



AOTA Evidence Briefs

Autism Spectrum Disorder

**A product of the American Occupational Therapy Association's
Evidence-Based Literature Review Project*

Long-Term Outcome of Social Skills Intervention Based on Interactive LEGO® Play

LeGoff, D. B., & Sherman, M. (2006). Long-term outcome of social skills intervention based on interactive LEGO® play. *Autism: The International Journal of Research and Practice*, 10(4), 317–329.

Level II

Two groups, nonrandomized study

Why research this topic?

Few studies have examined the long-term effects of interventions designed to improve social competence in children with **autism** (see *Glossary*). One intervention developed specifically to improve social competence in children with **high functioning autism (HFA)** (see *Glossary*) is LEGO®-based interactive play groups (Legoff, 2004). These groups include siblings and peers, are structured, and have club rules. They emphasize collaborative problem solving, joint attention, communication, sharing, and turn taking in the context of a LEGO building activity. Although short-term gains for LEGO therapy were demonstrated (Legoff, 2004), long-term gains have not been investigated.

What did the researchers do?

This Level II retrospective study examined the long-term benefits of LEGO-based interactive play groups on social skills and autistic behaviors over a 3-year period. The study was conducted with children who were referred by state departments of health and/or education to a private multidisciplinary autism disorders clinic for assessment and/or treatment services. A pretest/posttest control group design was used. The LEGO groups comprised 60 children who had participated in the group sessions for at least 36 months. During this time, they also had individual therapy. This sample of convenience consisted of children for whom pretest and posttest data were available.

The control group also received group and individual therapy weekly; however, their mental health interventions used traditional materials, not LEGO. Both groups received similar amounts of occupational, physical, and speech therapy. The groups were similar in gender, age, and diagnosis.

The pretest and posttest measures were the Vineland Adaptive Behavior Scales–Socialization Domain (VABS–SD) and the Gilliam Autism Rating Scale–Social Interaction (GARS–SI). It was hypothesized that the LEGO therapy groups would show great gains in social competence, as measured by these two scales. In addition, it was hypothesized that IQ, diagnosis, overall adaptation, and communication skills would not affect treatment outcomes.

What did the researchers find?

Comparing the 3-year outcomes, both the LEGO and control groups made significant improvements in social competence as measured by the VABS–SD and the GARS–SI. The LEGO groups made twice the gains demonstrated by the control group on the VABS–SD. The LEGO therapy group also improved more on the GARS–SI scores.

In a secondary analysis, Legoff and Sherman found that condition (whether the child was diagnosed with autism, Asperger syndrome, or Pervasive Developmental Disorder) and IQ did not affect outcomes. Communication ability as measured by the VABS–SD did correlate with outcome, and children with intact communication benefited more from the LEGO therapy.

What do the findings mean?

Over a 3-year period, the LEGO-based interactive therapy participants gained social competence (as measured by the VABS–SD) and showed reduced autistic behaviors (as measured by the GARS) when compared to a matched control group. The outcomes were **not significantly** (see *Glossary*) related to diagnosis; however, participants with HFA and intact language improved more in adaptive social behaviors than did participants with HFA and communication limitations.

The LEGO therapy is similar to occupational therapy intervention in that a play activity is used to achieve improvement in social goals. These goals include collaborative problem solving, turn taking, sharing, communication, and joint attention. Occupational therapy interventions also emphasize the child’s achievement of mastery and skilled performance. When a child achieves mastery in an activity, he or she is likely to participate in similar activities and generalize behaviors to other settings; therefore, the skills practiced and gained in LEGO therapy groups and play-based interventions may be easily generalized and sustained. In this study, the measures indicated that LEGO-based interactive therapy generalized beyond the intervention setting.

What are the study's strengths and limitations?

The strengths of this study are that it examined long-term effects and used a matched comparison group. The intervention was well designed and is conceptually similar to occupational therapy interventions because it uses an activity that is inherently rewarding, involves group roles and interactions, and involves learning LEGO building skills and group rules. The outcome examined, social competence, is an important focus of occupational therapy services, because it is critical to social participation involving appropriate verbal and nonverbal communication and interaction with peers and adults.

The limitations include using samples of convenience from one practice setting. Only children who stayed in intervention for 3 years and who had pretests and posttests were included. Therefore, children who discontinued intervention were not included or reported. Another significant problem is that the first author completed the GARS at pretest and posttest times for all of the children and was not **blinded** (see *Glossary*) to treatment condition. Although the parents were interviewed when completing the GARS, the author's evaluation of participants introduced potential **bias** (see *Glossary*).

Glossary

Autism—Autism Spectrum Disorder—Pervasive Developmental Disorders (PDD) is the diagnosis used in the *Diagnostic and Statistical Manual of Mental Disorders* (4th ed.), text revision (DSM-IV-TR; American Psychiatric Association [APA], 2000) and in the International Classification of Diseases (ICD-10; World Health Organization, 1993) to describe children with a cluster of symptoms that vary widely in type and severity. The symptoms are grouped into three broad categories: (a) qualitative impairment in social interaction; (b) communication disorders; and (c) stereotyped, repetitive patterns of behaviors or a restricted range of interests. Depending on the level and distribution of impairment across these categories, a child can be diagnosed with Autistic Disorder, Asperger syndrome, or Pervasive Developmental Disorder—Not Otherwise Specified (PDD—NOS). All three of these diagnoses are usually included under the umbrella term “autism spectrum disorders” (ASDs).

The Individuals with Disabilities Education Improvement Act of 2004 (IDEA, Pub.L. 108–446) also includes autism as a disability category under which children might be eligible for special education and related services. The IDEA regulations define autism as “a developmental disability significantly affecting verbal and nonverbal communication and social interaction generally evident before age 3 that adversely affects a child's educational performance. Other characteristics often associated with autism are engagement in repetitive activities and stereotyped movements, resistance to environmental change or change in daily routines, and unusual responses to sensory experiences” (34 C.F.R., §300.7[c][1][i]).

Biased/biases—Biases are systematic errors within a study. When a study is biased, the means of treatment and/or control groups are artificially inflated or reduced. This artificial inflation or reduction can cause the study's results to be incorrect; the treatment will appear to have an effect, when in reality it does not, or vice versa. Many of the limitations reported in these evidence briefs are related to biases.

Blinded/blinding—Blinding refers to the practice of keeping members of the research study unaware of which group a participant is assigned to (treatment or control) in the study. Single blinding usually refers to keeping study participants unaware of whether they are receiving the experimental or the sham treatment. Double blinding usually refers to keeping the participants and those who are administering the treatment unaware of who is receiving the experimental and who is receiving the sham treatments. In some cases, where it is impossible to blind those administering treatment, the individuals who are administering the outcome measures can be blinded to group status.

Studies in which blinding does not occur can have significant biases. When the participants know that they are receiving the experimental treatment, they often get better because they think they ought to (this is often referred to as the placebo effect). When researchers know that a participant is receiving the experimental treatment, they often subconsciously favor those participants when evaluating them on outcome measures. For example, when timing a participant in the treatment group, researchers may unknowingly stop the watch a little faster or slower so the treatment participant seems to do better.

High Functioning Autism (HFA)—Individuals with autism spectrum disorder who score higher on tests of IQ (IQ > 70) and adaptive behavior.

Significance (or significant)—A statistical term that refers to the probability that the results obtained in the study are not due to chance, but to some other factor (e.g., the treatment of interest). A significant result is likely to be generalizable to populations outside the study.

Significance should not be confused with *clinical effect*. A study can be statistically significant without having a very large clinical effect on the sample. For example, a study that examines the effect of a treatment on a client's ability to walk may report that the participants in the treatment group were able to walk significantly longer distances than those in the control group. However, after reading the study one may find that the treatment group was able to walk, on average, 6 feet, whereas the control group was able to walk, on average, 5 feet. Although the outcome may be statistically significant, a clinician may not feel that a 1-foot increase will make his or her client functional.

References

American Psychiatric Association. (2000). *Diagnostic and statistical manual of mental disorders* (4th ed.—Text Revision). Washington, DC: Author.

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World Health Organization. (1993). *International classification of diseases: Diagnostic criteria for research* (10th ed.). Geneva, Switzerland: World Health Organization.

This work is based on the evidence-based literature review completed by Jane Case-Smith, EdD, OTR/L, FAOTA

For more information about the Evidence-Based Literature Review Project, contact the Practice Department at the American Occupational Therapy Association, 301-652-6611, x 2040.



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