes
Comments	There is a sentence referring to the purpose of the study, but this could be more detailed with more specific aims and questions being explored	The aims of the study and the specific research questions are clearly stated.
2. Is a qualitative methodology appropriate?	In part	Yes
Comments	The researcher states they wish to explore how a dogs presence affected students emotional wellbeing and learning. This could potentially have been better met with mixed methods approach that explored the impact on learning and emotional welling through statistical evaluation of measures. However, as there is not a clear detailed explanation of the aims and as the study focuses on only one setting in a case study format it does provide insight through qualitative methods which are appropriate in the context.	The research questions focus on the exploration of perceptions and individuals understanding and experiences, making the qualitative approach appropriate.
3. Was the research design appropriate to address the aims of the research?	Yes	Yes
Comments	The case study design is appropriate to explore the experience of one particular setting in relation to the therapy dog intervention.	There is clear justification for the qualitative design and it's appropriateness for the purpose of the study.
4. Was the recruitment strategy appropriate to the aims of the research?	Yes	Yes
Comments	As the research has a case study design and focuses on the experiences of a specific school the recruitment from the school known to the researcher.	As the study was focused on the experiences of staff at a specific setting and following a specific training/intervention, it was appropriate that only these staff were contacted and asked to participate.
5. Was the data collected in a way that addressed the research issue?	Yes	Yes
Comments	Interviews and collection of data from school staff. Possibly more focused on negative behaviour incidents through ABC charts, however a wide variety of data was collected	Semi structured interviews of participants, who were all members of school staff, was an appropriate way to gather their views.

	Anderson and Olson (2006)	Wodder (2014) – Doctoral Thesis
	including observations and interviews with pupils and parents.	
6. Has the relationship between researcher and participants been adequately considered?	No	In part
Comments	It is stated that the research were also a teacher and was involved in delivering the intervention as well as collecting data, but the prior relationship and the impact this had on interpretation of the data is not addressed or acknowledged.	There is not explicit mention of the relationship between researcher and participants, but there is reference to peer-review by a research assistant to address 'researcher bias' which although not always appropriate for qualitative research, appears in line with the methods as described.
7. Have ethical issues been taken into consideration?	In part	No
Comments	There is explicit discussion of the steps taken to ensure the safety of the pupils in the study and the dog. However, there is limited explanation of how or if pupils in the class were able to choose not to take part or if pupils who did not consent to take part were still able to access the therapy dog intervention.	There is no explicit reference to potential ethical considerations that needed to be or were addressed.
8. Was the data analysis sufficiently rigorous?	Unclear	Yes
Comments	There is not an explicit explanation of the process of analysis. There is a schematic map of the data analysis which includes codes and themes and detailed information about individual participants experiences are shared in a case study format.	There is a detailed description of the analysis process and results are presented in detail in relation to the research questions.
9. Is there a clear statement of findings?	Yes	Yes
Comments	Findings and conclusions drawn by the author are clearly displayed in an appropriate case study format and in the discussion section.	Findings are given in detail in the results section and a clear summary is also given at the start of the discussion.
10. How valuable is the research?	The researcher makes links back to previous research as well as suggestions for future research. Although a case study of one specific setting the research provides interesting insight which adds to existing research and could be built upon by others wishing to explore the impact of therapy dogs for children in schools.	The findings are discussed in relation to existing research and show a clear added value of the results to the field as well as making suggestions for future research.

Mixed Methods Appraisal Tool (MMAT), version 2018

Category of study designs	Methodological quality criteria	Mercer (2019)	Schimming (2022) – Doctoral Thesis
Screening questions (for all types)	S1. Are there clear research questions?	Unclear	Yes
	S2. Do the collected data allow to address the research questions?	Yes	Yes
1. Qualitative	1.1. Is the qualitative approach appropriate to answer the research question?	Unclear	Yes
	1.2. Are the qualitative data collection methods adequate to address the research question?	Yes	Yes
	1.3. Are the findings adequately derived from the data?	No	Yes
	1.4. Is the interpretation of results sufficiently substantiated by data?	No	Yes
	1.5. Is there coherence between qualitative data sources, collection, analysis and interpretation?	Yes	Yes
2. Quantitative randomized controlled trials	2.1. Is randomization appropriately performed?	N/A	N/A
	2.2. Are the groups comparable at baseline?	N/A	N/A
	2.3. Are there complete outcome data?	N/A	N/A
	2.4. Are outcome assessors blinded to the intervention provided?	N/A	N/A
	2.5 Did the participants adhere to the assigned intervention?	N/A	N/A
3. Quantitative non-randomized	3.1. Are the participants representative of the target population?	N/A	N/A
	3.2. Are measurements appropriate regarding both the outcome and intervention (or exposure)?	N/A	N/A
	3.3. Are there complete outcome data?	N/A	N/A
	3.4. Are the confounders accounted for in the design and analysis?	N/A	N/A
	3.5. During the study period, is the intervention administered (or exposure occurred) as intended?	N/A	N/A
4. Quantitative descriptive	4.1. Is the sampling strategy relevant to address the research question?	Yes	No
	4.2. Is the sample representative of the target population?	Yes	No
	4.3. Are the measurements appropriate?	Unclear	Yes
	4.4. Is the risk of nonresponse bias low?	Unclear	Unclear
	4.5. Is the statistical analysis appropriate to answer the research question?	Unclear	No
5. Mixed methods	5.1. Is there an adequate rationale for using a mixed methods design to address the research question?	Yes	Yes
	5.2. Are the different components of the study effectively integrated to answer the research question?	Yes	Yes
	5.3. Are the outputs of the integration of qualitative and quantitative components adequately interpreted?	No	Yes
	5.4. Are divergences and inconsistencies between quantitative and qualitative results adequately addressed?	Unclear	Yes
	5.5. Do the different components of the study adhere to the quality criteria of each tradition of the methods involved?	No	Partially

Appendix C

Data Extraction Table

Study	Country	Design	Participants	Intervention	Comparison	Measures	Results	Limitations
Anderson and Olson (2006)	USA	Qualitative Case study Data coded and analysed qualitatively	Six pupils aged between 6 and 11 years = class of pupils in a specialist setting, class for children with 'severe emotional disorders' affecting their 'emotional stability and their learning'. 1 student (female) in the class with diagnosis of "Asperger's syndrome and Bipolar Disorder"	Dog present in class between 8am and 3pm every day for 8 weeks (with the exception of 3 days when the teacher or dogs owner were absent). During each day pupils had 30 minute 1:1 sessions with the dog, teaching about the dog, and the dog was present throughout the day including during playtimes. Toy poodle (J.D.) not a certified therapy dog nor trained in animal-assisted activities: pet dog of one of the school's 'para-educators'. 30 minutes 'social skills instruction' at the start of every day – teacher focused on similarities and differences between dog's and pupils communication patterns for 'addressing…needs and emotions'. The class were also taught about being respectful of the dogs needs; how to meet the dogs needs;	N/A	Data collected using 'Problem-Solving Sheets' and ABC (antecedent, behaviour, consequence) analysis forms. Problem solving sheets filled out every time a pupil 'entered emotional crisis' indicated by 'severe verbal and physical aggression'. Daily observations were conducted by the teacher/researcher every day during the eight-week study. Notes were taken in relation to 1:1 sessions, unstructured playtime, reading to the dog, students comments about interactions with the dog during the social skills instruction, and pupils spontaneous interactions with the dog. On six Fridays during 1:1 time the teacher asked 'interview questions' to the students' including descriptions of their interactions with the dog, positive and negative aspects of the dogs	Overall the presence of the dog contributed to pupils emotional stability by preventing and de-escalating 'episodes of emotional crisis'. Author also states that overall pupils attitude towards school improved and the presence of the dog facilitated their learning around responsibility, respect and empathy. For 'Molly' only pupil with autism related diagnosis – was reported to refer to herself as the dog's "fake mother", was protective of the dog but also willing to share him with others. She invited a peer to go on a walk with her and the dog and talked to younger children about the dog. She personally reflected that she "felt happy and calmer in the dog's presence" and "expressed her desire not to make bad choices and go into the quiet room because J.D> would be afraid of her". Her mother reported feeling as though the dog made a good companion for Molly as his "love was unconditional" and also reported improvements in her motivation to do well at school, talk about her day and outwardly show affection to her family. The experience made the family want	Low number of participants Not focused solely on autism (only one of six pupils had diagnosis of Asperger's) USA not UK Dog not trained to be support/therap y dog No explicit wellbeing measures used. Unclear how much impact the dog had and how much related to teacher's role in delivering sessions and spending 1:1 time with each pupil and dog.

Study	Country	Design	Participants	Intervention	Comparison	Measures	Results	Limitations
				how to use the dog as a calming tool; how to use the dog to socialise with others; how to interact with the dog during a 30 minute individual session.		presence, and their understanding of his behaviour and how they benefited from having him in the classroom. During week 4 parents were interviewed about their experience of perception of the intervention in terms of the impact on their child. Three weeks after the end of the study (and end of the school year) – the pupils and their parents were interviewed at home about their experiences of the intervention and any longer term impact.	to get a dog to help Molly at home. Problem Solving Sheets and ABC Analysis Forms showed that Molly had only 1 incident of 'emotional crisis' during the time the dog was in the classroom, in comparison to 3 in the 8 weeks prior to the intervention. She also increased in her socialising with peers and played more with peers with the dog.	
Becker et al. (2017)	USA	<u>Quantitative</u> Between-within repeated measures comparison. Both intervention and control conditions had two groups: one for children aged 8-10 and one for	31 pupils aged between 8 and 14 (mean 10.97, SD= 1.84) with an 'ASD' diagnosis, attending a school at a therapeutic treatment facility. Exclusion criteria included: allergy to dogs, intellectual	12 week intervention: Social skills group with therapy dog – 1 hour per week during the intervention period. Group led by professional therapists experienced in working with autistic children plus handler/therapeutic dog team. Each child had the opportunity to pet the dog individually during the greeting and 'good	Control group: social skills training only, meting for one hour each week over 12 weeks in similarity with interventio n group. Run by same	Participants assessed for depressive symptoms, theory of mind ability, and social skills using: Self-report on Children's Depression Inventory (CDI-2) Social Language Development Test (SLDT) Reading the Mind in the Eyes Test (RMET) Assessments administered per-test by graduate students in psychology who	No differences at baseline between groups on the CARS-2 were found, meaning any change over time and group likely to be the result of intervention. Data was analysed using an independent samples t-test to determine differences between intervention and control group in teacher reported SRS-2. Results showed significantly higher levels of 'symptom severity' in the control group than the experimental group on both overall	Overall participant numbers of 31 and group size of 17 for intervention and 14 for control means only just big enough to find large effect size, unlikely to find more subtle smaller effect size and may only just be big

Study	Country	Design	Participants	Intervention	Comparison	Measures	Results	Limitations
		children aged 11-14 (7-8 children per group)	disability (IQ below 70) and severe language disorder. 28 boys 3 girls (reflecting school's demographics)	bye' stages of the session. The dogs were also integrated throughout the sessions, including activities involving the dog such as practicing grooming, walking, and giving commands to the dog. Same location for intervention and control group and same therapists. Multiple handler/dog teams were also used to control for the influence of specific dogs. Dogs and handlers were certified through Pet Partners, The Good Dog Foundation or Therapy Dogs International. Children given explicit guidance on working with the dogs appropriately and safely.	profession al therapists experience in working with autistic children as interventio n groups. Control group session goals aligned with the session goals of the interventio n group and were based on the same social skills training programm e.	were blind to participants assigned conditions and read out questions to pupils to address reading difficulties. Teacher-rated measure of autism-related symptoms based on Social Responsiveness Scale (SRS-2) measured after the final group. Teacher ratings not collected pre-intervention due to difficulty with teacher availability due to intervention running at the end of the academic year. Teachers were not explicitly told which group students were in, but it was not possible to avoid pupils telling teachers about their experience in the group, so not completely blind. Childhood Autism Rating Scale (CARS-2) was used to measure and control for difference between groups at baseline.	score, and composite scales measuring social interactions and restricted repetitive behaviours. Repeated measures mixed ANOVAs were used to examine change over time as a function of treatment condition on the SLDT, CDI-2 and RMET. **CDI-2**: Significant time by group interaction on the interpersonal problems sub-scale and the functional problems subscale with a large effect size for both, and both relating to a greater improvement in participants in the intervention group than the control. Change over time was significant for subscales measuring feelings of self-worth and effectiveness (but not a between groups interaction). **RMET**: significant improvements over time but no between groups differences. **SLDT**: No significant differences were found for the effects of time or condition.	enough to measure large effect. Study only took place in one setting at one point in time (at the end of the school year). USA not UK Measures largely focused on 'symptoms' of autism and social communication rather than more general wellbeing. Intervention of only one hour per week and focused more on social skills training then time with dog may impact ability to demonstrate how the presence and interaction with the dog may

Study	Country	Design	Participants	Intervention	Comparison	Measures	Results	Limitations
								benefit autistic pupils fully. More boys than girls in study. Demographically representative of school but not clear how representative of winder population (e.g. no demographic information about ethnicity and race)
Ben-Itzchak and Zachor (2021)	Israel	<u>Quantitative</u> Controlled crossover	73 pupils aged 2-7 years (mean 4:10, SD 1). 61 boys 12 girls All pupils were white. No socioeconomic data collected but lived in middle-high socioeconomic status area. All pupils had autism diagnosis and were recruited from autism specific special education	Dog Training Intervention (DTI) designed 'and performed in cooperation with' non-profit organisation 'Dogs for People'. Gentle neglected dogs from dog shelters who are then trained to work with children and adults with special needs and at risk populations used to run dog therapy programmes. Programme run by certified dog therapists. Intervention lasted 4 months and included 2	'multidisciplinary standard of care intervention provided by the schools': "All the children received individual and group therapies provided by a multidisciplinary team including	Social Responsiveness Scale (SRS-2) Vineland Adaptive Behaviour Scale (VABS) Spence Children's Anxiety Scale (SCAS) Teachers completed SRS-2, SCAS and VABS (through interview by study coordinator) at baseline, after group 1 completed the intervention, and again after group 2 completed the intervention. "speech and language pathologists" provided the language assessments and Educational psychologists	VABS subdomain standard scores and SRS-2 subdomain scores were analysed using MANOVAs with repeated measures for time. SCAS total scores were analysed using 2x3 ANOVAs. **VABS:** significant time x group effect overall. Time x group effect for communication and motor subdomains. Individual groups showed improvements over time, with more significant changes noted from before to after intervention period for both groups. **SCAS:** baseline scores for both groups showed they were in the	Israel not UK Participants all white and from medium to high socioeconomic areas so may not representative of wider population Measures focused more on autism symptoms and behaviour than wellbeing SCAS may not have been sensitive enough to

Study	Country	Design	Participants	Intervention	Comparison	Measures	Results	Limitations
			schools within the same municipality. With 7-8 participants recruited from each school. Participants divided into two groups of five schools, matched on teacher's impressions of pupils – one group received the DTI at the beginning of the school year, the second group received the intervention during 'the second phase' and acted as a control during the first group's intervention period. Group 1 = 37 participants (29 boys 8 girls) Group 2 = 36 participants (32 boys 4 girls)	treatment sessions per week with a 1:1 therapist to child ratio. In months 1 and 4 the sessions lasted 45 minutes and included the entire DTI group from each school (eight children). In the middle months the training was conducted in pairs (two children and two trainers) and lasted 20 minutes. 6 dogs participated: 1 Australian shepherd, 1 Jack Russell terrier, 4 'large breed dogs' and 1 'small mixed breed dog'. Programme had 9 stages, beginning with getting used to the dog through being around the dogs without the pupils having to actively do anything. Then building up physical contact with the dogs and learning how to give commands to and care for the dogs. The final stage involved 'independent initiation on the part of the children with the dogs' during group work.	speech pathologists, psychologists, occupational therapists, and applied behavioral analysts and were supported by the Ministry of Health."	provided the cognitive assessments.	medium-low normal range (i.e. not indicating clinical levels of anxiety). Significant time x group interaction found. Significant increase from T1 to T2 (intervention period) with no significant increase from T2 to T3 for group 1. Significant decrease from T1 to T2 and from T2 to T3 (intervention period) for group 2. All mean scores found to be within the normal range at all time points. **SRS-2**: significant effect for time overall, but individual subdomain ANOVAs showed only a significant difference for the RIRB not the SCI subdomains. Significant increase in RIRB from T1 to T2 and significant decrease from T2 to T3. = most significant improvement related to intervention was related to adaptive social and communication skills as measured by the Vineland. Quote from discussion: "The increase in anxiety symptoms seen among the children who received DTI in the first study period and the decrease in anxiety symptoms seem among those who received it	measure change over time as children not in the clinical range for anxiety at baseline. No qualitative data which may have given more context and greater depth to the significance of the results. i.e. to help explain why anxiety increased during intervention period for first group but decreased during control and intervention phase for second group.

Study	Country	Design	Participants	Intervention	Comparison	Measures	Results	Limitations
			All schools followed the same educational protocols.				in the second study period may suggest that it is better to implement such a program after a period of adjustment to the school environment, rather than at the beginning of the school year."	
Jesionowicz (2016) – Doctoral Thesis	USA	Quantitative Single-case, non-concurrent multiple-baseline across participants design.	Kindergarten – second grade pupils with a diagnosis of autism. Exclusion criteria included allergies to animals, fear of dogs, aggression towards animals, and below average cognitive scores. 3 participants all male. One first grader, one second grader, and one kindergarten pupil. All described as Caucasian	Animal Assisted Therapy intervention using the Mutt-i-grees curriculum (Finn-Stevenson, 2010). Intervention was delivered by a research assistant who was a graduate student, and the researcher. Mutt-i-grees Curriculum is built on research base of emotional intelligence and social-emotional learning intended to teach children social and emotional skills. The study used the grade 1-3 lesson plans. The intervention allows the use of a dog hand puppet but for this study a registered therapy dog from a local organisation was used. Curriculum had five units: achieving awareness; finding feelings; encouraging empathy; cultivating	5 – 8 weeks of baseline data Once a stable baseline is established the independent variable is administered.	Dependent variables of participants' tantrum and aggressive behaviours were measured with: Temper tantrum grid (where higher scores indicate higher frequency, longer duration of and more intense tantrums) Overt aggression scale. Teachers and parents were taught how to use both measures.	Data was analysed using single-case design visual analysis and descriptive statistics. Percentage of Non-overlapping Data (PND) and Improvement Rate Difference (IRD) were calculated to explore the impact of the intervention on each individual participant. Frequency of tantrum behaviours at home decreased during the intervention period for one participant, but remained the same for the other two participants. Frequency of tantrum behaviours at school increased slightly for one participant who had virtually no tantrum behaviour recorded at baseline, remained the same for another participant and decreased slightly for the third participant, although this appeared to be a levelling off continuation from the baseline period, and the PND indicated 0% for all participants in relation to school data, and the IRD showing that for participant one	Low participant numbers USA not UK All participants Caucasian. Two of the three participants already had pet dogs at home. Focused on externalising behaviour (emotional dysregulation) rather than using specific measures of wellbeing. Intervention was measured by teachers but did not take place in school. Missing data due to intervention taking place but pupil not being

Study	Country	Design	Participants	Intervention	Comparison	Measures	Results	Limitations
				cooperation; and dealing with decisions. 17 core lessons and 7 extension lessons from the 5 units were used to create 12 one-hour 1:1 intervention sessions. 3 certified therapy dogs were used: 1 Australian Cattle Dog, 1 Standard Poodle, 1 Labrador Retriever. The intervention was delivered over 7 weeks for one participant, over 8 weeks for another participant, and over 6 weeks for the final participant. Intervention sessions took place in a room at a local community centre.			there was a moderate negative effect of the intervention. Intensity of Tantrum Behaviours: Home: two participants decreased slightly, one participant increased slightly. School: two participants increased slightly, one participant stayed the same. PND 0% for all participants IRD showed small negative effect of intervention for two participants. Duration of Tantrum Behaviours: Home: slight decrease for two participants, slight increase for the third. School: slight increase for two participants, third stayed the same. Frequency of aggressive behaviours: Home: decreased for one participant, slight increased for another participant, stayed the same for third. School: stayed the same for all participants Intensity of aggressive behaviours: Home: decreased slightly for two participants, increased slightly for third. School: increased slightly for two participants, decreased slightly for one.	in school, child being away or unwell. Case study style design but no qualitative data that could have added depth to descriptive statistics. Potentially disruptive to children's existing routine as taken out to community centre rather than integrated in existing routine. Intervention delivered by researcher rather than familiar adult or trained animal therapist. Parent and teacher report data, no data reported by pupil or observation by researcher.

Study	Country	Design	Participants	Intervention	Comparison	Measures	Results	Limitations
							Overall summary by author: Intervention had little impact on improving tantrum and aggressive behaviour. There was some indication that the intervention might decrease the duration of tantrum behaviour and the intensity of aggressive behaviours, but the data to support this was minimal and no evidence to support the impact of the intervention on the frequency of aggressive behaviours or tantum behaviours, nor the intensity of tantrum behaviours. Two pupils who had pet dogs at home showed slightly more benefit from intervention than participant who did not have pet dog at home.	
Mercer (2019)	UK	Mixed methods Phenomenological study	3 schools with dogs participated in semi-structured interviews. 10 schools with school based dogs completed online qualitative questionnaire. Plus 2 dog training session observations by researcher.	Schools with a 'school dog'	N/A	Semi-structured interview and qualitative questionnaire based on the interview topic guide.	Phenomenology analysis including data triangulation Four main themes were identified: 1. School Dogs Have Social, Emotional and Behavioural Benefits for Pupils. 2. School Dogs have Educational Value 3. School Dog's Welfare and Training 4. Introducing a Dog to School. A sub-theme in theme 1 was: 'Positive Impact on Pupils with ASC' – examples were giving of how	Focus not explicitly on the wellbeing of autistic pupils (although the fact that five participants mentioned it spontaneously perhaps strengthens the evidence). Self-report mostly through questionnaire so limited

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							having a school dog benefited autistic pupils by all three interview participants and two questionnaire respondents. One example given is a pupil who was described as 'a reluctant speaker' by the participant who then 'spoke all the way back to the classroom' after meeting the dog. Other participants also described autistic children talking more to the dog and becoming less 'isolated' due to the interactions with the dog.	information about the activities of the dog and more objective measures of impact. Although qualitative studies need fewer participants to create rich dater, only 10 participants for a qualitative questionnaire is potentially a little on the low side.
Schimming (2022) – Doctoral Thesis	USA	<u>Mixed Methods</u> Single-subject design, measuring impact within each pupil individual rather than across all participants	4 pupils from 6th, 7th and 8th grade in a Special Education Classroom, supporting pupils with 'emotional and behavioural disabilities'. Two with diagnosis of autism 1 with diagnosis of Asperger's syndrome (and	Daily social lessons led by teacher, over a two week period incorporating dogs as the focus. Therapy dog: Golden retriever, who was already a regular visitor to the school but without 'extensive encounters' with the pupils from the special education classroom who participated in the study.	Baseline	Data was collected by the classroom teacher, for the two weeks prior to the intervention and the two weeks after the began intervention. - Daily counts of verbal outbursts and aggression outbursts. Qualitative data included: - pupil self-reflection surveys pre and post intervention. -daily teacher observation notes from intervention sessions.	Descriptive statistics used to evaluate quantitative data, independent t-test used for each pupil's baseline and intervention data for aggressive outbursts. - Three out of four participants had a significant decrease in mean number of verbal outbursts form pre to post implementation - One out of the four participants had a significant decrease in mean number of aggressive outbursts from pre to post implementation (although the other three participants had a relatively low	Low number of participants USA not UK Only one school Pupil participants all male, mostly white.

Study	Country	Design	Participants	Intervention	Comparison	Measures	Results	Limitations
			the fourth with ADHD diagnosis). I student African American, 3 student white, all male. 8 school staff participants who completed a survey			-teacher notes and researcher memos Educator perception surveys also used to explore the impact on perception of the use of therapy dogs.	number of aggression outbursts both pre and post-implementation) Thematic analysis used to analyse qualitative data. - Themes generated from pupils self-reflection data were: purpose; ownership/responsibility; confidence; engagement; self-awareness; sense of belonging; anxiety; undesired behaviour; and self-efficacy. Pupil with ADHD had increased social anxiety during study, and was seen to turn to the dog for comfort during moments of high anxiety, e.g. standing near to dog and talking to him softly. One autistic pupil with high anxiety before study had reduction in anxiety during study, which contributed to increased state of general happiness and fewer behaviour incidents. Another autistic pupil found elements of the intervention involving increased self-awareness and feelings of appreciation towards self and others difficult and these increased his anxiety. However the impact of the dog overall appeared to decrease his anxiety.	

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							The last autistic pupil, who had a previous history of severe anxiety did not appear to have any anxiety during the study. All three autistic pupils were also reported to have increased sense of belonging and increased self-efficacy as a result of the intervention. School staff survey results showed overall school staff perceived the intervention to have been very positive and believed that student behaviour had improved due to the intervention.	
Wodder (2014) – Doctoral Thesis	USA	Qualitative Semi-structured interviews, comparative analysis	7 members of School staff (from one private school for children with special needs, predominantly autism) four of whom had taken part in a 10 week functional behavioural analysis and American kennel association canine god	Therapy dog in school and used in classroom as part of 'pet therapy' programme. Previously the school had four therapy dogs but at the time of the interviews the school had only one.	N/A	Semi-structured interviews using topic guide informed by the open ended research questions: 1.What is the perceived impact of AAT on children in the classroom setting relative to no AAT treatment? 2. What are participants' thoughts regarding the costs/risks and benefits of the presence of therapy dogs in the classroom? 3. From the participants' perspectives, are there perceived benefits to participation in an AAT program for teachers, for students, and for the school in general? 4. What are	Teachers reported multiple benefits to their pupils from the therapy dog programme, from motivation in class to improved wellbeing. Specifically, participants described a reduction in anxiety for their pupils, through providing a unique form of emotional support.: "a dog provides a non-biased, nonjudgmental approach to how they are feeling. During therapy sessions with the dogs, students would tell more to a dog than a human" Another participant reported that pupils who ordinarily needed a high level of emotional support, showed an increased	Only one school USA not UK No objective measures to back up staff reports of increased wellbeing/reduced anxiety Voice of pupils themselves not included.

Study	Country	Design	Participants	Intervention	Comparison	Measures	Results	Limitations
			citizenship training programme and used dogs in their classrooms.			participants' attributions about if and how the presence of therapy dogs in the classroom leads to therapeutic change? 5. Do participants perceive obstacles/barriers to using therapy dogs? How can participants' knowledge of perceived impediments be used to remediate those obstacles, and/or how are solutions generated in order to increase access to AAT programs while providing improvements?	ability to manage challenging feelings when the dog was present. All participants also described a calmer classroom environment when the dog was present.	