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Review article

A scoping review of the role of LEGO® therapy for improving inclusion and social skills among children and youth with autism

Sally Lindsay [a, b, c, *], Kara Grace Hounsell [a], Celia Cassiani [a, c]

[a] Bloorview Research Institute, Holland Bloorview Kids Rehabilitation Hospital, 150 Kilgour Road, Toronto, Ontario, M4G 1R8, Canada
[b] Department of Occupational Science & Occupational Therapy, University of Toronto, Toronto, Ontario, Canada
[c] Rehabilitation Sciences Institute, University of Toronto, Toronto, Ontario, Canada

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ABSTRACT

Background: LEGO® therapy uses children's natural interest in play to help motivate behavioural change and may be an effective teaching tool to increase social competency and communication skills. Although the literature is growing it has not been synthesized.
Objectives: To review the literature on the role of LEGO® therapy on social skills and inclusion among children and youth with Autism Spectrum Disorder (ASD).
Methods: A scoping review was conducted, involving comprehensive searches of international databases. Eligible articles included: (a) youth aged 19 or younger, with ASD; (b) empirical research on LEGO® therapy interventions; (c) published from 1996 to 2016 in a peer-reviewed journal, conference proceedings, or dissertation.
Results: Of the 6964 studies identified, 15 articles—involving 293 participants, aged 5–16 (mean age 8.7 years), across five countries—met the inclusion criteria. Although the outcomes of the LEGO® therapy varied across the studies, 14 studies reported at least one improvement in social and communication skills (e.g., building friendships, improved social interactions and social competence), ASD-specific behaviors, belonging, family relationships, coping, and reductions in playing alone.
Conclusions: Although LEGO® therapy shows promise as an intervention for children and youth with ASD, more rigorously designed studies are needed to fully understand its impact.

Autism Spectrum Disorder (ASD) is characterized by repetitive behaviours or interests and deficits in social interaction, communication, and imaginative thought.[1] Children with ASD tend to engage in independent and repetitive play rather than playing with others.[2] Such deficits in social interactions can negatively affect children's emotions and behaviours, which may lead to challenges in forming relationships later in life.[3] Children with ASD have difficulties forming and maintaining friendships with peers, and engaging in collaborative play.[4] As a result, children with ASD often have low rates of social participation,[5] which is concerning because those who are socially excluded are more likely to experience adverse physical, mental and social consequences such as depression, anxiety, and low self-esteem.[6–8] Given that social participation is a key predictor of quality of life and overall functioning, it is critical to develop the social functioning of children and youth with ASD.[5,8] Social skills and play interventions may be an effective means of engaging youth while developing social skills.[9]

Although there are published guidelines for social skills interventions for children with autism, few of them show evidence of being effective,[5,10,11] and the focus is often on modifying deficiencies rather than building on strengths.[9,12,13] LEGO® therapy is a social skills intervention that focuses on developing children's strengths and interests[12,14] while also addressing some of the criticisms in other social skills programs because it is more naturalistic and can be implemented within school settings.[2,15] LEGO® therapy draws on children's natural interest in play to help motivate behavioural change and can be used as an effective teaching tool to increase social competency and communication skills.[16] Target skills include verbal and non-verbal communication (self-initiated interactions), turn-taking, sharing, and collaboration.[16] Among typically developing youth, LEGO® has been used to help increase social skills and promote positive moods.[17] LEGO® therapy, also known as "LEGO® club" involves at least three participants,

* Corresponding author. Bloorview Research Institute, Holland Bloorview Kids Rehabilitation Hospital, 150 Kilgour Road, Toronto, Ontario, M4G 1R8, Canada.
E-mail address: slindsay@hollandbloorview.ca (S. Lindsay).

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each of whom takes a turn playing one of three roles: "supplier", "builder" or "engineer."[16] Each participant is encouraged to follow specific rules for creating the design.[16] The supplier's role is to locate and retrieve the blocks as instructed by the engineer, who is responsible for interpreting the instructions and determining which pieces are needed for each step of the assembly. The builder is responsible for assembling the blocks according to the instructions given by the engineer.[16] This process involves verbal and nonverbal communication skills, turn taking, sharing, and problem-solving skills. Although the literature focusing on LEGO® therapy for children and youth with autism is growing, it has not yet been synthesized. Our objectives were: (1) to explore the role of LEGO® therapy on social skills and inclusion among children and youth with ASD; and (2) to understand the common components of effective LEGO® therapy for children and youth with ASD. Synthesizing this research will provide insight into the benefits of such programs and how they can be further developed to meet the needs of children with ASD.

Methods

We used a scoping review methodology, which is useful for mapping the size and scope of research on a topic, synthesizing findings, and identifying gaps in the literature.[18] This is an appropriate type of review given that LEGO® therapy interventions are relatively new and we anticipate finding diverse methodologies that may not use randomized controlled trials—making it challenging to undertake a systematic review.[19] Scoping reviews are a valid way to examine the range and nature of research within a topic to determine the value of undertaking a full systematic review.[19] Scoping studies are also relevant for emerging evidence,[19] such as LEGO® therapy for children and youth with ASD. We followed the scoping review guidelines outlined by Arksey and O'Malley.[18]

Search strategy and data sources

Our search strategy was developed in consultation with a research librarian. We conducted a series of electronic searches from 1996 to 2016 using the following databases: Healthstar, PsychInfo, Embase, Ovid Medline, JSTOR, Scopus, ERIC, and Google Scholar (see Fig. 1 and Supplemental Table 1). Although LEGO® therapy is a relatively new intervention we chose these dates to be comprehensive in our search. We searched for subject headings and MeSH terms related to LEGO® therapy (LEGO®, LEGO® therapy, play therapy, social skills, collaborative play, social competence, group therapy), child (pediatric, youth, adolescent, teen), and autism (autism spectrum disorder, pervasive development disorder, Asperger syndrome, autistic disorder, high functioning autism). Minor modifications to the search strategy were made, as necessary, within individual databases. Reference lists of articles selected for inclusion were also manually reviewed to identify additional relevant articles.

Study selection

This review focused on empirical research on LEGO® therapy among children with autism. Eligible articles met the following criteria: (1) a sample of children under 19 years with ASD; (2) a LEGO® therapy intervention; (3) the article was published in English, between 1996 and 2016 in a peer-reviewed journal, conference proceeding or dissertation. To ensure that our recommendations were based on the best available evidence, articles were excluded if they were based on opinion or did not contain empirical data. The first author and a research assistant independently reviewed all titles and abstracts for relevance. All potentially relevant articles were then reviewed in full. Any discrepancies in reviewers' inclusion decisions were resolved through discussion amongst the team.

Charting and summarizing the data

The first and second authors extracted data from the articles selected for inclusion, including information on study location, participant characteristics, research design, type, and duration of the intervention and findings. The first author piloted the data table prior to implementing. We used a descriptive analytical method to extract information from each article.[18] The third author verified the data extraction tables for accuracy. If data were missing from an article we contacted the authors for further information. We also noted the limitations of each study and the risk of bias.

The extracted data were compared and contrasted, while the intervention methods and study results were explored to understand trends. The themes we identified related to the impact of LEGO® therapy interventions, methods, and study results within and across each article. After the analysis was complete, we reviewed the common characteristics across the articles, which involved discussions amongst the research team.[18]

Results

Study and participant characteristics

Of the 6964 articles identified in our search, 15 remained after removing duplicates and applying the inclusion criteria (see Fig. 1). The selected articles were published between 2004 and 2016. Six of the reported studies were conducted in the UK, five from the US, two in the Netherlands, one in Canada, and one in Finland. Table 1 provides an overview of the study characteristics. Reported sample sizes ranged from 1 to 117 participants (including control groups), for a total of 293 participants (see Table 1). The majority of participants (86%) were male. The ages of participants ranged from 5 to 16 years (mean age was 8.7; note that three studies did not report the mean age). Of the six studies that reported ASD-sub-types two focused on high functioning ASD,[20,21] and four had a mix of sub-types.[8,12,22,23] Two studies included participants where the children were perceived to have ASD because they had ASD-related behaviours although not a formal diagnosis.[15,24] The remainder of the studies did not report the ASD sub-types of their sample so it was difficult to make comparisons between the articles in this regard. We did not observe any differences in outcomes based on the ASD sub-type. Only six studies reported co-morbid characteristics of their sample including ADHD,[20,22,25] tic disorder,[22] mild intellectual impairment,[12] and psychiatric morbidities.[26] Owens reported that their sample had no psychiatric co-morbidities. Only one study explored the role of demographic factors on the impact of LEGO® therapy and found no differences based on age or gender.[12]

A wide variety of standardized and non-standardized measures were used to evaluate the effectiveness of the LEGO® therapy interventions. Of the articles that used standardized measures they included: Gilliam Autism Rating Scale (VARS) (social interaction subscale),[8,12,26] the Vineland Adaptive Behavior Scale VABS (socialization domain),[8,12,26,27] Social Competence Inventory (SCI),[15] Belonging Scale,[15] and the Autism spectrum rating scale.[28] Non-standardized measures included observations of social interactions,[2,27] social initiation,[22] social competence (i.e., initiation and duration of social interaction, autistic aloofness, rigidity), and development of age appropriate play skills,[12] communication (i.e., prepositions, visual and verbal prompts),[29] language,[21] human-