The Use of Jordanian Arabic Possessive Pronouns by Children with Autism Spectrum Disorder

Використання в йорданській арабській мові присвійних займенників дітьми з розладами аутистичного спектру

Razan N. Alkhatib [1]
PhD. in Special Needs,
Assistant Professor
of Special Needs

Разан Н. Алхатіб [1]
доктор філософії в галузі
особливих потреб,
асистент професора

Scopus Author ID: 57213257593
E-mail: razan.alkhatib@aau.ac.ae
razanalkhatib1988@gmail.com
https://orcid.org/0000-0002-5630-0788

**Abdel Rahman
Mitib Altakhaineh** [2] [*]
Ph.D. in Linguistics,
Associate Professor of English
Language and Literature

**Абдель Рахман
Мітіб Алтахіне** [2] [*]
доктор філософії
в галузі лінгвістики,
асоційований професор у галузі
англійської мови і літератури

Scopus Author ID: 57168901500
E-mail: a.altakhaineh@ju.edu.jo
https://orcid.org/0000-0001-7605-2497

[1] *Department of Humanities
and Social Sciences,
Al Ain University
(United Arab Emirates)*
✉ Al Ain, UAE, 64141

[1] *Кафедра гуманітарних
та соціальних наук,
Університет Аль-Айна
(Об'єднані Арабські Емірати)*
✉ Аль-Айн, Об'єднані Арабські
Емірати, 64141

---

* Corresponding author

---

² English Language and Literature Department, School of Foreign Languages, The University of Jordan (Jordan)
✉ Queen Rania Str., Amman, Jordan, 11942

² Йорданський університет (Йорданія)
✉ вул. Королеви Ранії, Амман, Йорданія, 11942

ABSTRACT

Aim. *This study aimed to investigate the use of different Jordanian Arabic possessive pronouns by children with autism spectrum disorder (ASD) and explore the influence of their IQ on the usage of possessive pronouns and possessive adjectives.*

Methods. *The study employed a paired-choice preference assessment method adapted from Fisher et al. (1992). The sample consisted of 16 autistic children aged 11–15, divided into two groups based on their IQ: low (70–74) and high (76–80). The participants were presented with two stimuli and observed as they made choices and interacted with the selected stimulus. Preference percentages were calculated to determine their choices. The data analytics included descriptive statistics and t-tests to assess differences between groups.*

Results. *The findings revealed that children with autism struggled to use and produce all possessive pronouns effectively in both forms. Additionally, the results indicated a preference for possessive pronouns over possessive adjectives among the autistic participants.*

Conclusions. *Notably, the study highlights that the children's IQ played a significant role in their usage and production of possessive pronouns. Based on these findings, it is recommended that interventions and educational programs for children with autism incorporate targeted teaching strategies for the proper use of possessive pronouns. These strategies should be tailored to the individual language and cognitive abilities of the child, considering their IQ level as an influencing factor.*

Key words: *autism, possessive pronouns, Jordanian Arabic, IQ.*

Introduction

Language allows people to communicate with one another and with the wider world. Between nine and twenty months after birth, children with typical developmental patterns eventually start using language to interact with the outside world to fulfill their own developmental requirements. However, children with autism spectrum

disorder (ASD) are less likely than typically developing (TD) individuals to communicate with others in the same way (Cummings, 2014). Behavioral deficits in social communication and social interaction – such as the absence of social cooperation, difficulty starting or participating in social conversation, or a temporary loss of normal verbal exchange – are diagnostic for autism. A person with systematized verbal or nonverbal attitudes, for instance, stereotyped or repetitive speech, is likely to exhibit these behaviors (American Psychiatric Association (APA henceforth), 2000).

Individuals with autism, regardless of its origin or cause, are affected by how language, including pronouns, is processed, interpreted, and used in their daily lives. The significant amount of research on pronoun usage in the context of ASD has likely been conducted because it involves grammar domains in which those with autism commonly struggle (Marinis et al., 2013). The acquisition of pronouns holds great significance in language development as these linguistic tools facilitate the expression of relationships between referents and convey meaning during communication. Understanding how children with Autism Spectrum Disorder (ASD) acquire pronouns is essential for unravelling the intricacies of their language development. It is crucial to recognize that the use of pronouns extends beyond mere linguistic structure; it is intricately linked to communicative function and the conveyance of meaning (Cummings, 2014).

The idea of this study holds substantial significance within the realm of psycholinguistic science. We place particular importance on possessive pronouns, which are a fundamental aspect of language, because we recognize that individuals with Autism Spectrum Disorder (ASD) often face difficulties in grammatical areas, including the use of pronouns. This study aims to address a critical gap in the existing body of literature by examining the specific linguistic challenges experienced by children with ASD who speak Jordanian Arabic. Through this, we aim to deepen our understanding of their language development.

By focusing on possessive pronouns and taking into account the children's IQ levels, our goal is to uncover the intricate relationship between language acquisition and cognitive abilities in children with ASD. This research concept has implications for designing personalized interventions and educational strategies, ultimately enhancing the linguistic skills of these children. To summarize, our research idea

centers on investigating how Jordanian Arabic-speaking children with ASD use possessive pronouns, shedding light on its significance in their language development.

Literature Review

Autism Spectrum Disorders

According to the APA (2013), a language disorder (LD) is a communication impairment distinguished by deficiencies in language acquisition, development, and use in any format (e.g., spoken, written, and signed). These deficiencies impact the person's comprehension or production of vocabulary, sentence structure, and discourse. NICHCY (2004) defines autism as a severe, permanent disorder which affects how people develop mentally and socially, resulting in information processing difficulties. The disorder is part of diverse developmental impairments characterized by deficiencies in a child's capacity to comprehend language, engage or talk with others, acquire social skills, and even play due to various neurological abnormalities (NICHCY, 2004). Rao and Gagie (2006) suggested that children diagnosed with autism typically struggle with language, creativity, and utilizing words in new ways, as well as understanding and interpreting complex ideas.

Pronouns

There are pronouns in every language. In English, a pronoun can be classified as a lexical item which falls under the closed system category (Igaab & Tarrad, 2019). Pronouns are derived from pro and noun, which means nouns can be replaced by pronouns (Arts, 2001: 30). When substituted for a noun phrase, a pronoun conveys the same meaning. In order to determine what a pronoun means, it is necessary to consider its syntax and context (Rodman & Hyams, 2007: 200). Arabic pronouns are regarded as a definiteness type, and this makes them indeclinable, i.e., their form remains the same. Since they have no dual or plural form, they cannot be considered derived nouns. Speakers use pronouns to refer to the first, second, and third person (Al-Suyoty, 2001: 194). The speaker and the addressee must both be aware of the pronoun's reference in order to use it. What this indicates is that a speaker employs a pronoun only after being certain that the recipient understands whether

it refers to the speaker, the addressee, or an absent participant. Pronouns, despite their small size, are regarded as constructed utterances used to avoid repetition and ambiguity (Aniis, 1994: 290).

Possessive pronouns are one of the most common pronouns in Arabic, and indeed they are an essential component of any language. These words indicate ownership or possession and are commonly used in everyday communication (Igaab & Tarrad, 2019). When pronouns are attached to nouns, they are considered bound suffixes because their occurrence depends on the nouns (Al-Quuzy, 1981: 126–127). In general, possessive pronouns fall into two categories. In the first case, a possessive determiner is used to modify a noun such as my, our, their, her, his, it, and your- none of which can be used alone. The second case concerns the possessive pronouns mine, ours, yours, theirs, his, its, and hers, which are usually used alone. Jordanian Arabic speakers can use these two cases but they must agree with the possessor in number and gender. In Arabic, the possessive pronouns are classified into three main types:

(1) possessive first person pronouns: (yaaʔ) (na);
(2) possessive second person pronouns: (ka), (kuma), and (kum);
(3) possessive third person pronouns: (haaʔ), (huma), (hum), (hunna) (Jiyad, 2017: 10).

In Jordanian Arabic, speakers use or add similar possessive suffixes to nouns such as -na, -ku, -ha, -hum, -i, -ak, -ik, -uh. Below, Table 1 illustrates possessive pronouns in Jordanian Arabic (A Short Guide for Beginners, n.d.):

Table 1

Possessive Pronouns in Jordanian Arabic

English	Arabic	Transliteration
My book	كتابي	Kitaab**ii**
Your book (m.)	كتابك	Kitaab**ak**
Your book (f.)	كتابك	Kitaab**ik**
Your book (pl.)	كتابكو	Kitaab**kuu**
His book	كتابه	Kitaab**uh**
Her book	كتابها	Kitaab**ha**
Their book	كتابهم	Kitaab**hum**
Our book	كتابنا	Kitaab**na**

In Jordanian Arabic, possessive pronouns can be used by themselves, separate from other words. While they are typically added as suffixes to nouns, they can also stand alone. For instance, pronouns like "mine" and "yours" can indicate ownership without a noun. This is a common way of using possessive pronouns in everyday conversations among Jordanian Arabic speakers (Al-Quuzy, 1981).

Pronouns Acquisition

The acquisition of possessive pronouns in children is crucial for their language development as it allows them to express ownership and establish relationships between objects or people (Smith, 2018). However, the development of grammatical form typically follows the development of linguistic function and meaning (Brown, 2016). Thus, it is necessary to explore the cognitive-linguistic basis for the use of possessive pronoun forms in children's communication.

In addition to studying pronoun forms, it is important to explore the broader cognitive-linguistic basis for the acquisition of possessive pronouns and the influence of semantic and pragmatic deficits on pronoun usage in children with ASD (Schneider and Williams, 2016; Kim et al., 2018). Research on language disorders provides valuable insights into the factors contributing to impaired pronoun usage.

For instance, research has shown that children with ASD often exhibit deficits in semantic repertoire and pragmatic intents, which affect their communicative abilities (Charman et al., 2010; Tager-Flusberg & Joseph, 2003). These deficits can hinder the development of grammatical forms, including pronouns (Petersen et al., 2014). By examining the semantic and pragmatic aspects of language development in children with ASD, we can gain a deeper understanding of the challenges they face in acquiring and using possessive pronouns effectively.

Moreover, studying language disorders and linguistic development helps explain why pronoun usage may be impaired in children with ASD. The observed deficits in semantic and pragmatic abilities among children with ASD have implications for their comprehension and production of pronouns, which are closely tied to referential relationships and ownership (Boucher, 2012; Durrleman et al., 2016).

Cross-Linguistic and Dialectal Considerations in Possessive Pronoun Acquisition

To obtain a comprehensive grasp of how children with ASD in Jordanian Arabic-speaking communities acquire possessive pronouns, it is crucial to examine the broader context of pronoun development both across different languages and within various Arabic dialects. Exploring possessive pronoun acquisition in diverse languages and dialects offers valuable insights into both universal and language-specific aspects of how possessive pronouns are learned, thereby illuminating the cognitive-linguistic foundations that necessitate the use of possessive pronoun forms (Smith, 2018).

Comparative studies across languages have uncovered both commonalities and differences in how possessive pronouns are acquired. Such studies enable the identification of shared developmental patterns and milestones that are pivotal in understanding the typical acquisition of possessive pronouns. For instance, research conducted with English-speaking children has revealed that possessive pronouns tend to emerge later in development compared to personal pronouns, suggesting that specific linguistic and cognitive factors influence the acquisition of possessive forms (Hadley, 2020).

In the case of Arabic, examining possessive pronoun acquisition in relation to other languages allows researchers to discern language-specific challenges and variations. Although Arabic shares certain features with other Semitic languages, such as an intricate pronoun system and complex morphological structures, it also possesses unique characteristics. For example, Arabic encompasses diverse forms of possessive pronouns that vary based on gender, number, and case. Gaining an understanding of how these language-specific features impact the acquisition of possessive pronouns is crucial for accurately evaluating the developmental trajectory of children with ASD in Jordanian Arabic-speaking communities (Adams & Gaigg, 2017).

Additionally, within the Arabic language itself, there are discrepancies in pronoun forms across different dialects. Standard Arabic is primarily employed as a formal written language, while colloquial Arabic dialects are widely spoken and exhibit distinct linguistic features, including variations in pronoun systems. These dialectal disparities can significantly influence the acquisition of possessive pronouns, as children are exposed to different linguistic input depending on their dialectal

background. Exploring the acquisition of possessive pronouns in specific Arabic dialects, such as Jordanian Arabic, provides insights into the specific obstacles and patterns that children in these communities may encounter (Durrleman et al., 2016).

Previous Studies on the Acquisition of Language by Autistic Children

Numerous studies have been conducted to investigate language acquisition in children with ASD, with a particular focus on pronoun acquisition (Terzi et al., 2014; Shield et al., 2015; Terzi et al., 2019; Finnegan et al., 2020). However, in the current study, our main interest lies in understanding the acquisition patterns of possessive pronouns in Jordanian Arabic-speaking children with ASD. To provide a clear link between the previous studies and our research questions, we will first highlight the most relevant studies that specifically examine possessive pronoun forms. Subsequently, we will discuss other relevant studies on pronoun acquisition.

Terzi et al. (2014) conducted a study on high-functioning Greek-speaking children with ASD, focusing on the use of non-active verb morphology and pronoun references. The study was driven by the difficulties with reflexive pronouns that English-speaking children with ASD have shown, as well as the fact that Greek non-active reflexive verbs can also indicate reflexivity. The study adopted sentence-picture matching, elicitation, and judgment tests as its main data collecting tools. The sample consisted of 20 children with ASD aged 5–8 years old. Terzi et al. (2014) proposed that children with ASD were less accurate in their understanding of clitics and omitted them from their production, but they did not differ from controls in their interpretation of reflexive and strong pronouns. The results showed that syntax-pragmatics or syntax-phonology interface issues may be the cause of the vulnerability of Greek clitics to autism, and potentially other languages with clitics also. This highlights the importance of considering the connection between pronoun forms and their pragmatic and semantic functions in communication. Although their study was not directly related to possessive pronouns, it provided insights into the difficulties experienced by children with ASD in understanding clitics and reflexive pronouns. These findings raised questions about the potential impact of syntax-pragmatics or syntax-phonology interface issues on

the vulnerability of clitics in languages like Greek to autism. While this study focused on a different language, it provides valuable background information regarding pronoun acquisition in children with ASD.

Similarly, Shield et al. (2015) investigated pronoun usage in children with ASD who were raised by deaf parents and introduced to American Sign Language (ASL) from birth. Although their study explored pronouns in the context of sign language rather than possessive pronouns, it shed light on the challenges faced by children with ASD in using personal pronouns. Their study revealed that signing children with ASD displayed preferences for names over sign pronouns. This preference can be linked to variations in linguistic ability and self-representation, emphasizing the significance of the meaningful aspects of pronouns in communication.

In a study by Terzi et al. (2019) that specifically examined subject and object pronoun usage in Greek-speaking children with ASD, the focus shifted from possessive pronouns to broader aspects of pronoun acquisition. Nevertheless, this study is relevant as it investigated the use of null subjects and subject determiner phrases (DPs) in children with ASD. Their findings indicated that the use of null subjects was prevalent in both typically developing children and those with ASD, suggesting that communicative function and felicitous reference influence pronoun choices. While the focus was not solely on possessive pronouns, the study provided insights into how children with ASD navigate pronoun usage in a language with null subject characteristics.

Furthermore, Finnegan et al. (2020) conducted a comprehensive meta-analysis and systematic review comparing pronoun usage in people with autism to typically developing individuals. Although the study encompassed various types of pronouns, including possessive pronouns, it did not specifically address possessive pronoun acquisition in children with ASD. Nonetheless, this study offers a broader perspective on the general use of pronouns in individuals with autism and highlights the influence of cognitive capacity and language development on pronoun usage.

Alzyoudi et al. (2023) investigate the frequency of consonant production errors and phonological processes among Emirati Arabic-speaking children with DS and examine the relationship between these difficulties, their intellectual capacity, and hearing status. The study included thirty Emirati children with DS, aged 9–12 years,

as well as a control group of the same age. An informal linguistic assessment was conducted to assess all participants. Results revealed that all participants, including both the DS group and the control group, exhibited phonological and articulation problems. Significant differences were observed between the normal hearing group and the mild conductive hearing loss group in terms of the total number of errors in words and typical segmental errors. Similarly, significant differences were found between individuals with mild and severe intellectual impairments in terms of the total number of incorrect words and both normal and atypical segmental errors. Additionally, the percentage of errors decreased as participants' age increased.

While these studies have offered valuable insights into pronoun acquisition in children with ASD and have explored the interplay between linguistic form and communicative function, it is important to note that most of them centered on English or other languages, with possessive pronouns not being their primary focus. Our study distinguishes itself by specifically examining possessive pronoun usage in Jordanian Arabic-speaking children with ASD, thereby contributing novel insights into the linguistic development of this unique population. By addressing the following questions, our research seeks to fill this gap and offer a fresh perspective on possessive pronoun acquisition in children with ASD:

RQ 1. To what extent do autistic children use singular and plural possessive pronouns in their native language (L1)?

RQ 2. What is the frequency of occurrence for each form of singular and plural possessive pronouns in the language produced by autistic children?

RQ 3. Does the child's IQ significantly impact their performance when using singular and plural possessive pronouns?

Methodology

Setting and Participants

A comprehensive language assessment test, namely the Arabic Test of Language Development (ATLD) was used to measure the ability of children with ASD to use possessive pronouns and applied at the Amman-based Tawasul Center for Autism with the help of experts

in special education. The ATLD is a widely recognized and validated assessment tool specifically designed to measure various aspects of language, including expressive and receptive skills, vocabulary, grammar, and overall language proficiency in Arabic-speaking individuals. The assessments considered age-appropriate linguistic milestones and evaluated the children's language abilities in relation to their developmental norms for speaking, listening, reading, and writing skills.

The sample consisted of nine male and seven female children, whose native language is Arabic, diagnosed with autism of higher (A) and lower (B) learning abilities (IQ), who were studying at the center. Note that the IQ tests administered at the center employs items of appropriate difficulty for the children's language and levels. The ages of the children ranged between 11 and 15. The children's level of intelligence was determined by regular IQ tests conducted every six months by experts working at the center. The center used the Wechsler Intelligence Scale for Children, 5th Edition (WISC-V). The WISC-V is a widely used and well-established IQ test that assesses cognitive abilities across various domains, including verbal comprehension, perceptual reasoning, working memory, and processing speed. It provides a comprehensive measure of intellectual functioning. It is crucial to highlight that the informed consent procedure encompassed verbal consent acquired from the parents/legal guardians of every child with Autism Spectrum Disorder (ASD) who participated. This procedure entailed a thorough explanation of the study's goals, methodologies, possible risks, and the voluntary aspect of participation. The researchers ensured that oral consent was recorded and validated before initiating the study. All ethical guidelines and participant rights were meticulously observed throughout the research process. Table 2 presents the characteristics of the participants.

Table 2
Demographic Information of Participants with ASD

Participant	Age	IQ
Child A1	11	79
Child A2	12	77
Child A3	11	79
Child A4	15	77
Child A5	12	80

Child A6	15	76
Child A7	10	77
Child A8	10	76
Child B1	12	74
Child B2	12	72
Child B3	10	72
Child B4	11	70
Child B5	10	71
Child B6	14	72
Child B7	15	70
Child B8	10	74

Procedures

The research utilized a Stimulus Preference Assessment (SPA) to evaluate the preferences of the participants regarding different stimuli, including possessive pronouns. The main objective of the SPA was to identify stimuli that acted as positive motivators for children diagnosed with autism spectrum disorder (ASD) who participated in the study (Cooper et al., 2007). These identified motivating stimuli were then employed to encourage and engage the participants during the assessment tasks focusing on possessive pronouns.

During the SPA, the children were presented with a series of choices where they had to select between different stimuli that were relevant to their individual interests and preferences. The available options included both tangible items, such as toys, snacks, or preferred objects, as well as social interactions, such as interactions with peers, receiving praise, or other forms of positive social reinforcement.

The selection options were intentionally designed to be related to possessive pronouns within specific contexts. This approach aimed to encourage the children to express their preferences using the appropriate pronouns. For instance, during the pronoun assessment task, the children were shown an object, such as a pen, and asked questions like, "Whose pen is this?" By correctly identifying the corresponding possessive pronoun (e.g., "his pen", "her pen"), the child demonstrated their comprehension of pronoun usage and the associated concept of ownership.

The use of these pronouns within these particular contexts was reinforced by providing the child with access to their preferred stimulus as a reward. This reinforcement strategy aimed to strengthen the connection between possessive pronouns and the concept of ownership, facilitating the child's understanding and usage of pronouns in everyday communication.

It is important to note that the reinforcement provided during the SPA was not solely based on pronoun usage but rather on the overall demonstration of preferences and expression of choices. The pronoun assessment tasks were integrated into the SPA procedure to create meaningful and contextually relevant opportunities for the children to showcase their understanding and usage of possessive pronouns.

By incorporating the SPA within the assessment protocol, the study sought to capture the participants' preferences, motivation, and their ability to use possessive pronouns in communicative contexts. The choice options and reinforcement strategies were carefully designed to create an engaging and meaningful assessment experience for children with ASD, considering their individual needs and characteristics. In particular, the study applied the following steps to collect and analyze the data:

(1). Select the target possessive pronouns: the researcher chose the possessive pronouns to be tested, including different forms of Jordanian possessive pronouns, such as -na, -ku, -ha, -hum, -i, -ak, -ik, -uh, as well as any other relevant possessive pronouns.

(2). Develop test materials: the researcher created a set of materials that used the target possessive pronouns in the context of everyday communication. At this stage, Picture stimuli were used, depicting different individuals or animals with various items they owned, such as "his bag", "her book" and "their toy".

(3). Present the options: The researcher orally presented each possessive pronoun along with its different options to the children. The researcher did this by asking the children out loud "What is this?" and "To whom does it belong?" before showing pictures with two options for describing the possessor. The children were then asked to choose the option they preferred. For example, for the possessive pronoun /-i/,

the children were given a pen and asked, "Whose pen is this?". The two options provided them with a choice between different pronoun forms (e.g., "his pen" or "her pen"). The goal of this step was to assess the children's ability to accurately identify and use possessive pronouns in a real-life context. Figure 1 illustrates the procedure.

Figure 1
Illustration of the Procedure for Choosing a Pronoun
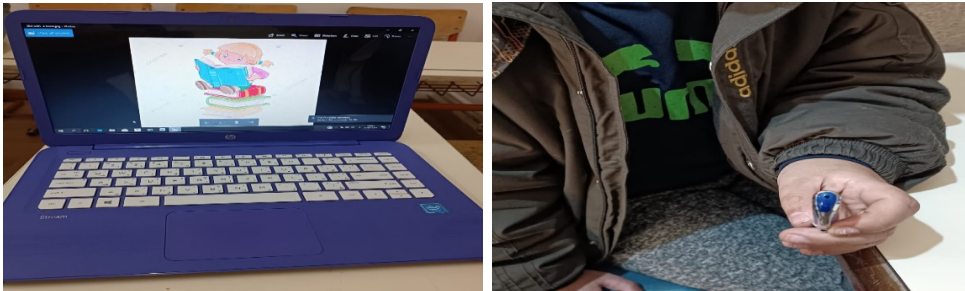
(4). Record the responses: The researcher carefully recorded the children's responses for each option, including any verbal or non-verbal behaviors displayed while making their choice, such as eye contact or vocalizations. This recording aimed to capture not only the accuracy of the pronoun used but also any indicators of preference or engagement with the chosen option.

(5). Analyze the results: after collecting the responses, the researcher analyzed the data to identify the preferred form of each possessive pronoun. The analysis involved calculating the percentage of times the child chose each option for each target pronoun. The option with the highest percentage of choices was considered the preferred form of the possessive pronoun for that child.

Results and Discussion

With regards to the first research question, each test question received one mark in grading the children's performance. Table 3 shows a summary of children's test results.

Table 3
Test Results for Pronoun Usage by Participants with ASD

Participant	IQ	Number of correct answers/Possessive Adj	Number of correct answers/Possessive Pro	Total Responses	IQ Level
Child A1	79	2	5	7	Lower
Child A2	77	1	4	5	Lower
Child A3	79	4	2	6	Lower
Child A4	77	1	4	5	Lower
Child A5	80	5	3	8	Higher
Child A6	76	1	4	5	Lower
Child A7	77	1	3	4	Lower
Child A8	76	1	4	5	Lower
Child B1	74	1	4	5	Lower
Child B2	72	0	1	1	Lower
Child B3	72	0	1	1	Lower
Child B4	70	0	0	0	Lower
Child B5	71	0	0	0	Lower
Child B6	72	0	2	2	Lower
Child B7	70	1	0	1	Lower
Child B8	74	0	2	2	Lower
Total		18	39	57	

Table 3 shows that children A1, A3, and A5 achieved slightly better answers than children A2, A4, A6, A7, and A8. In this case, it is crucial to emphasize that children A1, A3, and A5 had similar high IQ scores. With regards to the low IQ group, a minor improvement in responses was obtained by children B1, B6, and B8 than B2, B3, B4, B5, and B7. It should be noted that the specific pronouns targeted in the assessment and the number of questions per pronoun were consistent across all participants. Each participant was evaluated on their understanding and usage of the pronouns in the context of ownership. The total score provides an overall measure of the participants' performance on the assessed pronouns, taking into account both possessive adjectives and possessive pronouns.

Based on these results, it is evident that there are challenges for autistic children in producing and using Jordanian possessive pronouns accurately. This finding aligns with previous studies by Shield et al. (2015) and Terzi et al. (2019), which have also reported difficulties

in producing certain English pronouns, including possessive pronouns, among individuals with ASD. These findings provide insight into the specific aspect of pronoun usage in the context of ownership.

For the second research question, a *t*-test was conducted to determine whether there is a statistically significant difference between the use of possessive pronouns and possessive adjectives, as shown in Table 4.

Table 4
t-Test Results of the Effect of Pronoun Types on Performance on Both IQ Groups

Types of Pronouns	Mean	SD	Df	*t*-value	Sig.
Possessive Adj	1.13	1.45	15	2.8919	0.0112
Possessive Pro	2.44	1.67			

Table 4 shows that autistic children preferred the use of possessive pronouns (M=2.44) over possessive adjectives (M=1.13). Thus, there is a statistically significant difference between possessive adjectives and possessive pronouns, regardless of any difference in IQ; the statistical significance (0.0112) is lower than (0.05). This result could be due to many reasons. One of the main reasons is that possessive pronouns are more straightforward and less complex than possessive adjectives. Autistic children often struggle with complex language structures, and using a possessive pronoun can make the sentence more manageable and easier to comprehend. This can lead to improved communication and reduce the likelihood of misunderstandings. Another reason why autistic children may prefer possessive pronouns is that they are more concise. Autistic children may struggle with processing large amounts of information, especially in social situations (Van Hees et al., 2014). Using a standalone possessive pronoun can reduce the amount of information that needs to be processed, making communication more efficient and effective. Additionally, it is suggested that possessive pronouns can be used more flexibly than possessive adjectives. As Altakhaineh et al. (2020b) stated, autistic children may have difficulty with understanding and using grammatical rules, so using a possessive pronoun can simplify the language structure. For example, in Jordanian Arabic, a possessive adjective can have different forms depending on the gender and number of the noun. Using a possessive pronoun eliminates the need for

gender and number agreement, making the sentence easier to construct and understand.

To answer the third research question, a *t*-test was conducted to determine if each child's IQ affected their performance when producing possessive pronouns, as shown in Table 5 below.

Table 5
t-Test Results of the Effect of IQ on L1 Performance

IQ groups	Mean	SD	Df	*t*-value	Sig.
High	5.63	1.30	7	6.1892	0.0004
Low	1.50	1.60			

Table 5 shows that there is a statistically significant difference between the high IQ and low IQ groups in terms of learning possessive adjectives and possessive adverb pronouns; the statistical significance (0.0004) is lower than (0.05). Research has shown that there is a wide range of language abilities among individuals with ASD, with some individuals having above-average language skills and others having a significant language impairment. In general, children with a higher IQ tend to have better language abilities than those with a lower IQ, although there is still significant variability within each group. This result is in line with Altakhaineh et al. (2020a), who suggested that a child's IQ plays a crucial role in language production.

It can be argued that cognitive processing differences have an impact on generating the different forms of possessive pronouns. Children with a higher IQ tend to have stronger cognitive abilities, including attention, memory, and processing speed, which can support language processing and production (Fernald et al., 2012). Based on this, it could be proposed that possessive pronouns require a higher level of cognitive processing than possessive adjectives, as they are standalone words that require the use of working memory and other cognitive processes to be generated and understood. Autistic children with a higher IQ may therefore be better able to use possessive pronouns due to their stronger cognitive abilities. Cognitive linguistic theory suggests that language is grounded in embodied experiences and that our cognitive processes shape the way we use and understand language. One potential explanation for the preference for possessive pronouns over possessive

adjectives in autistic children is the cognitive demands that pronouns impose (Barsalou, 2008).

According to Cognitive Linguistics, using pronouns involves greater cognitive processing because they require a more complex mental representation of the referent compared to adjectives. Pronouns necessitate individuals to activate more cognitive processes, such as retrieval from memory and integration with contextual information, than adjectives do. This cognitive burden may explain why autistic children may prefer to use possessive pronouns over adjectives (Barsalou, 2008).

Moreover, the differences in possessive pronoun use between autistic children with high and low IQs could be related to differences in language exposure and experience. Children with a higher IQ tend to have more opportunities for language exposure and use, which can support language development and use. Autistic children with a higher IQ may therefore have had more opportunities to learn and practice using possessive pronouns, leading to better language skills in this area. It has also been noticed that children with higher IQs have better social and communication skills, which can support their language development and use. In this regard, autistic children with higher IQs may be better able to use possessive pronouns as a way of expressing ownership and belonging in social contexts.

Conclusion

This study has explored the production and use of various forms of Jordanian Arabic possessive pronouns by children with Autism Spectrum Disorder (ASD) with varying IQ levels. The research methodology involved the application of the paired-choice preference assessment method, as introduced by Fisher et al. in 1992. The findings of this investigation have unveiled significant insights into the linguistic abilities of children with autism in the realm of possessive pronouns. In general, our results suggest that children with ASD encountered difficulties in both producing and using all forms of possessive pronouns within the Jordanian Arabic language. Additionally, the study has illuminated a preference among these children with autism for possessive pronouns over possessive adjectives.

One of the significant outcomes of this research pertains to the pivotal role that intelligence level plays in the ability of autistic children

to produce possessive pronouns and employ them appropriately within the context of language. This discovery underscores the importance of tailoring educational and intervention strategies to the individual cognitive profiles of children with ASD. It emphasizes the need for specific teaching methods to address their language challenges effectively.

While this study has advanced our understanding of possessive pronoun usage in Jordanian Arabic-speaking children with ASD, it also suggests directions for future research. Future studies should explore how ASD children across various Arabic dialects use different types of pronouns, including reflexive, subject, and object pronouns. This research will help us better understand language development and communication skills in this group, ultimately guiding more precise and effective support strategies.

In summary, our research not only enhances our understanding of how children with ASD develop language but also has practical implications for interventions and educational programs aimed at improving their language skills. Hopefully, these insights will lead to more tailored and effective approaches to support these children in their language development journey.

ADHERENCE TO ETHICAL STANDARDS

Ethics Declarations. The study was conducted according to the guidelines of the Declaration of Helsinki (1964) and approved by Research and Ethical Committee of Tawasul Center for Autism. Ethical principles were followed in the process of conducting the empirical research: the principle of voluntary consent (Informed consent was obtained from the administration of Tawasul Center for Autism, Amman, Jordan); the principle of minimizing risks for participants; the principle of confidentiality; the principle of informing participants' parents about the content of the research; the principle of mandatory documentation of the stages and the results of the research; the principle of reliability of methodical instruments of the research having been conducted; the principle of validity of research data processing.

Data Availability. The datasets generated and analysed during the current study are available from *Zenodo*: https://zenodo.org/doi/10.5281/zenodo.10051706

Conflict of interest. The authors do not have any potential conflict of interests that may influence the decision to publish this article.

Author Contributions. Razan Alkhatib and Abdel Rahman Altakhaineh contributed to the study conception and design. Material preparation, data collection and analysis were performed by Abdel Rahman Altakhaineh and Razan Alkhatib. The first draft of the manuscript was written by Razan Alkhatib and Abdel Rahman Altakhaineh. All authors commented on previous versions of the manuscript and all authors read and approved the final manuscript.

References

A Short Guide for Beginners. (n.d.). Retrieved February 21, 2023, from https://www.livelingua.com/peace-corps/Arabic-Jordanian/Jordanian%20Arabic%20Grammar%20for%20Beginners.pdf.

Adams, S., & Gaigg, S.B. (2017). The role of pronoun processing in the development of social cognition in Autism Spectrum Disorders: A feasibility study. *Journal of Autism and Developmental Disorders*, *47*(7), 2091–2103.

Al-Quuzy, D. (1981). Grammatical Expression. *Its Origin, Development until the End of the Third Century*. Saudi: Deanship of Library Matters in Riyadh University.

Al-Suyoty, J. (2001). *ham9 alhawami9 fi sharih aljawami9*. Egypt: World Books.

Altakhaineh, A.R.M., Mahmoud, H., & Abukhater, A.Y. (2020a). The effectiveness of using colors in L1 and L2 vocabulary development of autistic children. *Advances in Autism, ahead-of-print* (ahead-of-print). https://doi.org/10.1108/aia-10-2019-0032

Altakhaineh, A.R.M., Zibin, A., & Alkhatib, R.N. (2020b). On the Acquisition of the Arabic Grammatical Gender by Arabic-Speaking Children with ASD. *Journal of Psycholinguistic Research*, *49,* 1027–1045. https://doi.org/10.1007/s10936-020-09732-5

Alzyoudi, M., Albustanji, Y., Khan, A., & Al Mazroui, K. (2022). Phonological Process in Arabic-Speaking Children with Down Syndrome: A Psycholinguistic Investigation. *Africa Education Review*, *19*(1), 1–14. https://doi.org/10.1080/18146627.2022.2158352

American Psychiatric Association, American Psychiatric Association, and Task Force on DSM-IV. (2000). *Diagnostic and statistical manual of mental disorders: DSM-IV-TR.* Washington, DC: American Psychiatric Association.

Aniis, I. (1994). *Language Secrets.* Egypt: Egyptian Anjilo library.

Arts, B. (2001). *English Syntax and Argumentation*. London: Macmillan.

Barsalou, L.W. (2008). Grounded cognition. *Annual Review of Psychology, 59,* 617–645. https://doi.org/10.1146/annurev.psych.59.103006.093639

Boucher, J. (2012). Language in Autism Spectrum Disorders. In P. Brooks, & V. Kempe (Eds.), *Encyclopedia of Language Development* (pp. 354–357). Sage Publications.

Brown, A. (2016). Grammatical form development in children. *Journal of Language Development*, *12*(1), 45–62.

Charman, T., Hobson, H.R., Slonims, E.L., Simonoff, M.S., Pickles, A., Chandler, S., & Baird, G. (2010). Communicative intentions in children with autism spectrum disorder. *Journal of Child Psychology and Psychiatry*, *51*(5), 550–559.

Cooper, J.O., Heron, T.E., & Heward, W.L. (2007). *Applied Behavior Analysis*. Pearson.

Cummings, L. (2014). *Pragmatic Disorders and Social Communication*. Springer. https://doi.org/10.1007/978-94-007-7954-9_7

Durrleman, S., Farmer, T.R., & Goldberg, A.W. (2016). The acquisition of possessive pronouns: Evidence from French children. *Language Acquisition*, *23*(3), 281–308.

Fernald, A., Marchman, V.A., & Weisleder, A. (2012). SES differences in language processing skill and vocabulary are evident at 18 months. *Developmental Science*, *16*(2), 234–248. https://doi.org/10.1111/desc.12019

Finnegan, E.G., Asaro-Saddler, K., & Zajic, M.C. (2020). Production and comprehension of pronouns in individuals with autism: A meta-analysis and systematic review. *Autism*, 136236132094910. https://doi.org/10.1177/1362361320949103

Fisher, W., Piazza, C.C., Bowman, L.G., Hagopian, L.P., Owens, J.C., & Slevin, I. (1992). A comparison of two approaches for identifying reinforcers for persons with severe and profound disabilities. *Journal of Applied Behavior Analysis*, *25*(2), 491–498. https://doi.org/10.1901/jaba.25-491

Hadley, P.A. (2020). Exploring Sentence Diversity at the Boundary of Typical and Impaired Language Abilities. *Journal of speech, language, and hearing research: JSLHR*, *63*(10), 3236–3251. https://doi.org/10.1044/2020_JSLHR-20-00031

Igaab, Z.K., & Tarrad, I.R. (2019). Pronouns in English and Arabic: A Contrastive Study. *English Language and Literature Studies*, *9*(1), 53–69. https://doi.org/10.5539/ells.v9n1p53

Jiyad, M. (2017). *A Hundred and One Rules in Arabic Grammar*. Califorinia: Create space Publishing Independent Platform.

Kim, E., An, Y.K., Park, S., & Lee, J.S. (2018). The role of cognitive-linguistic skills in possessive pronoun acquisition. *International Journal of Language and Communication Disorders, 53*(4), 723–737.

Marinis, T., Terzi, A., Kotsopoulou, A., & Francis, K. (2013). Pragmatic abilities of high-functioning Greek-speaking children with autism. *Psychology*, *20*, 321–337. https://doi.org/10.12681/psy_hps.23544

NICHCY. (2004). *Autism and pervasive developmental disorder: Fact sheet 1 (FS1)*, National Information Center for Children and Youth with Disabilities, Washington, DC, available at: www.nichcy.org/pubs/factshe/fs1txt.htm (accessed February 2, 2023).

Petersen, S., McCall, C.M., & Stoops, V.S. (2014). Grammatical deficits in children with Autism Spectrum Disorder: A meta-analysis. *Autism Research*, *7*(4), 418–427.

Rao, S.M., & Gagie, B. (2006), Learning through seeing and doing: visual supports for children with autism, *Teaching Exceptional Children*, *38*(6), 26–33. https://doi.org/10.1177/004005990603800604

Razan, N.A., & Altakhaineh, A.R. (2023). The Use of Jordanian Arabic Possessive Pronouns by Children with Autism Spectrum Disorder [Data set]. *Zenodo*. https://doi.org/10.5281/zenodo.10051707

Rodman, R., & Hyams, N. (2007). *An Introduction to Language*. Belmont: Thomson Wadsworth.

Schneider, P., & Williams, D. (2016). Language acquisition in children with Autism Spectrum Disorder: A critical review. *Journal of Autism and Developmental Disorders*, *46*(11), 3692–3704.

Shield, A., Meier, R.P., & Tager-Flusberg, H. (2015). The Use of Sign Language Pronouns by Native-Signing Children with Autism. *Journal of Autism and Developmental Disorders*, *45*(7), 2128–2145. https://doi.org/10.1007/s10803-015-2377-x

Smith, J. (2018). The role of possessive pronouns in language development. *Journal of Child Language*, *45*(3), 512–527.

Tager-Flusberg, H., & Joseph, R. (2003). Identifying neurocognitive phenotypes in autism. *Philosophical Transactions of the Royal Society B: Biological Sciences*, *358*(1430), 303–314. https://doi.org/10.1098/rstb.2002.1198

Terzi, A., Marinis, T., Kotsopoulou, A., & Francis, K. (2014). Grammatical Abilities of Greek-Speaking Children with Autism. *Language Acquisition*, 21(1), 4–44. https://doi.org/10.1080/10489223.2013.855216

Terzi, A., Marinis, T., Zafeiri, A., & Francis, K. (2019). Subject and Object Pronouns in High-Functioning Children with ASD of a Null-Subject Language. *Frontiers in Psychology*, *10, 1–8*. https://doi.org/10.3389/fpsyg.2019.01301

Van Hees, V., Moyson, T., & Roeyers, H. (2014). Higher Education Experiences of Students with Autism Spectrum Disorder: Challenges, Benefits and Support Needs. *Journal of Autism and Developmental Disorders*, *45*(6), 1673–1688. https://doi.org/10.1007/s10803-014-2324-2

АНОТАЦІЯ

Мета. *Це дослідження мало на меті вивчити використання різних йорданських арабських присвійних займенників дітьми з розладом аутистичного спектру (РАС) та дослідити вплив IQ дітей на вживання присвійних займенників і присвійних прикметників.*

Методи. *У дослідженні використовувався метод оцінки переваг парного вибору, адаптований Фішером та ін. (1992). Вибірка складалася з 16 дітей з аутизмом у віці 11–15 років, розділених на дві групи за рівнем IQ: низький (70–74) і високий (76–80). Учасникам пропонувалося два стимули і проводилося спостерігали за тим, як вони робили вибір і взаємодіяли з обраним стимулом. Для визначення вибору дітей було підраховано відсотки переваг. Аналіз даних включав описову статистику та t-тести для оцінки відмінностей між групами.*

Результати. *Дітям з аутизмом важко ефективно використовувати та утворювати всі присвійні займенники в обох формах. Крім того, результати вказують на перевагу присвійних займенників над присвійними прикметниками серед респондентів з аутизмом.*

Висновки. *Примітно, що дослідження підкреслює, що IQ дітей відіграє значну роль у використанні й утворенні присвійних займенників. На основі цих висновків рекомендується, щоб інтервенції та освітні програми для дітей з аутизмом включали цілеспрямовані стратегії навчання правильного використання присвійних займенників. Ці стратегії повинні бути адаптовані до індивідуальних мовних і когнітивних здібностей дитини, враховуючи рівень її IQ як фактора впливу.*

Ключові слова: *аутизм, присвійні займенники, йорданська арабська, IQ.*