Review Paper: Imitation Skill in Children With Autism Spectrum Disorder and Its Influence on Their Language Acquisition and Communication Skills

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Introduction: Autism spectrum is a lifelong neural growth disorder, manifested as problems in social interaction, communication, and imagination along with limited and repetitive behaviors and interests. Furthermore, autistic children show clear defects in imitation skill. Acquiring imitation skill plays a vital role in the growth of social communication such as language, common attention, and play. Given the increasing prevalence of autism in advanced societies and lack of speech therapies for language enhancement and the role of imitation in the development of language, the purpose of this study is to evaluate recent studies in the field of mimicking effects on the different aspects of language in autistic children and determining the most effective and appropriate way of teaching imitation to improve the language and communication skills in these children.

Materials and Methods: This research is a review study aimed at collecting the relevant data from 2000 to 2017 in the field of imitation and its impact on language and communication in children with autism by searching the Google Scholar, Science Direct, Scopus, PubMed, SID, and IranMedex databases.

Results: In this article, 13 related studies were found from 2000 to 2017. Out of these studies, two studies were carried out in Iran, and 11 other studies in other countries. Two research studies compared imitation ability of autistic children with other disorders, and other studies examined the effect of imitation on different aspects of language acquisition.

Conclusion: All studies have shown that imitation influences on different aspects of language acquisition and enhances pre-lingual communication, such as the infant’s gaze at mother’s eyes, development of perception and expression language, improvement of understanding language application skills and syntax, including the number of verbs and the increase of the verbal production of vocabulary and the phrase.

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Keywords: Autism Spectrum Disorder, Language, Cognition, Communication

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1. Introduction

The autism spectrum is a lifelong neural growth disorder, manifested as problems in social interaction, communication, and imagination along with limited and repetitive behaviors and interests [1, 2]. These disorders are increasingly recognized as the most important causes of communication disabilities [3, 4]. Autistic children show obvious defects in imitation skills [5-8]. These defects are recognized in a variety of assignments, including objects [9, 10], gestures [9-11], and words [12]. For example, autistic children have a lower frequency of imitation skills than children with normal growth or other growth disorders [7, 8, 13, 14]. An interactive imitation is a primary tool for communication between the baby and the parents [15-17].

The first imitation function involves the movement of the body, whispering, and expressions of the face that provide a sense of communication or opposition with parents [6, 18-20]. Acquisition of imitation skills during the early stages of growth is necessary for speech and communication [17-21]. Imitation may be an essential cognitive process for the development of cognitive social skills [22-24]. Since imitation skills can predict language acquisition in autistic children [8, 25, 26], it is argued that acquiring imitation skill plays a vital role in the development of social communication such as language, common interests, and play [5, 8, 27].

In 2000, Carpenter, Pennington, and Rogers in a study on autistic children found a link between the imitation of arbitrary acts and referral language skills [28]. In 2005, in a study on young children with autism, Stone and Yoder found that imitation skills combined with speech therapy were the best predictor of language skills in the next two years in a sample of autistic children [29].

In 2006, Toth, Munson, Meltzoff, and Dawson reported that immediate imitation skills were related to language skills in preschool children with autism and delayed imitation was related with language achievements of over two years old children [26]. In 2001, Williams and his colleagues conducted an overview study on imitation and mirror neurons in autism. They focused on imitation problems in two types of imitation of action and avoidance of echolalia and concluded that the nerve base might be a problem in imitating the frontal cortex neurons, which are called mirror neurons. Early growth failure of the mirror neuron system is probably the result of a series of growth damages characterized by clinical symptoms of autism [4].

Because of the increasing prevalence of autism in advanced countries and lack of appropriate speech therapies for their linguistic improvement, the aim of this study was to study recent works in the field of imitation effects on different aspects of language in autistic children and to find the most appropriate method of teaching imitation for maximum improvement in the language and communication of these children. In this regard, the specialists in this area can use the most effective treatments to improve the language skills of these children.

2. Materials and Methods

This research was a review article aimed at collecting the studies from 2000 to 2017 in the field of imitation and its impact on language and communication in children with autism. First, we used keywords of “autism”, “imitation”, and “language” in databases such as Google Scholar, Science Direct, Scopus, and PubMed, and then we collected data from internal resources like IranMedex and SID databases.

3. Results

Table 1 summarizes the articles found in relation to our research.

4. Discussion

This study aimed to review recent studies in the field of imitation and its impact on language and communication in children with autism disorder. In this study, according to the research done at the aforementioned resources and applying inclusion and exclusion criteria, 13 studies were chosen from 2000 to 2017. These studies were arranged from the newest to the oldest. Of these studies, only 2 studies have been carried out in Iran, and 11 others in other countries. In most of the studies, video recording was used as the measurement tool, and most studies were of a cross-sectional design. The studies conducted prior to 2000 generally sought to investigate whether the ability to imitate in autistic children had been damaged and if so, tried to investigate the causes of the damage to the mirror cells as the main etiology of this problem.

From 2000 onwards, the studies examined the effect of imitation on the language of children with autism. Of 13 studies found, two studies compared the ability of imitation in autistic children with other disorders, including delayed growth, Down syndrome, and SLI. And eleven other studies evaluated imitation impact on different aspects of language and communication, including the effect of imitation on the development
<table>
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<th>Study Design</th>
<th>Results</th>
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<td>Cross-sectional</td>
<td>A significant and strong correlation was found between the total score of TGMD and the total score of imitation, which shows that imitation skills and motor function are related to each other and with initial social communication skills. There is also a significant correlation between MIS and TGMD scores with common attention and response to common attention (P≤0.05) as ESCS subscale. However, overall MIS and TGMD scores were not correlated with social interaction and response to the subscale of behavioral requests.</td>
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**Table 1.** List of studies done on imitation skills in autistic children.
Souza et al. [33]
Comparison of successive and overall gesture imitation skills in family life among ASD and Specific Language Impairment (SLI) children and investigating the relation between imitation and verbal production in children with autism.

Thirty-six children have participated, 24 ASD children and 12 SLI children.
Independent variable: Imitation, dependent variable: verbal production.

Case-control study
SLI individuals showed better performance in imitation and verbal production in comparison with ASD, whereas no differences were found in the general imitation and verbal production in children with both ASD and SLI.

Miniscalco et al. [32]
Answering the question of whether the main language skills, such as grammar and vocabulary are measured or the prescriptive communication skills, including gesture and the ability to imitate stimulate lingual pragmatics development of autistic children.

Thirty-four children with autism, including 29 boys and 5 girls with an average age of 41 months.
Independent variable: Imitation, dependent variable: development of pragmatics.

Parent’s Questionnaire MCDI (MacArthur Communicative Development Inventory) in two types: word and gesture for children aged 8 to 16 months and word and sentences for children aged 16 to 28 months.

Cross-sectional, comparative
The results showed that basically all pre-language, linguistic, and pragmatics skills were simultaneously related. The results showed that imitation may play an essential role in the development of conversational pragmatics functionalities in autistic children.

Turan et al. [34]

Eighteen children with autism and 15 children with delayed growth and 16 normally developed children.
Independent variable: imitation skills, Dependent variable: Language development.

Motor Imitation Scale (MIS) and Imitation Battery (IB) Turkish Communicative Development Inventory (TCDI) Ankara Developmental Screening Inventory (ADSI) assess children aged 0-6 years.

Cross-sectional, comparative
Autistic children had significantly lower scores in imitation compared to children with delayed growth and normal children and there was no significant difference in the score of imitation between normal children and children with delayed growth. There was also a significant relationship between the score of imitation and the development of expressive language in autistic children. The findings show that the lack of imitation skill is a distinctive feature of children with autism, which plays a vital role in the development of child language.

Sanefuji et al. [35]
Investigating the effect of imitative behaviors on communication gaze in children with autism.

Seventy mothers and children, 6 children were excluded. 30 boys and 2 girls in the group of autism and 30 boys and 2 girls in the normal group.
Independent variable: imitation behaviors, Dependent variable: communication gaze.

Video recording
Cross-sectional, Comparative
Autistic children look at longer in imitation behaviors than random behaviors, while normal children with normal growth (TD) gaze at their mothers regardless of the type of intervention.


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The study aimed to investigate the effectiveness of a particular intervention on the communication skills of children with autism. The intervention involved the use of natural behavioral techniques such as joint attention and imitation training.

**Participants:**
- Fifty preschool autistic children aged 3 to 4 years.
- Sixty normal children of the same age as the autistic children.

**Intervention:**
- The autistic children were divided into two groups: one received joint attention and immediate imitation training, while the other received joint attention and delayed imitation training.
- The normal children received joint attention and immediate imitation training.

**Measurement Tools:**
- The Early Social Communication Scales (ESCS), the MacArthur-Bates Communicative Development Inventory (MCDI), and the Motor Imitation Scale (MIS; Stone et al., 1997).

**Results:**
- Participants increased their imitation skills.
- The autistic children showed a wider range of imitation skills compared to the normal children.
- Joint attention and immediate imitation training led to a significant increase in imitation skills.

**Conclusion:**
- The study supports the effectiveness of natural behavioral techniques in improving the imitation skills of children with autism.

**References:**
- Ingersoll et al., 2006
- Karen Toth et al., 2006
- Ross et al., 2019
of the language of comprehension and expression, on the pragmatics of language, on the prognostic growth, such as gazing at mother, on syntax, such as increasing the number of verbs and on increase of voicing, and some studies examined the different approaches and methods of training imitation in terms of effectiveness and impact on language.

The results showed obvious deficiencies in the imitation ability of autistic children in comparison with normal children or children with other disorders such as SLI and Down syndrome [31, 33]. The problem in mirror cells is considered as one of the causes of the impairment of imitation performance in these children [4]. All studies have shown that imitation influences on different aspects of language and enhances pre-lingual communication, such as the infant’s gaze at mother’s eyes, development of perception and expression language, improvement of understanding language application skills, improvement of the syntax, including the number of verbs and the increase of the verbal production of vocabulary and the phrase.

A number of studies have examined the differences between various types of imitation training methods and their impact on language acquisition. Their results showed that the use of randomized imitation method has a more effective role on the language than the random response method [8] and natural behavioral intervention techniques can increase imitation ability and impact on the game, and common attention, and language acquisition [27].

The results of other studies showed that the joint attention and immediate imitation skills were strongly related to language ability at the age of 3 to 4 years, while toy play and deferred imitation were the best predictors of communication growth from age 4 to 6.5 years [26]. The findings also showed that the procedure and imitation training affect its effectiveness, and in the autism group, recognition of facial expressions and audio facial imitation increases with the reduction in the speed of presentation of facial expressions and audio imitation [36].

Ethical Considerations

Compliance with ethical guidelines

There was no ethical considerations to be considered in this research.

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Authors’ contributions

Conceptualization: Samane Mazaheri, Zahra Soleymani; Writing-original draft: Samane Mazaheri; Writing-review & editing: Zahra Soleymani; and Supervision: Zahra Soleymani.

Conflict of interest

The authors declared no conflict of interest.

References


