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A Review of Play Interventions for Children with Autism at School

Kossyvaki, Lila; Papoudi, Despoina

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Table

Information of the included studies regarding all the features contemplated in the review.

	References	Participants' characteristics			Research design			Intervention								
		N/ Gender	Age	Diagnosis	Methodology	Data collectors	Strength	Name	Theory	Frequency/ Duration	Materials	Interventionist	Setting	Areas of play	Generalisation	Effectiveness
1	Argyropoulou and Papoudi (2012)	1 male	6	Autism with no further delays	Single subject ABA design	Teacher	Weak <u>**PQIs:</u> a/b/c <u>SQIs:</u> a/e/f	Interactive play/intensive interaction	Developmental	15 sessions/ 10-15 mins per session / 2 months	Materials which suited child's interests and sensory preferences	Teacher	Mainstream school	Initiations and responses to a peer during play	Yes	Positive findings for both initiations/ responses post training. Mixed findings at follow up (initiations decreased/ responses remained high)
2	Dykstra et al. (2012)	2 females 1 male	3.6-4.8 M=4.2	Autism (n=2), autism with language difficulties	Multiple baseline across participants	Researchers	Strong <u>PQIs:</u> a/b/c/d/e/f <u>SQIs:</u> a/c/d/f	Advancing Social communication And Play (ASAP) intervention	Behavioral and developmental	40-75 mins per week/ unknown duration	Not described	School staff (teachers, TAs and SLTs)	Special classes*	Functional and symbolic play skills	No	All participants showed either increases in frequency or more stability in functional and symbolic play
3	François et al. (2009)	3 males 1 female 2 of unknown gender	7-10 M=8.5	Autism and moderate learning difficulties	Evaluative case study	Researchers	Weak <u>PQIs:</u> b/c	Robot mediated play and therapy	Developmental	Once per week/ Up to 10 weeks	An autonomous robot with dog-like appearance	Researchers	Special school	Symbolic and pretend play, social aspect of play, causality and transitions between two segments of play	No	Longer engagement in play activity. Children who engaged in social play showed progressively higher levels of symbolic or pretend play
4	Hine and Wolery (2006)	2 females	2.5 and 3.6 M=3.05	Autism	Multiple probe design	Researchers	Weak <u>PQIs:</u> a/b/c <u>SQIs:</u> a/c/e/f	Point of view video modelling	Behavioral	Unclear. Many sessions which varied per child	Video camera, gardening and cooking play set	Researcher	Mainstream school	Teach toy play actions (gardening and cooking)	Yes	Toy play actions were increased

	References	Participants' characteristics			Research design			Intervention								
		N/ Gender	Age	Diagnosis	Methodology	Data collectors	Strength	Name	Theory	Frequency/ Duration	Materials	Interventionist	Setting	Areas of play	Generalisation	Effectiveness
5	Lawton and Kasari (2012)	16 unknown gender	M= 3.7	Autism with ID	Randomised Control Trial (RCT)	Researcher	Adequate PQIs: B/C/D/E/F SQIs: A/B/C/D/ F	Joint Attention and Symbolic Play Engagement and Regulation Intervention (JASP/ER)	Behavioral and developmental	Unknown frequency/ 6 weeks	Not described	Teachers and paraprofessionals	Special school	Joint engagement during play interaction	No	Joint Attention and joint engagement during play interactions were improved.
6	Liber et al. (2008)	3 males	6-9 M= 7.3	Autism and speech and language delays	Multiple baseline across subjects	Researchers (teachers were involved in inter-observer reliability)	Adequate PQIs: a/b/c/d SQIs: a/e	Graduated time delay procedure	Behavioral	Unclear. It varied for each participant. One had as many as 40 sessions	Train track, train, animals and wooden blocks	Classroom teacher, TA and SEN peers	Special school	Multi step social play sequences	Yes	All participants were able to follow scripted play activity sequence and initiate play actions with peers. One improved imaginative skills and one was more engaged in play activities with peers in the classroom
7	Licciardello et al. (2008)	3 males 1 female	6-8 M= 7.25	Autism (n=2)/ autism and language or other delays (n=2)	AB design	Researchers	Weak PQIs: a/b/c SQIs: a/f	Social Skills intervention	Behavioral	Unclear but at least twice	Usual school outdoor equipment (e.g. swings, climbing structure, 'free play' area)	TAs	Mainstream school	Social initiation and response during interactive play	No	All participants increased social initiation and response
8	Lu et al. (2010)	23 males 2 females	7-12 M= 9.9	Autism and some additional delays in motor coordination and impaired hearing	Action research	Researchers	Weak PQIs: a/b/c	Sand play/ floor time	Developmental	Once a week / 10 sessions	A sandtray, figurines and play objects	Art therapists	Inclusive classes within a mainstream school	Creative and symbolic play	No	Verbal expression, social play, symbolic/spontaneous play were increased. Children became more flexible in their playing and increased peer awareness

	References	Participants' characteristics			Research design			Intervention								
		N/ Gender	Age	Diagnosis	Methodology	Data collectors	Strength	Name	Theory	Frequency/ Duration	Materials	Interventionist	Setting	Areas of play	Generalisation	Effectiveness
9	Miltenberger and Charlop (2014)	2males 1 female	6.3-9.2 M=8.2	Autism and social and communication delays	Single subject multiple baseline across participants and within participants across athletic activities	Behavioural therapists	Strong PQIs: a/b/c/d/e/f SQIs: a/c/d/e/f	Teaching athletic skills and group play	Behavioural	Unclear but each child had 19 testing sessions for each game	Sport equipment needed for the specific athletic group games	Behavioural therapists	Special setting (behavioural treatment centre)	Advanced athletic group games: handball and 4-square	Yes	All participants improved group play and speech as well as they mastered the taught athletic skills
10	Nelson et al. (2007)	4 males	3.9-4.5 M=4.2	Autism (n=1)/autism with ID and/or language difficulties (n=3)	Multiple baseline probe design across children and settings	Research assistants and secondary data collectors	Strong PQIs: a/b/c/d/e/f SQIs: a/c/e/f	Keys to Play: Visual intervention strategy	Behavioural and developmental	2 to 4 times a week/ Unclear duration	Usual motivating activities	TD peers and staff from the learning centre	Mainstream settings	Play initiations	Yes	Play initiations, and engagement time in play activities were increased. The sophistication level of their play was improved
11	Parker and O'Brien (2011)	1 male	7	Autism	Single case study	Researcher and teacher	Weak PQI: a SQI: e	Sand play/play therapy	Developmental	One session per week for 45 mins /12 weeks	A sandtray, figurines and play objects	Counsellor	Not clear	Organise their play	Yes	Participant was more friendly towards peers, had fewer outbursts in classroom and playground
12	Stagnitti et al. (2012)	10 (gender of pupils with autism not clear)	5-6 M=5.7	Autism with ID	AB design	Researchers and teachers	Weak PQIs: B/D/F SQI: B	Learn to Play program	Behavioural and developmental	Twice a week for an hour / 6 months	Not described	Teachers and other therapists (OT, SLT)	Special school	Self-initiated play and pretend play skills	No	Social interaction and language were increased. Children's social disconnection was decreased.
13	Thomas and Smith (2004)	3 unknown gender	3.4-4.1 M=3.7	Autism (n=1)/autism and language delay (n=2)	AB design	Educational psychologists	Weak PQIs: a/b/c SQIs: b/e	Tabletop identiplay	Behavioural and developmental	5 mins daily input/ 2 weeks	Two identical sets of toys and a detailed typed script	Educational psychologists	Mainstream school	Specific play behaviours, social interaction and generalisation to other contexts	Yes	Functional use of toys and social interactions with peers were improved

	References	Participants' characteristics			Research design			Intervention								
		N/ Gender	Age	Diagnosis	Methodology	Data collectors	Strength	Name	Theory	Frequency/ Duration	Materials	Interventionist	Setting	Areas of play	Generalisation	Effectiveness
14	Yang et al. (2003)	1 female	7.11	Autism with ID and language difficulties	AB design	Researcher	Adequate PQIs: a/b/c/d SQIs: a/f	Integrated Play Groups (IPG)	Developmental	Twice a week for 40-60 mins per session/ 6 months	Age appropriate play materials	Researcher	Mainstream school	Symbolic/pretend and social play	No	Both symbolic and social play were improved

*Not clear whether the school is mainstream or special

**Primary Quality Indicators (PQIs) and Secondary Quality Indicators (SQIs) met per study according to Reichow, Volkmar & Cicchetti (2008) criteria.