





The Effectiveness of the Early Start Denver Model on Empathy and Adaptive Behavior in Preschool Children with Autism Spectrum Disorder

Rawaa Izzat Maruf Al-Sadi¹, Ilnaz Sajjadian²^{*}, Ibrahim Mortadha Al-Araji³, Mohsen Golparvar⁴

1. PhD Student, Department of Psychology, Isfahan (Khorasgan) Branch, Islamic Azad University, Isfahan, Iran.

2. Associate professor, Department of Clinical Psychology, Isfahan (Khorasgan) Branch, Islamic Azad University, Isfahan, Iran (Corresponding author).

3. Professor, Department of Psychology, Baghdad University, Baghdad, Iraq.

4. Professor, Department of Psychology, Isfahan (Khorasgan) Branch, Islamic Azad University, Isfahan, Iran.

* Corresponding author email address: i.sajjadian@khuif.ac.ir

Article Info

Article type:

Original Research

How to cite this article:

Al-Sadi R, Sajjadian I, Al-Araji I, Golparvar M. (2024). The Effectiveness of the Early Start Denver Model on Empathy and Adaptive Behavior in Preschool Children with Autism Spectrum Disorder. *Iranian Journal of Neurodevelopmental Disorders*, 3(3), 45-54.

<https://doi.org/10.61838/kman.jndd.3.3.6>



© 2024 the authors. Published by Iranian Association for Intelligence and Talent Studies, Tehran, Iran. This is an open access article under the terms of the Creative Commons Attribution-NonCommercial 4.0 International (CC BY-NC 4.0) License.

ABSTRACT

Objective: This study aimed to determine the effectiveness of the Early Start Denver Model (ESDM) on empathy and adaptive behavior in preschool children with ASD.

Methods and Materials: This quasi-experimental study employed a pretest-posttest design with follow-up and a control group. The statistical population included all preschool children aged 3 to 5 years attending the Autism Center at Baghdad Health Complex in 2024. A total of 30 children diagnosed with ASD were selected using purposive sampling based on inclusion and exclusion criteria. They were randomly assigned to experimental and control groups (15 children in each group). The experimental group received 10 sessions of ESDM, each lasting 60 minutes, while the control group was placed on a waitlist without any intervention. Data collection instruments included the Bahr Empathy Questionnaire and the Vineland Adaptive Behavior Scales. Data were analyzed using repeated-measures ANOVA with SPSS version 23.

Findings: The results revealed significant differences in the mean scores for empathy and adaptive behavior between the pretest and posttest stages, as well as between the pretest and follow-up and the posttest and follow-up stages in the intervention group ($p < .001$). Empathy and adaptive behavior showed improvements in the posttest and follow-up stages compared to the pretest. Furthermore, scores remained stable in the follow-up stage compared to the posttest.

Conclusion: The findings suggest that the ESDM can enhance empathy and adaptive behavior in preschool children with ASD by improving their social skills. This intervention empowers children to address behavioral challenges and serves as a foundation for future research on preschool interventions for children with ASD. It is recommended that healthcare and counseling centers adopt the ESDM to address behavioral challenges in these children.

Keywords: Autism spectrum disorder, adaptive behavior, Early Start Denver Model, empathy.

1. Introduction

Autism spectrum disorder (ASD) is categorized as a neurodevelopmental disorder in the fifth edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM-5). Its diagnostic criteria fall into two behavioral domains: (1) deficits in social communication and interaction, including difficulties in initiating and responding socially, challenges in nonverbal communication, and impairments in social insight and relationships; and (2) restricted, repetitive patterns of behavior, interests, or activities, including resistance to change, preoccupation with specific objects or topics, and atypical sensory behaviors (APA, 2022). ASD can impact a child's nervous system, affecting various skills such as verbal and nonverbal communication and social interactions (Maurizio et al., 2022).

The prevalence of ASD globally is approximately 1 in 1,000 children. Boys are 4 to 5 times more likely to be diagnosed with ASD, although girls are more likely to exhibit severe intellectual disabilities. In a country like Iran, with a population of about 80 million, it is estimated that there are approximately 150,000 individuals with ASD (Gorji et al., 2021). Studies conducted by the U.S. Department of Education and other governmental organizations indicate that ASD is increasing at a rate of 10-17% annually (Wahdan et al., 2023). Similar concerning trends have been observed in Iran (Faramarzi et al., 2021). The prevalence of ASD spectrum disorders is 60 per 10,000 individuals, with 8–30 per 10,000 diagnosed specifically with autism (Baghban Vahidi et al., 2017; Gorji et al., 2021). One of the most well-known and persistent characteristics of ASD from childhood to adulthood is deficits in social skills. A core challenge in the social skills of children with ASD is the inability to demonstrate empathy and reciprocal social interaction (Ali & Fazil, 2022).

Empathy refers to the ability to adopt another person's perspective and experience their thoughts and feelings (MacDonald & Price, 2019). Theoretical approaches to empathy are classified into two types: cognitive and emotional. Cognitive empathy involves understanding another person's internal states, such as their thoughts, emotions, perceptions, and intentions (Sigelman et al., 2018). In contrast, emotional empathy emphasizes sharing emotional responses with others (Cuff et al., 2016). Research by Rueda et al. (2015) indicates that cognitive empathy levels are lower than emotional empathy in children with ASD. Deficits in empathetic behaviors are often evident in

the first 20 months of life in children with ASD (Rueda et al., 2015). Empathy and compassion require recognizing and understanding the emotions of others, which these children often lack. As a critical social skill, empathy can improve the ability of children with ASD to navigate the social world (Baron-Cohen & Wheelwright, 2004).

Children with ASD frequently struggle with interpersonal relationships and tend to have restricted, repetitive behaviors. They also show little interest in understanding others' emotions through facial expressions, tone of voice, or body language, limiting their ability to express empathy (Peterson, 2014). Research by Aan het Rot and Hogenelst (2014) found that interpersonal difficulties in children with ASD may be partly related to their low cognitive empathy (Aan het Rot & Hogenelst, 2014). Tarbox et al. (2014) demonstrated that individuals with ASD do not develop typical levels of empathy and compassion and struggle to express emotions effectively (Tarbox et al., 2014). Overall, research underscores that empathy deficits are a central feature of ASD (Williams & Cameron, 2017).

Another significant challenge for children with ASD is adaptive behavior (Sattler, 2002). Adaptive behavior is defined as the ability to perform daily activities required for personal and social competence, such as self-help, interpersonal relationships, household management, recreation, work, and social life (Brawn & Porter, 2014). It encompasses functional skills such as self-care, social skills, and self-management, which are essential for independent living (Brawn & Porter, 2014). Adaptive behavior includes ten domains: communication, self-care, home-living, social skills, community use, self-direction, health and safety, functional academics, leisure, and work skills (Jalil Abkenar et al., 2013).

Most children acquire these behaviors naturally through interactions with their parents, siblings, and peers without explicit teaching (Raines, 2016). However, studies indicate that children with ASD show significantly weaker adaptive behavior than their typically developing peers (Gillham et al., 2000). These challenges include deficits in social and language skills, difficulties in interpersonal interactions, and an inability to comprehend and express emotions effectively. These deficits hinder their ability to understand and use pragmatic language, such as sarcasm or irony (Singer, 2009). Consequently, children with ASD exhibit poor social skills and face significant behavioral issues (Soares et al., 2021; Wahdan et al., 2023).

Developing and implementing suitable intervention programs to improve social cognition and other

psychological components in children with ASD is critical (Savas & Ilyas, 2014). Various interventions, including self-help skill training, emotion-seeking programs, prelinguistic skill training, and play therapy, have been employed to address ASD symptoms over the years (Khalili & Ansari Shahidi, 2018).

Early intervention has gained importance with the earlier diagnosis of ASD in children. Meta-analyses and extensive reviews have concluded that intensive and comprehensive early interventions yield better outcomes for children with ASD than standard treatments (Reichow, 2012). The Early Start Denver Model (ESDM) adopts a comprehensive approach based on developmental and behavioral sciences (Rogers & Dawson, 2020; Rogers et al., 2012; Rogers et al., 2019). ESDM focuses on early interventions to enhance social skills and empathy in children with ASD.

This approach, designed for children with ASD, features a structured curriculum divided into four levels (Rogers & Dawson, 2020). ESDM emphasizes the critical role of parents in implementing early interventions in home settings (Ruiz & Braden, 2021). Rogers et al. (2019) found that a 12-week ESDM intervention improved group tasks, social interactions, and parent-child relationships (Rogers et al., 2019). Similarly, Touzet et al. (2017) demonstrated that ESDM significantly enhanced the cognitive levels of children with ASD, with secondary outcomes including improved behavioral adaptation, communication skills, sensory profiles, and parental quality of life (Touzet et al., 2017).

Additionally, El-Zaiat (2023) reported that ESDM-based educational programs significantly improved language development in children with ASD (El-Zaiat, 2023). Many studies have shown that parent-led ESDM interventions provide children with ASD greater learning opportunities (Waddington et al., 2016). Parents can be trained to implement ESDM with fidelity, resulting in improved outcomes for their children (Stadnick et al., 2015).

Given the increasing number of children diagnosed with ASD, there is an urgent need for effective interventions to alleviate their psychological symptoms. A review of existing research revealed no studies specifically examining the effectiveness of ESDM in improving empathy and adaptive behavior in preschool children with ASD. Therefore, this study aims to evaluate the impact of ESDM on empathy and adaptive behavior in preschool children with ASD.

2. Methods and Materials

2.1. Study Design and Participants

This study is of a quasi-experimental design with a pre-test, post-test, and follow-up assessment, alongside a control group. The statistical population of the study consisted of all preschool children diagnosed with autism who attended the Autism Center in the Health Town of Baghdad in 2024. The sample included 30 individuals from the aforementioned population, selected using a convenience sampling method through referrals and specialist recommendations for this study, and based on the inclusion criteria, they were purposively selected. These children were then randomly assigned into two groups: an experimental group (early Denver intervention) and a control group, with 15 participants in each group.

The inclusion criteria were as follows: children aged 3 to 5 years diagnosed with autism, parental consent for participation in the study, written consent from parents for their children's involvement, and a valid certificate from a specialist confirming the diagnosis of autism. The exclusion criteria were: physical disabilities, age above 5 years, and simultaneous receipt of other therapeutic interventions.

In this study, preschool children aged 3 to 5 years with autism, attending the Autism Center in the Health Town of Baghdad, were randomly assigned to an experimental group and a control group (each group containing 20 participants). They completed the Empathy - Behavior and Analysis Questionnaire and the Weiland Adaptive Behavior Scale. The experimental group then received the Early Denver Model intervention in 10 sessions, each lasting 60 minutes, while the control group received no training. After the therapy sessions, participants completed the same questionnaires (Empathy - Behavior and Analysis and Weiland Adaptive Behavior Scale) again. A follow-up assessment was conducted 45 days later to evaluate the effect of the intervention.

For ethical considerations, the control group received the same treatment sessions after the study concluded.

Data collection was performed using a demographic questionnaire, including information about the mother's age, education, and the child's gender. Additionally, the following tools were used:

2.2. Measures

2.2.1. Empathy

This questionnaire was developed by Ayung et al. (2009) and contains 11 items scored using a 4-point Likert scale. To

obtain the total score, the scores for each item are summed. A higher score indicates a higher level of empathy. A score of 22 can be considered the cut-off point or average score for the questionnaire. In other words, if the score is above 22, it indicates a higher level of empathy, and if it is below 22, it reflects a lower-than-average level of empathy (Naghizadeh, 2012). Internal consistency for the empathy scale was reported as 0.93, and for the analysis scale, it was 0.78 (Auyeung et al., 2009). Test-retest reliability after 6 months was reported to be 86% for empathy and 80% for analysis (Khani & Haghayegh, 2018). In the present study, the reliability of the questionnaire was found to be 0.798 using Cronbach's alpha.

2.2.2. Adaptive Behavior

This scale was first published by Dahl in 1965 and revised by Sparrow et al. (1984) (Veen, 2004). It consists of 117 items, divided into 11 age groups. The items cover 8 areas: general self-help, eating, dressing, self-direction, occupation, communication, mobility, and socialization. This scale is a developmental scale related to an individual's ability to meet their practical needs and take responsibility for their life. While the scale covers ages from birth to over 25 years, with separate items for each year up to age 12, from age 12 onwards, the items are standardized. The scale has been shown to be particularly effective in exceptional groups. In 1968, Dahl performed norming on 620 men and women from each age group (birth to 30 years), reporting a reliability coefficient of 0.92 (Anastasi, 1976). In Iran, Jalilvand and Ghobari Benab (2004) reported the scale's validity as 0.81 and reliability as 0.73, noting that its validity and reliability were higher in younger age groups, particularly among those with intellectual disabilities. In another study, the Cronbach's alpha coefficient for the scale was reported as 0.86 (Moradi, 2021). In the current study, the reliability of the scale was found to be 0.754 using Cronbach's alpha.

2.3. Intervention

2.3.1. Early Denver Model

The experimental group received the Early Denver Model (EDM) intervention, designed by Rogers et al. (2012). The intervention was conducted in 10 sessions, each lasting 60 minutes, with a follow-up session after 45 days (Dawson et al., 2010; El-Zaiat, 2023; Laister et al., 2021; Rogers &

Dawson, 2020; Rogers et al., 2012; Rogers et al., 2019; Touzet et al., 2017; Waddington et al., 2016).

Session 1: Increasing Child's Attention and Motivation: The goal of the first session is to enhance the child's attention and motivation. The therapist identifies the child's focus area and removes any competing distractions from the environment. A safe zone for the child is established, ensuring that the therapist remains within these boundaries. The child is encouraged to lead the interaction, allowing the therapist to join in and follow the child's lead.

Session 2: Using Daily Sensory Activities for Social Engagement: In this session, the therapist uses sensory play activities and social games to increase the child's motivation to interact with their surroundings. The rhythm of the child's social-sensory play is observed, and a list of these games is created. The therapist explores more effective ways to perform these activities and optimizes the child's energy level for maximum learning. The child is taught to hand objects to the therapist and to point at objects as a way to share their experiences.

Session 3: Using Daily Activities for Social Participation and Multi-person Activities: This session focuses on facilitating the child's engagement in shared activities and turn-taking behaviors. The therapist sets the stage for initiating joint activities, increasing the complexity of the tasks while ensuring the child participates in everyday routines. The goal is to create opportunities for social interaction in the midst of daily activities.

Session 4: Enhancing Non-Verbal Communication: The aim of this session is to encourage non-verbal communication skills. The therapist minimizes the child's direct needs fulfillment and instead waits for the child to communicate, creating many opportunities for the child to practice. Simple words are added to the child's body language and gestures, as well as to the therapist's own non-verbal cues.

Session 5: Developing Imitation Skills: This session emphasizes imitation skills, encouraging the child to mimic sounds, object manipulation, gestures, and body postures. Imitation is integrated into the shared activities, and the therapist models imitative behaviors that the child can replicate, thus enhancing cognitive and social engagement.

Session 6: Facilitating Joint Attention: The focus of session six is to foster joint attention. The therapist organizes play activities involving objects in a way that facilitates focus on the same subject. Variations in the games are introduced, allowing the child to engage in new play methods. When the child's interest wanes, the therapist

transitions to a new activity, ensuring continued engagement.

Session 7: Promoting Expressive and Receptive Language Development: This session aims to promote the child's expressive and receptive language. The therapist expands on the sounds made by the child, creating auditory play with those sounds. Opportunities for the child to listen and respond to others' speech are encouraged, and gestures and sounds are incorporated into the child's language development. The therapist fosters an expectation for responses from the child and makes use of natural language reinforcement, while minimizing direct instructions.

Session 8: Teaching Understanding of Behavior as Antecedent-Behavior-Consequences: In this session, the therapist focuses on helping the child understand the relationship between antecedents, behaviors, and consequences (ABC). The child's behavior is closely observed, and a reward is selected as a consequence. The therapist focuses on the events that occur just before and after the behavior to help the child learn the cause-and-effect relationship between actions and outcomes.

Session 9: Improving Shaping and Fading Skills: This session focuses on shaping and fading behaviors. The therapist encourages the child to respond and ensures the use of natural reinforcers for speech development. Fewer direct instructions are given, but those that are provided are clear and firm. The therapist supports the child in understanding and processing new words and instructions, thus enhancing the child's response and engagement.

Session 10: Evaluation of Results from Corrective and Therapeutic Training: The final session involves evaluating the results of the corrective and therapeutic interventions. The therapist assesses the child's progress in terms of attention, communication, and social skills based on the previous sessions and identifies areas that may require further support or adjustment in the intervention strategy. This assessment guides the next steps for the child's continued development.

2.4. Data Analysis

Data were analyzed using repeated measures analysis of variance (ANOVA) in SPSS-23.

3. Findings and Results

The mean age of children in the experimental group was 3.97 years, while in the control group it was 4.11 years. A comparison of the mean ages between the two groups using a t-test revealed no significant difference in the children's ages ($p > 0.05$). In the experimental group, 5 individuals (33.3%) had education below high school, 6 individuals (40%) had a high school diploma, 3 individuals (20%) had an associate's degree, and 1 individual (6.7%) had a bachelor's degree. In the control group, 3 individuals (20%) had education below high school, 9 individuals (60%) had a high school diploma, 2 individuals (13.3%) had an associate's degree, and 1 individual (6.7%) had a bachelor's degree. The results of a chi-square test indicated that the frequency distribution of education levels did not differ significantly between the two groups ($p > 0.05$). In the experimental group, the average age of the mothers was as follows: 4 mothers (26.7%) were under 30 years old, 9 mothers (60%) were between 30 and 40 years old, and 2 mothers (13.3%) were over 40 years old. In the control group, 1 mother (6.7%) was under 30 years old, 10 mothers (66.7%) were between 30 and 40 years old, and 4 mothers (26.7%) were over 40 years old. The results of the chi-square test showed that the frequency distribution of mothers' age groups in both groups was not significantly different ($p > 0.05$). The frequency and percentage of the children's gender were as follows: in the experimental group, 12 children (80%) were boys, and 3 children (20%) were girls; in the control group, 11 children (73.3%) were boys, and 4 children (26.7%) were girls. The chi-square test indicated no significant difference in the gender distribution of children between the two groups ($p > 0.05$).

Descriptive statistics for the research variables are presented in [Error! Reference source not found.](#)

Table 1

Descriptive Statistics of Research Variables by Group and Stage

Variable	Group	Pre-Test M (SD)	Post-Test M (SD)	Follow-Up M (SD)
Empathy	Experimental	22.4 (1.88)	32.02 (4.42)	30.53 (4.55)
	Control	22.6 (3.43)	23.13 (3.68)	23.07 (3.75)
Adaptive Behavior	Experimental	45.13 (6.11)	57.27 (8.08)	56.6 (9.27)
	Control	46.6 (6.79)	47.01 (7.25)	47.26 (7.02)

As seen in **Error! Reference source not found.**, based on descriptive findings, the mean scores of empathy and adaptive behavior in the experimental group showed a greater increase in the post-test and follow-up stages compared to the pre-test.

The use of parametric repeated measures tests requires meeting several assumptions, including the normality of scores, equality of variances, and equality of the covariance matrix. If the group sizes are unequal and fewer than 40 participants, these assumptions must be checked and confirmed to apply these tests (Molavi, 2006).

The goal of checking the assumption of normality is to ensure that the distribution of scores is consistent with that of the population. This assumption is based on the premise that the observed difference between the sample's score distribution and the normal distribution is not significant. To test this, the Shapiro-Wilk test was used. The results of this test on the research variables indicated that the null hypothesis of normality for the score distributions in the

research variables at all three stages (pre-test, post-test, and follow-up) remained valid in both groups (all significance levels were greater than 0.05).

Thus, the null hypothesis of normality for all research variables, including empathy and adaptive behavior, remains valid at all stages (pre-test, post-test, and follow-up), meaning the sample's distribution is normal and consistent with the population, with skewness and kurtosis being due to random variation (all significance levels were greater than 0.05). The assumption of equality of variances in the groups for the research variables, including empathy and adaptive behavior, remained valid at all three stages (pre-test, post-test, and follow-up) ($p > 0.05$). The assumption of homogeneity of covariances was confirmed using the Mauchly test for the research variables of adaptive behavior and empathy ($p < 0.05$).

The results of the analysis of between-subject and within-subject effects for the research variables are presented in **Error! Reference source not found.**

Table 2

Results of analysis of between-subject and within-subject effects for the research variables

Variable	Effect	Source	Sum of squares	Degrees of freedom	Mean square	F	Significance	Effect size	Power
Empathy	Between-subjects	Group	650.711	1	650.711	19.09	0.001	0.45	0.988
	Within-subjects	Time effect	447.489	2	223.744	59.33	0.001	0.679	1.000
		Time × Group	357.356	2	178.678	47.87	0.001	0.629	1.000
Adaptive behavior	Between-subjects	Group	822.044	1	822.044	5.25	0.03	0.158	0.7
	Within-subjects	Time effect	761.156	2	380.578	67.28	0.001	0.697	1.000
		Time × Group	637.956	2	318.978	53.87	0.001	0.658	1.000

As shown in **Error! Reference source not found.**, based on the results, the main effect of group in all research variables was significant ($p < 0.05$). In other words, there was a significant difference in the mean scores of the research variables between the experimental group (early intervention Denver) and the control group ($p < 0.05$). The results indicated that 40.5% of the difference in empathy and 15.8% of the difference in adaptive behavior can be attributed to the group difference. Within-subject effects also showed that there were significant differences between the mean scores of empathy and adaptive behavior in the pre-test, post-test, and follow-up stages for all four tests ($p < 0.001$). Additionally, the interaction of time and group membership for both variables was found to be significant ($p < 0.001$). In other words, the difference in empathy and

adaptive behavior scores at the three stages (pre-test, post-test, and follow-up) was significant for the entire sample, with differences at the pre-test, post-test, and follow-up stages being 69.7%, 67.9%, and significant, respectively. Moreover, the difference in scores for both variables at the three stages in the two groups was significant, indicating that the rate of change in scores at the pre-test, post-test, and follow-up stages was significantly different between the groups. The effect size for adaptive behavior in the research stages was 65.8% for empathy and 62.9% for adaptive behavior.

Results from the Bonferroni post-hoc test comparing the experimental and control groups at the research stages are presented in **Error! Reference source not found.**

Table 3

Results of post-hoc Bonferroni test comparing groups by research variables at the post-test and follow-up stages

Phase	Variable	Mean Difference	Significance	Effect Size
Post-Test	Empathy	8.86	0.001	0.56
	Adaptive Behavior	10.267	0.001	0.326
Follow-Up	Empathy	7.47	0.001	0.462
	Adaptive Behavior	9.933	0.003	0.256

As seen in [Error! Reference source not found.](#), the mean differences in the scores of empathy and adaptive behavior in the experimental and control groups at both the post-test and follow-up stages were statistically significant ($p < 0.001$). The effect of early Denver intervention at the post-test stage for empathy was 56% and for adaptive behavior was 32.4%. At the follow-up stage, the effect size for empathy was 46.2% and for adaptive behavior was 25.6%.

In conclusion, it can be stated that early Denver intervention has a significant effect on improving empathy and adaptive behavior in preschool children with autism, and the therapeutic effects remained evident in the follow-up stage.

4. Discussion and Conclusion

This study aimed to evaluate the effectiveness of the Denver Early Intervention Program on empathy and adaptive behavior in preschool children with autism. The results of this study indicated that the Denver Early Intervention Program had a significant effect on empathy and adaptive behavior over time and across group membership, and these treatment effects remained during the follow-up phase. In other words, the intervention improved empathy and adaptive behavior in the participants.

When comparing the results of this study with similar research, although the Denver Early Intervention Program had not previously been examined specifically for empathy and adaptive behavior in preschool children with autism, the findings align with prior studies ([Baghban Vahidi et al., 2017](#); [Dawson et al., 2010](#); [El-Zaiat, 2023](#); [Khosh Akhlagh, 2017](#); [Laister et al., 2021](#); [Masi et al., 2022](#); [Rogers & Dawson, 2020](#); [Rogers et al., 2012](#); [Rogers et al., 2019](#); [Touzet et al., 2017](#); [Waddington et al., 2016](#)). In explaining the effectiveness of the Denver Early Intervention Program on empathy in preschool children with autism, it can be argued that this approach includes joint activities between

parents and children, which encourages the child to learn and strengthen language, social, and cognitive skills. The principles of this method can be summarized as follows: teaching based on the toddler's understanding and development, focusing on building constructive relationships, and teaching during play and daily activities to encourage interaction and communication ([Dawson & Rogers, 2010](#)). In other words, using play allows children to express their emotions and thoughts, explore their interests, and gain a sense of control over their environment. The development of these skills enhances self-awareness, self-knowledge, empathy, and ultimately facilitates group and social living ([Ghiyasi Zadeh, 2013](#)). Additionally, play can be used to promote the development of motor, cognitive, language, problem-solving, emotional recognition, and logical reasoning skills, providing opportunities for children to understand their environment, recognize the people around them, identify environmental limitations, and adapt effectively. Ultimately, this process fosters a collaborative mindset, cooperation, and the development of social skills, including empathy ([Hashemi Poor & Mohammadi, 2018](#)).

In explaining the effectiveness of the Denver Early Intervention Program on adaptive behavior in preschool children with autism, it can be said that this method pays special attention to contextual factors and places the primary responsibility on the main caregivers. The treatment enhances the family's capacity and involves techniques that are applied during everyday activities in the natural family environment ([Vakili Zadeh et al., 2015](#)). In this approach, parents and therapists use play to create constructive and enjoyable relationships, and through joint activities, children are encouraged to enhance their language, social, and cognitive skills ([Dawson et al., 2010](#)). Since one of the essential characteristics in diagnosing autism spectrum disorder is the persistent deficit in social communication and social interaction, as well as adaptive behaviors, the Denver Early Intervention Program enables individuals to engage in reciprocal relationships with others by enhancing language

skills through play and increasing social skills. This allows children to respond positively, avoid inappropriate behaviors, and improve their ability to make friends, leading to more adaptive behaviors. In other words, this method, through supporting parents and improving their approaches to handling children and parenting strategies, reduces behavioral issues and enhances social and emotional competence (Mohammad Zadeh & Qamarani, 2017). Additionally, one advantage of the Denver model is that it evaluates the child both at the treatment center and at home. After necessary evaluations, personalized exercises are provided to parents. It is important to attract and maintain the child's attention when the training begins. Throughout the intervention, some pre-existing behaviors in the child are reinforced through rewards. For behaviors not present in the children's behavioral program, parents and teachers are encouraged to use reward-based strategies. This skilled management of consequences allows for increased learning and a reduction in undesirable behaviors. In other words, the power, timing, and frequency of reinforcement affect the quality, intentions, speed, and frequency of behavior, as well as the rate of learning (Laister et al., 2021; Masi et al., 2022), and this process leads to increased adaptive behavior in these children.

In conclusion, it can be said that the Denver Early Intervention Program had a significant effect on empathy and adaptive behavior in preschool children with autism during the post-test phase, and this effect was sustained during the follow-up phase. It can be argued that the Denver Early Intervention Program is effective in improving empathy and adaptive behavior in preschool children with autism.

Limitations of this study include its cross-sectional nature, the research being conducted in Baghdad, and the lack of comparison of the effectiveness of this therapeutic method with other methods. Furthermore, this study focused on preschool children aged 3 to 5 years with autism, so future studies are recommended to include other samples and time periods. A comparative study between this therapeutic method and other treatments in this area is also suggested.

Authors' Contributions

Authors contributed equally to this article.

Declaration

In order to correct and improve the academic writing of our paper, we have used the language model ChatGPT.

Transparency Statement

Data are available for research purposes upon reasonable request to the corresponding author.

Acknowledgments

We would like to express our gratitude to all individuals helped us to do the project.

Declaration of Interest

The authors report no conflict of interest.

Funding

According to the authors, this article has no financial support.

Ethics Considerations

The study protocol adhered to the principles outlined in the Helsinki Declaration, which provides guidelines for ethical research involving human participants.

References

- Aan het Rot, M., & Hogenelst, K. (2014). The Influence of Affective Empathy and Autism Spectrum Traits on Empathic Accuracy. *PLoS One*, 9(6), e98436. <https://doi.org/10.1371/journal.pone.0098436>
- Ali, H. H., & Fazil, H. (2022). Efficacy of Discrete Trial Training in Developing Social-Communication Skills in Children with Autism. *Journal of Behavioral Sciences*, 32(1), 1-10. <https://doi.org/10.20286/jrehab-170140>
- Anastasi, A. (1976). *Psychological Testing*. University of Tehran. <https://www.scribd.com/document/235152020/Anne-Anastasi-Psychological-Testing>
- APA, A. P. A. (2022). *Diagnostic And Statistical Manual Of Mental Disorders, Fifth Edition, Text Revision (DSM-5-TR)*. <https://doi.org/10.1176/appi.books.9780890425787>
- Auyeung, B., Wheelwright, S., Allison, C., Atkinson, M., Samarawickrema, N., & Baron-Cohen, S. (2009). The children's empathy quotient and systemizing quotient: sex differences in typical development and in autism spectrum conditions. *Journal of Autism and Developmental Disorders*, 39, 1509-1521. <https://doi.org/10.1007/s10803-009-0772-x>
- Baghban Vahidi, M., Hossein Khanzadeh, A., & Nedaei, N. (2017). The effect of teaching effective communication skills to mothers of children with autism on improving the social skills of these children. *Journal of Disability Studies*, 7, 231-238. <https://www.sid.ir/paper/355878/en>
- Baron-Cohen, S., & Wheelwright, S. (2004). The empathy quotient: an investigation of adults with Asperger syndrome

- or high-functioning autism, and normal sex differences. *Journal of Autism and Developmental Disorders*, 34(2), 163-175. <https://doi.org/10.1023/B:JADD.0000022607.19833.00>
- Brawn, G., & Porter, M. (2014). Adaptive functioning in Williams syndrome and its relation to demographic variables and family environment. *Research in Developmental Disabilities*, 35(12), 3606-3623. <https://doi.org/10.1016/j.ridd.2014.08.012>
- Cuff, B. M. P., Brown, S. J., Taylor, L., & Howat, D. J. (2016). Empathy: A Review of Concept. *Emotion Review*, 8(2), 144-153. <https://doi.org/10.1177/1754073914558466>
- Dawson, G., Rogers, S., Munson, J., Smith, M., Winter, J., Greenon, J., Donaldson, A., & Varley, J. (2010). Randomized, Controlled Trial of an Intervention for Toddlers With Autism: The Early Start Denver Model. *Pediatrics*, 125, e17-e23. <https://doi.org/10.1542/peds.2009-0958>
- El-Zaiat, H. M. (2023). Effectiveness of a Training Program Based on the Principles of Early Start Denver Model on Increasing Language Development in Children with Autism Spectrum Disorder. *Journal of Scientific Research in Education*, 24(6), 1-49. <https://doi.org/10.1016/j.jaac.2012.08.003>
- Faramarzi, S., Samani, S., Amini Manesh, S., & Omidvar, B. (2021). The effectiveness of the identity play method in improving imitation skills in children with autism. *Islamic lifestyle with a focus on health*, 5(2), 235-249. <https://www.sid.ir/paper/984888/en>
- Ghiyasi Zadeh, M. (2013). The effectiveness of cognitive-behavioral play therapy (Mykemba method) in reducing shyness and social withdrawal in elementary school students in the city of Malekshahi. *Journal of Ilam University of Medical Sciences*, 21(6), 96-105.
- Gillham, J. E., Carter, A. S., Volkmar, F. R., & Sparrow, S. S. (2000). Toward a developmental operational definition of autism. *Journal of Autism and Developmental Disorders*, 30(4), 269-278. <https://doi.org/10.1023/A:1005571115268>
- Gorji, R., Hassan Zadeh, S., Ghasem Zadeh, S., & Gholamali Lavasani, M. (2021). Investigating the psychometric properties of the Gilliam Autism Rating Scale for diagnosing autism in the Iranian population. *Journal of Alborz University of Medical Sciences*, 10(4), 439-450. <https://aums.abzums.ac.ir/article-1-1400-en.html>
- Hashemi Poor, S., & Mohammadi, K. (2018). The effectiveness of child-centered play therapy on emotional and social skills in children with autistic disorder. *Preventive Medicine*, 5(2), 1-10. <https://jpm.hums.ac.ir/article-1-301-en.html>
- Jalil Abkenar, S., Pourmohammadi Tajarishi, M., & Ashouri, M. (2013). Comparison of the effectiveness of cognitive-behavioral training and social competence on the adaptive behavior of male students with intellectual developmental disabilities. *Journal of Behavioral Sciences*, 7(3), 189-197. https://www.behavsci.ir/article_67830.html
- Khalili, Z., & Ansari Shahidi, M. (2018). Evaluating the effectiveness of drama therapy on social skills and emotional recognition in high-functioning autistic children. *Empowerment of Exceptional Children*, 9(1), 65-78. https://www.ceciranj.ir/article_68959.html?lang=en
- Khani, R., & Haghayegh, A. (2018). Comparison of empathy and emotional facial recognition between children with conduct disorder and oppositional defiant disorder. *Journal of Exceptional Children*, 18(49), 117-128. https://joec.ir/browse.php?a_id=893&sid=1&slc_lang=en
- Khosh Akhlagh, A. (2017). Investigating the impact of timely psychological and educational interventions by family members on the cognitive and social skills of children with autism. *Science and Research in Applied Psychology*, 18(4), 102-114. <https://sanad.iau.ir/en/Journal/jsrp/Article/892805/FullText>
- Laister, D., Stammer, M., Vivanti, G., & Holzinger, D. (2021). Social-communicative gestures at baseline predict verbal and nonverbal gains for children with autism receiving the Early Start Denver Model. *Autism*, 25(6), 1640-1652. <https://doi.org/10.1177/1362361321999905>
- MacDonald, H. Z., & Price, J. L. (2019). The Role of Emotion Regulation in the Relationship between Empathy and Internalizing Symptoms in College Students. *Mental Health and Prevention*, 13, 43-49. <https://doi.org/10.1016/j.mhp.2018.11.004>
- Masi, A., Azim, S. I., Khan, F., Karlov, L., & Eapen, V. (2022). Dissemination of Early Intervention Program for Preschool Children on the Autism Spectrum into Community Settings: An Evaluation. *International journal of environmental research and public health*, 19(5), 2555. <https://doi.org/10.3390/ijerph19052555>
- Maurizio, B., Cartabia, M., & Clavenna, A. (2022). Still too much delay in recognition of autism spectrum disorder. *Epidemiology and Psychiatric Sciences*, 31, e1. <https://doi.org/10.1017/S2045796021000822>
- Mohammad Zadeh, A., & Qamarani, A. (2017). Introducing the Incredible Years program to reduce behavioral problems in children. *Exceptional Education*, 4, 79-92. <https://www.magiran.com/paper/1801383/introduction-to-incredible-years-programs-for-decrease-behavioral-problems-in-children-with-emotional-and-behavioral-disorders?lang=en>
- Moradi, R. (2021). The effectiveness of multimedia social skills training on the adaptive behavior of students with intellectual disabilities. *Quarterly Journal of Exceptional Children*, 21(3), 103-112. <https://www.magiran.com/paper/2373117/effectiveness-of-social-skills-training-with-multimedia-instruction-method-on-social-adjustment-of-mentally-disable-students?lang=en>
- Naghizadeh, S. (2012). *Comparison of the level of empathy of mentally healthy and retarded children: a case study* [Payame Noor University]. Saez city.
- Peterson, C. (2014). Theory of mind understanding and empathic behavior in children with autism spectrum disorders. *International Journal of Developmental Neuroscience*, 39, 16-21. <https://doi.org/10.1016/j.ijdevneu.2014.05.002>
- Raines, J. C. (2016). Improving the self-esteem and social skills of students with learning disabilities. In (pp. 1-19).
- Reichow, B. (2012). Overview of meta-analyses on early intensive behavioral intervention for young children with autism spectrum disorders. *Journal of Autism and Developmental Disorders*, 42, 512-520. <https://doi.org/10.1007/s10803-011-1218-9>
- Rogers, S. J., & Dawson, G. (2020). *Early Start Denver Model for Young Children with Autism: Promoting Language, Learning, and Engagement*. Guilford Publications. <https://www.guilford.com/books/Early-Start-Denver-Model-Young-Children-Autism/Rogers-Dawson/9781606236314?srsltid=AfmBOoojrxDVIcFR0nKmpTOkosm6PgERS7cLj3OHgDpY-sjf-Uoctlw>
- Rogers, S. J., Estes, A., Lord, C., Vismara, L., Winter, J., Fitzpatrick, A., Guo, M., & Dawson, G. (2012). Effects of a Brief Early Start Denver Model (ESDM)-Based Parent Intervention on Toddlers at Risk for Autism Spectrum Disorders: A Randomized Controlled Trial. *Journal of the American Academy of Child and Adolescent Psychiatry*, 51, 1052-1065. <https://doi.org/10.1016/j.jaac.2012.08.003>
- Rogers, S. J., Estes, A., Vismara, L., Munson, J., Zierhut, C., & Greenon, J. (2019). Enhancing low-intensity coaching in parent-implemented Early Start Denver Model intervention for early autism: A randomized comparison treatment trial.



- Journal of Autism and Developmental Disorders*, 49, 632-646. <https://doi.org/10.1007/s10803-018-3740-5>
- Rueda, P., Fernández-Berrocá, P., & Baron-Cohen, S. (2015). Dissociation between Cognitive and Affective Empathy in Youth with Asperger Syndrome. *European Journal of Developmental Psychology*, 12(1), 85-98. <https://doi.org/10.1080/17405629.2014.950221>
- Ruiz, E. H., & Braden, B. B. (2021). Improving a Parent Coaching Model of Music Interventions for Young Autistic Children. *Journal of Music Therapy*, 58, 278-309. <https://doi.org/10.1093/jmt/thab008>
- Sattler, J. M. (2002). *Assessment of Children: Behavioral and Clinical Applications*. JM Sattler Publisher, Inc. https://www.sattlerpublisher.com/beh5e_preface.htm
- Savas, B., & Ilyas, Y. (2014). Investigating Causal Attributions of Success and Failure and Mathematics Instructions of Students in Turkish High Schools. *Procedia - Social and Behavioral Sciences*, 2(2), 1940-1943. <https://doi.org/10.1016/j.sbspro.2010.03.260>
- Sigelman, C. K., George, L. D., Cumial, K., & Rider, E. A. (2018). *Life-Span Human Development*. Cengage Learning. https://books.google.de/books?id=Ng1tDwAAQBAJ&prints_ec=copyright&redir_esc=y#v=onepage&q&f=false
- Singer, H. S. (2009). Motor stereotypes. *Seminars in Pediatric Neurology*. <https://pubmed.ncbi.nlm.nih.gov/19501335/>
- Soares, E. E., Bausback, K., Beard, C. L., Higinbotham, M., Bunge, E. L., & Gengoux, G. W. (2021). Social skills training for autism spectrum disorder: A meta-analysis of in-person and technological interventions. *Journal of Technology in Behavioral Science*, 6(1), 166-180. <https://doi.org/10.1007/s41347-020-00177-0>
- Stadnick, N. A., Stahmer, A., & Brookman-Frazee, L. (2015). Preliminary Effectiveness of Project ImPACT: A Parent-Mediated Intervention for Children with Autism Spectrum Disorder Delivered in a Community Program. *Journal of Autism and Developmental Disorders*, 45, 2092-2104. <https://doi.org/10.1007/s10803-015-2376-y>
- Tarbox, J., Dixon, D., Sturmey, P., & Matson, J. L. (2014). *Handbook of Early Intervention for Autism Spectrum Disorders*. Springer New York. <https://doi.org/10.1007/978-1-4939-0401-3>
- Touzet, S., Ocelli, P., Schröder, C., Manificat, S., Gicquel, L., Stanciu, R., Schaer, M., Oreve, M. J., Speranza, M., Denis, A., Zelmar, A., Falissard, B., Georgieff, N., Bahrami, S., Geoffray, M. M., & Group, T. I. S. (2017). Impact of the Early Start Denver Model on the cognitive level of children with autism spectrum disorder: study protocol for a randomised controlled trial using a two-stage Zelen design. *BMJ open*, 7, e014730. <https://doi.org/10.1136/bmjopen-2016-014730>
- Vakili Zadeh, N., Abedi, A., Mohseni Azhiyeh, A., & Pishgaman, A. (2015). The effectiveness of early parent-based intervention on shared attention (response) in preschool children with autism spectrum disorder: A case study. *Journal of Rehabilitation*, 17(1), 53. <https://doi.org/10.20286/jrehab-170140>
- Veen, J. (2004). *Assessing Students with Special Needs*. Merrill Publishing. https://books.google.de/books/about/Assessing_Students_wit_h_Special_Needs.html?id=10NLAAAAYAAJ&redir_esc=y
- Waddington, H., van der Meer, L., & Sigafos, J. (2016). Effectiveness of the Early Start Denver Model: A Systematic Review. *Reviews in Journal of Autism and Developmental Disorders*, 3, 93-106. <https://doi.org/10.1007/s40489-015-0068-3>
- Wahdan, M. M., Malak, M. Z., Al-Amer, R., Ayed, A., Russo, S., & Berte, D. Z. (2023). Effect of Incredible Years Autism Spectrum and Language Delays (IY-ASD) Program on Stress and Behavioral Management Skills Among Parents of Children with Autism Spectrum Disorder in Palestine. *Journal of Pediatric Nursing*, 72, 45-52. <https://doi.org/10.1016/j.pedn.2023.03.018>
- Williams, J. H. G., & Cameron, I. M. (2017). The Actions and Feelings Questionnaire in Autism and Typically Developed Adults. *Journal of Autism and Developmental Disorders*, 47(11), 3418-3430. <https://doi.org/10.1007/s10803-017-3244-8>