The Production of Jordanian Arabic Passive Structures by Children with Autism Spectrum Disorder

Продукування йорданських арабських пасивних конструкцій дітьми з розладом аутистичного спектру

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ABSTRACT

Aims. This study explores the acquisition of passive structures in Jordanian Arabic by ten children diagnosed with Autism Spectrum Disorder (ASD). It aims to identify the preferred passive structure among these children and investigate the underlying reasons for their preference.

Methods. The research included a sample of 10 male children with ASD, with an average age of eleven, enrolled at the Tawasul Center for Autism in Amman, Jordan. The choice of Jordanian Arabic (JA) as the participants’ native language facilitated effective communication, given that the researchers were also native speakers of JA. Participants were asked to narrate events depicted in five different pictures, and their responses, categorized into two passive structures (mafʕu:l and ʔinfaʕal), were recorded.

Results. Based on the results of the statistical analysis, it was revealed that mafʕu:l passive structures was used more often than ʔinfaʕal structures. We argue that mafʕu:l passive structure is used more frequently by children with ASD because acquiring nouns is easier than acquiring inflected words due to the noun bias principle and entity-oriented principle. Additional factors include structural simplicity, frequency of encounters, relevance across various settings, and the variances in cognitive and linguistic processing capacities.

Key words: language acquisition, autism spectrum disorder, passive structures, Jordanian Arabic.

Introduction

Autism Spectrum Disorder (ASD) is a developmental disorder diagnosed on the basis of early-emerging social and communication difficulties and rigid and repetitive patterns of behavior and interests.
The language characteristics of children with ASD is different from the language characteristics of normally developing children, so it is common to have communication styles different from normally developing children, some children with ASD may have delayed speech development or prefer alternative communication methods, such as sign language while in some cases they may have advanced language skills (Lord et al., 2006). Another challenge children with ASD may endure is executive functioning disorder which involves skills like planning, organization, and flexible thinking (Ozonoff, 1995).

Structural language is one of the salient aspects that is universally affected due to several complex factors, as stated by Boucher (2011). However, early studies on the relationship between language impairments and ASD focused on aspects related to socialization, such as pragmatic deficits, while the investigation into the development of formal levels, such as syntax, phonology, and morphology, has been relatively limited (Chin & Bernard-Opitz, 2000; Reddy et al., 2002; Altakhaineh et al., 2020; Zibin et al., 2023). Thus, understanding the linguistic problems encountered by children with ASD, such as difficulties in acquiring syntactic structures, enhances our comprehension of how the disorder affects language development. Although research in Arabic-speaking nations may be restricted, the extensive body of global research on ASD and language development offers useful insights that can guide interventions and support techniques for children with ASD in various linguistic and cultural settings. Furthermore, the examination of syntactic development in children with ASD is crucial for the advancement of psycholinguistic research. Language acquisition is an intricate process that is affected by a range of circumstances, including neurodevelopmental disorders such as ASD. Through the examination of how children with ASD learn and employ syntactic structures, researchers can obtain more profound understanding of the cognitive and linguistic mechanisms that play a role in language development. This knowledge not only improves our comprehension of normal and abnormal language development, but also provides insights into theoretical models of language processing and cognition. Moreover, tackling the linguistic difficulties encountered by individuals with ASD has practical ramifications for both clinical practice and educational initiatives. Efficient communication is essential for interpersonal
engagement, scholastic achievement, and general well-being. Hence, pinpointing precise linguistic obstacles, such as issues with passive language structures, can direct the creation of focused interventions and support tactics to enhance communication abilities and promote social integration for individuals with ASD.

Against this background, this study seeks to investigate the ability of individuals with ASD to acquire passive constructions in Jordanian Arabic and to identify the types of passives they employ, while also attempting to justify their selective usage of these forms.

**General Background**

**Passivation in Arabic**

Jordanian Arabic (JA) is a variety of Standard Arabic (SA), but they exhibit variations related to word order, case marking systems, and morphological systems, among other aspects. As a result, they differ in how they represent their syntactic constructions, including the passive. The passive in SA is a morphosyntactic process whereby the passive voice is inflected with the verb, involving an affixation process and syntactic movements (of the verb and the thematic object) that change the sentence structure. The passive verb is infixed with /u/ and /i/ in the perfective and with /u/ and /a/ in the imperfective. The object of the active sentence receives an accusative case mark (acc-CM) from the verb, but in the passive, the verb is too weak to assign case. Thus, the object is assigned a default nominative case mark (nom-CM), as assumed by traditional Arab grammarians such as Sibawayh (1988) and by Chomsky (1986). For instance, the sentence in (1.a) is in the active voice, and the object Zayd receives an accusative case from the verb ḍaraba (hit). In contrast, in (1.b), the thematic object Zayd becomes the structural subject and is assigned a nominative case. Regarding the internal morphology of the active verb ḍaraba, the first vowel /a/ changes to /u/, and the second /a/ becomes /i/, resulting in ḍu-ri-ba.

(1) a. ḍaraba l-walad-u zayd-an
    hit-past Def-boy-nom Zayd-acc.
    The boy hit Zayd.

    b. ḍuriba Zayd-un
    hit-past-passive Zayd-nom.
    Zayd was hit.
The analysis of the internal structure of the passive is based on
the minimalist program of Chomsky (1995) and its updates by Radford
(2008). The root verb ḍa-ra-ba is base-generated in VP, occupying the
head-V position, and then it is raised to voiceP, specifically head-voice,
to check [±active]. The head voice is affixal by nature, and the passive
morphemes are available at its spec position; hence, when the verb
checks the [-active] feature, the affixes can be lowered to the verb
to create the passive form. In Arabic, tense is expressed through the
verb; therefore, it also must be raised to head-T to be assigned tense
(Soltan, 2007). The subject of the passive, Zayd-un, is the thematic
object of the verb; therefore, it originates in the spec-V position, where
it receives a default nom-CM since the verb fails to assign it an acc-CM
(Ayyat et al., 2013). Accordingly, the passive sentence in (1.b) can be
represented in the structure in (2).

On the other hand, JA is more restricted concerning word order.
The basic order is SVO, and it is the most used in both active and
passive constructions. It is also common to have the VSO order,
but other orders like VOS or OSV are not, which might be due to
the lack of overt case marking in the surface structure in JA. In the
passive, JA has a different verb morphology from SA. The insertion of /u-i/ and /u-a/ is not found in any passive form in JA. The basic verbal form of the passive in JA has the perfective verb prefixed with the initial /in/. For example, the active verb ḍarab (hit-past) becomes inḍarab (was hit), as in (3).

(3) a. zayd in-ḍarab
    Zayd passive-hit-past
    Zayd was hit.

The imperfective verb has /in/ inserted after the present morphemes. For example, yuḍrub (hit-present) becomes (yinḍarib). Sometimes, another affixation process is employed for emphasis or exaggeration, i.e., the verb is prefixed with /it/, and the second consonant of the root verb is doubled (geminated). For instance, the verb kasar (break) becomes itkassar (was broken) or bitkassar (is being broken).

The syntactic structure of the passive in JA involves the same operations as in SA. Thus, in (3), the root verb ḍarab undergoes a head-to-head movement from head-VP to head-voiceP to have its [-active] feature valued and to be inflected with the passive morpheme /in/. Then, it moves again to head-T to be inflected with tense and thus becomes in-ḍarab. An A-movement also operates, whereby the structural subject Zayd raises to the spec-T position, resulting in the SV order of this passive sentence. The internal structure is illustrated in the tree diagram (4) below.
It is worth mentioning that some nominal clauses can be used in JA to convey the meaning of the passive, but they do not involve any passivization processes like those of verbal clauses. The nominal clauses in JA consist of a nominal subject and a non-verbal predicate. In the clauses that imply passivity, the predicate is an adjective derived from a verb. For instance, we can derive the adjectives maksūr and mkassar from the verb kasar to create the sentence in (5) (see Zibin, 2019):

(5) a. l-gazāz maksūr / mkassar
Def-glass broken
The glass is broken.

To summarize, the passive construction in JA involves a simple morphological change to the verb, and two syntactic movements of the verb to finally reside in head-T. The thematic object remains in situ in VS order and is raised to spec-T in SV order. Adjectival passive can also be used to convey the same meaning as a verbal passive structure. The passive structure in JA, as noted, is less complicated than in other languages like English for several reasons: first, the flexibility of the word order reduces the confusion of whether to begin with the verb or the subject (thematic object). Second, the absence of case marking on NPs in the surface structure eliminates the difficulty of reassigning the case marker of the thematic object (i.e., changing the case marker from accusative to nominative). Third, the complete absence of the thematic subject from the sentence does not impose any further operations to change its position or form. Finally, the adjectival passive (nominal clauses) can be a resort to avoid the cognitive load of processing the passive.

Language of Children with ASD vs. Typically Developing Children

Children diagnosed with Autism Spectrum Disorder (ASD) have certain language traits that differ from those observed in typically developing children. A significant distinction can be observed in the domain of pragmatic language abilities. Children diagnosed with Autism Spectrum Disorder (ASD) frequently face challenges in social communication and pragmatic language. These challenges manifest in difficulties comprehending and employing nonverbal cues, such as gestures, facial expressions, and tone of voice (see Klin et al., 2002). Proficiency in these cues is essential for successful communication.
in social interactions. Furthermore, they may exhibit difficulties in beginning and sustaining discussions, as well as struggles in adjusting their language correctly to various social situations. Conversely, children who develop ordinarily usually learn pragmatic language abilities effortlessly through exposure and interaction with their surroundings and caregivers, displaying competence in social communication from a young age. Moreover, whereas both groups may demonstrate language development delays, the characteristics and intensity of these delays might differ greatly. The research conducted by Tager-Flusberg and Kasari (2013) emphasizes the significance of early intervention and specialized language treatment that is customized to address the specific requirements of children with ASD. This intervention aims to enhance their language development and general communication abilities.

Autism is also characterized by communication phenomena: pronoun reversal, echolalia, and a reversed production-comprehension lag. Pronoun reversal refers to the use of “you” instead of “I” and vice versa. Echolalia is the repetition of others’ words. The production-comprehension lag, which is usually observed as speakers producing less advanced language than they comprehend, is diminished or reversed in individuals with autism. These characteristics are infrequently detected in the linguistic progression of children that are growing ordinarily (Gernsbacher, Morson & Grace, 2016). In relation to syntax, children with ASD frequently exhibit unique syntactic patterns in comparison to typically developing children. Although both groups may encounter delays in syntactic development, children with ASD typically display more significant challenges in mastering intricate grammatical structures and displaying syntactic adaptability. They may experience difficulties in generating and understanding sentences with embedded clauses, passive voice, and other grammatical structures that children with typical development typically acquire at an earlier stage. In contrast, typically developing youngsters have a more innate advancement in mastering syntactic structures, use their language abilities to articulate progressively intricate concepts and interact more proficiently with peers. The study conducted by Eigsti, Bennetto, and Dadlani (2007) emphasizes these disparities, indicating that interventions targeting the enhancement of syntactic skills in children with ASD can facilitate narrowing the disparity in language acquisition between them and their typically developing counterparts.
Previous Studies

The acquisition of the passive has sparked significant interest in the field of language acquisition. This is since children appear to achieve proficiency in understanding and using the passive voice relatively late in their language development compared to other aspects of their target grammar. In this section, we review some research on the acquisition of the passive by typically developing children and by children with ASD in different languages.

Maratsos et al. (1985) attempted to account for the late mastery of the passive, so they investigated the ability of preschool and early grade school children to comprehend English passive verbs. They compared the comprehension of action passive verbs (e.g., was held) with mental passive verbs (e.g., was liked). They adopted two methods to elicit data and assess children's understanding, i.e., children were asked to answer a question of a spoken sentence or to choose from a different picture. Both types were difficult for preschool children, but mental verb passive sentences appeared to be more challenging than action verb sentences for all children. This means that the passive is acquired at six years of age or later when the maturation of Universal Grammar happens. They argued that the limitations in the comprehension of passive verbs appear to stem from their tendency to actively interpret the input as indicating semantic conditions for when the passive voice is applicable. Passive with action verbs can be parsed as an adjectival construction, which is unavailable for non-action verb passives. Consequently, the Maratsos account for the failure to comprehend passive sentences is a syntactic one. This account has been adopted later by many works such as Borer and Wexler (1987), Wexler (2004), Orfitelli (2012), Snyder and Hyams (2015).

One significant concept in early language development that received special attention is noun bias which was proposed by Gentner (1982). Thus, based on this principle, typically developing children typically learn many more nouns than verbs early in vocabulary development. This is explained by a universal conceptual tendency to map nouns onto object concepts, hence, it is easy for the child to extract the referent of the noun from the surrounding context depending on his perception. On the other hand, the acquisition of verbs requires establishing relationships among nouns and associating the verb with a temporal reference. This assumption has been adopted by many other
researchers including (Swensen et al., 2007) who tested this phenomenon in children diagnosed with ASD.

Marchman et al. (1991) conducted a study involving 3–11-year-old children to examine how children respond to a question that requires an answer in the passive, and if they avoid using the passive, what alternatives they resort to. They found that children sometimes avoided using the passive and utilized other simpler alternatives that convey the same meaning. This avoidance of the passive, coupled with their full comprehension of the contexts that involve them, leads us to conclude that children do master the other alternatives they use instead of the passive, but they do not fully acquire the passive. Furthermore, it was found that age is an important factor in this respect; younger children tend to avoid the passive more than older children do. As an example of children’s responses, as stated in Marchman et al. (1991: 81), instead of saying “the tiger is licked by the bear”, one of the responses was “The tiger let the bear lick him”.

Terzi et al. (2014) evaluated the comprehension of Greek passive sentences in a group of 20 Greek-speaking children diagnosed with autism, aged 5 to 8 years, with an average age of 6 years and 8 months. All these children exhibited nonverbal abilities, as measured by the Rapid Prompting Method (RPM), at or above 80. Their performance was compared to that of a control group consisting of twenty typically developing children of similar age. The results indicated that both groups in the study demonstrated comparable levels of performance. The researchers concluded that this similarity could be attributed to the fact that the children with autism spectrum disorder (ASD) who were tested in the study had high-functioning capabilities, suggesting a link between overall cognitive abilities and proficiency in understanding passive grammatical structures.

Another study on children with ASD was conducted by Durrleman et al. (2017) to explore the comprehension of the French passive structure by French children with ASD. The study aimed to compare the ability of children with ASD to typically developing French-speaking children. The autistic children numbered 20, with a mean age of 9.4. The children were presented with pictures that could have been utilized to describe different situations in the active and various types of passives. The results of the experiment revealed that ASD children encountered difficulties in understanding passive
constructions when compared to typically developing children of the same and younger ages. Both ASD children and typical children showed superior proficiency in comprehending active constructions. The type of passive that expresses an event (eventive or actional passive) was better acquired than the type that describes a state (psychological passive) by both groups of children. The second type of passive investigated here is long (including a by-phrase) and short (without a by-phrase), which appeared to be similarly mastered by both groups of children. These findings suggest that some syntactic structures create acquisition difficulty for all children. Thus, ASD and typical children follow the same pattern of acquisition even though autistic children may experience some delays in this process.

In Jordanian Arabic, Alsadi (2018) investigated the comprehension of JA passive by Jordanian children. The researcher focused on the role of gender and age in this phenomenon; therefore, the study involved 40 male and female children of three age groups (3–8). A comprehension test was conducted, including six pairs of pictures that show the difference between active and passive sentences. The children were orally asked to point to one of the pictures when the experimenter said a passive or an active sentence. The results of this study indicated no significant differences related to the variable of gender. On the other hand, age revealed statistically significant differences in the comprehension of the passive structures based on their type. That is, adjectival passive was one of the most produced by four-year-old children, in addition to one verbal form that requires the verb to be prefixed with /it/ and its third consonant to be geminated. Accordingly, the children in this study acquired both adjectival and verbal passive at an early age.

Jones et al. (2021) argued that the difficulty in the passive does not arise from the syntactic structure per se but from other aspects of language, i.e., semantics, pragmatics, and narrative. To illustrate this assumption, the researchers tested 30 children, ranging in age from 6 to 9 years, some with ASD, and others typically developing. These children were instructed to describe a set of animations, with the experimenter guiding them to employ passive sentence structures by providing cue verbs. In the children's responses, passive sentence structures are employed correctly, but thematic roles are assigned inaccurately; for example, they reversed the agent and patient roles. Hence, instead of
saying “Windy was surprised by Bob”, they said “Bob was surprised by Windy”. Another vital result is that children with ASD displayed a similar ability to generate passive sentences; however, the number of reversal errors (i.e., reversing theta roles) was higher when it comes to autistic children. Accordingly, ASD children’s ability to create sentences with correct word order gives rise to the claim that the difficulty comes from other aspects of language (in this case, semantics) rather than pure syntax.

Research on the acquisition of Arabic by children with ASD is very limited. A study by Altakhaineh et al. (2020) on one Arabic variety i.e., Emirati Arabic tackled the acquisition of Arabic gender, particularly in terms of noun-adjective agreement, by Emirati-speaking children with ASD. They also attempted to assist those children through an experiment which involved a pre- and post-test that assessed their performances before and after they were presented to visual stimuli. In Arabic, all nouns are gendered, they are either feminine or masculine. The masculine is not overtly marked while most of the feminine are suffixed with [-t]. Adjectives also are marked for gender to agree with the nouns they describe. The results revealed that children correctly applied noun-adjective agreement when the noun was overtly marked for gender, even if the noun was semantically not feminine (i.e., inanimate). Further, pictures were found to be feasible to assist children to establish connection between the noun and the depicted reference. Thus, the conclusion of this study was that children with ASD can acquire noun-adjective agreement system in Arabic unless they have specific language impairments.

Another recent study was conducted by Zibin et al. (2023), wherein they argued that children diagnosed with ASD experience difficulties with language that are specifically related to syntax. Specifically, young children encounter challenges in understanding and responding to intricate linguistic patterns in Arabic. The study investigates the potential effects of a prototype Arabic assistive application on the cognitive abilities of children with ASD in comprehending and responding to content-based questions, as well as on their overall communicative skills. *Aseel*, a prototype assistive application, was developed through the administration of two surveys to 57 caregivers and ASD specialists in Jordan, as well as a focus-group discussion with three teachers from three autism centers in Jordan. In order to examine
the impact of utilizing this application on improving the cognitive skills of children with ASD in comprehending and responding to Arabic questions, a sample of participants was selected, consisting of two groups of children: 20 children with ASD who are able to communicate verbally, and 5 children with ASD who are nonverbal. These children were enrolled in three autism facilities located in Amman, Jordan. A preliminary examination consisting of 55 questions related to the subject matter was created and administered to both groups for evaluation. Subsequently, a three-week intervention was conducted, during which the teachers provided instruction to the students on how to respond to these questions utilizing the application. A post-test was administered following a three-day break to assess the impact of the app on the cognitive abilities of children with ASD, both verbal and nonverbal, in comprehending and accurately responding to questions. The data analysis indicated that there were statistically significant differences between the responses of the two groups in the pre- and post-tests. This indicates that this system has the capacity to assist both vocal and nonverbal youngsters with ASD in efficiently acquiring advanced Arabic content questions. This assistive program improves collaboration between teachers and children with ASD, boosts visual-spatial thinking, and facilitates communication with others. One additional benefit of this application is the expansion of word repertoire in youngsters with ASD. The results of the study highlight the difficulty encountered by children with ASD in understanding cause and effect relations.

In a nutshell, the passive construction, as observed in the literature, imposes challenges in production and comprehension for typically developing children. It is expected that autistic children will encounter even more difficulties in this regard. Nonetheless, the results of previous research showed that autistic children can eventually acquire passive structures, but the main issue lies in a delay in the acquisition process. Additionally, it is noteworthy that the source of this deficiency might be related to aspects of language beyond just syntax. Accordingly, this study aims to investigate the following research questions:

RQ 1. What is the passive structure favored by Jordanian Arabic-speaking children with ASD?

RQ 2. What is the rationale behind the preference of this passive structure by children with ASD?
Methodology

Participants

The research group comprised 10 children with autism, all of whom were males with an average age of eleven, and they were enrolled at the Tawasul Center for Autism in Amman, Jordan. This gender distribution aligns with the findings of various studies, which have consistently shown a higher prevalence of autism among males compared to females. As an instance, in the study conducted by Loomes, Hull, and Mandy in 2017, it was discovered that there is a three-to-one ratio of autistic children, with more males than females. In this current research, the participants primarily speak JA as their native language. This common language, JA, eased communication between the children and the researchers because the researchers themselves are also native speakers of JA. The participants in the study exhibited a moderate level of severity in their ASD, along with a nonverbal IQ score of approximately 45. These 10 children were chosen because they had a similar level of proficiency in their first language (L1) and had an average mental age of approximately 7, as determined through an annual assessment administered by the center. Furthermore, none of these children exhibited language difficulties, indicating that the sample had both similarities and differences in terms of their language abilities, making it a balanced and diverse group. Regarding ethical clearance, permission was granted by the center and the parents of the children to administer the tests within the center.

Procedure

The study is considered a psycholinguistics study since it seeks to understand the use of a linguistic phenomenon (passivation) by autistic children, aiming to identify the preferred structures and explore the reasons behind such preferences. Five representative images were employed to assess the capacity of children with ASD to grasp passive voice, as detailed in Appendix 1. The selected pictures were determined in collaboration with the teachers at the center who work with the children, ensuring that the children were acquainted with the images and that the colors used in the pictures did not cause any discomfort to them (see Zibin et al., 2023). Images were employed for
data collection because they have been reported as a valuable method for assessing children with ASD, as demonstrated in studies such as Charlop-Christy et al. (2002), Ganz and Simpson (2004), Altakhaineh and Alkhatib (2019), and Altakhaineh et al. (2020). Subsequently, each child was presented with the five pictures individually and requested to describe the activities they observed taking place in each image. The researcher asked each child the following question: What happened to the item in the picture? Their answers were documented for later analysis. Figure 1 displays a sample image that the students were tasked with describing.

**Figure 1**
*Picture Example*

Before the verbal prompting took place, a linguist, and an expert in the field of autism reviewed the items and questions to ensure their impartiality and appropriateness for the participants in the study.

**Statistical Analysis**
Descriptive analysis was utilized to present a thorough summary of the precise responses about the use of passive voice structures by the participants on the test. This approach facilitated the analysis of the frequency and dispersion of accurate answers, providing valuable insights on the competence and difficulties faced by children with ASD in comprehending passive voice structures. The utilization of descriptive analysis allowed for a detailed comprehension of the participants' performance, revealing insights into the patterns and differences in their syntactic abilities. The study aims to provide an accurate portrayal of the syntactic abilities and limitations of children with ASD in respect
to passive voice constructions. This would contribute to a better understanding of their language development.

**Ethical Considerations**

When conducting research on children with ASD, it is crucial to prioritize ethical considerations due to the vulnerability of this population. The study rigorously followed ethical criteria to safeguard the rights and well-being of the participants. Prior agreement was acquired from parents or legal guardians, with measures taken to assure understanding through the use of simplified language and visual aids. Data was anonymized and access was restricted to ensure privacy and confidentiality. The preservation of participants’ autonomy and dignity was ensured by establishing a nurturing atmosphere. The principles of beneficence and non-maleficence were given priority, with research processes intentionally designed to be non-invasive and any potential hazards minimized. This study seeks to provide useful insights into language development in children with ASD by employing ethical procedures and maintaining rigorous research standards and participants’ well-being.

**Results and Discussion**

Based on the results of the statistical analysis, the *maʃʿu:l* JA passive structure was the most used by the participants compared to the *ʔinfaʕal* JA passive structure or *faʕala* Standard Arabic passive structure. The empirical data presented in this study are not part of any international repositories, but rather, they consist of data collected in relation to a set of pictures and verbs chosen by teachers experienced in dealing with children with ASD. The passive structures used by autistic children are displayed in the following table. The instances of each structure were calculated as shown in Table 1.

It is worth noting that four students provided the word “nar” (fire) as an answer for the 4th picture, i.e., the answers were not passive structures but nouns. Furthermore, two students answered with “ħabal” (rope) for the 5th picture, i.e., the answers were not passive structures but nouns.

Table 1 indicates that the participants used the “maʃʿu:l” JA word structure more frequently than the “ʔinfaʕal” JA word structure.
or the “faṣala” standard Arabic word structure. However, to determine whether there is a statistically significant difference among the results of the three passive structures, a statistical analysis was conducted, and the results are presented in Table 2.

Table 1  
Number of Answers Using Passive Structure

<table>
<thead>
<tr>
<th>Type</th>
<th>Passive structure</th>
<th>Number of instances out of 10</th>
</tr>
</thead>
<tbody>
<tr>
<td>type 1: “mafʕu:l”</td>
<td>makswr</td>
<td>9</td>
</tr>
<tr>
<td>type 2: “ʔinfaʕal”</td>
<td>ʔinkasar</td>
<td>1</td>
</tr>
<tr>
<td>type 3: “faʕala”</td>
<td>kasara</td>
<td>0</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td><strong>10</strong></td>
</tr>
<tr>
<td>type 1: “mafʕu:l”</td>
<td>mmzwʕ</td>
<td>6</td>
</tr>
<tr>
<td>type 2: “ʔinfaʕal”</td>
<td>ʔinmazʕ</td>
<td>3</td>
</tr>
<tr>
<td>type 3: “faʕala”</td>
<td>mazaʕa</td>
<td>1</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td><strong>10</strong></td>
</tr>
<tr>
<td>type 1: “mafʕu:l”</td>
<td>mkbwb</td>
<td>8</td>
</tr>
<tr>
<td>type 2: “ʔinfaʕal”</td>
<td>ʔinkaba</td>
<td>2</td>
</tr>
<tr>
<td>type 3: “faʕala”</td>
<td>kaba</td>
<td>0</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td><strong>10</strong></td>
</tr>
<tr>
<td>type 1: “mafʕu:l”</td>
<td>mħrwq</td>
<td>6</td>
</tr>
<tr>
<td>type 2: “ʔinfaʕal”</td>
<td>ʔinħaraq</td>
<td>1</td>
</tr>
<tr>
<td>type 3: “faʕala”</td>
<td>ħaraqa</td>
<td>1</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td><strong>8</strong></td>
</tr>
<tr>
<td>type 1: “mafʕu:l”</td>
<td>mqtwʕ</td>
<td>8</td>
</tr>
<tr>
<td>type 2: “ʔinfaʕal”</td>
<td>ʔinqataʕ</td>
<td>1</td>
</tr>
<tr>
<td>type 3: “faʕala”</td>
<td>qataʕ</td>
<td>0</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td><strong>9</strong></td>
</tr>
</tbody>
</table>

Table 2  
Results of the Statistical Analysis

<table>
<thead>
<tr>
<th>Passive structure</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>mafʕu:l</td>
<td>68%</td>
</tr>
<tr>
<td>ʔinfaʕal</td>
<td>22%</td>
</tr>
<tr>
<td>faʕala</td>
<td>4%</td>
</tr>
<tr>
<td>not related (non-sense)</td>
<td>6%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>100%</td>
</tr>
</tbody>
</table>
Regarding the first researcher question, table 2 shows that most of the students’ answers were in the “маф’у:л” JA passive structure, accounting for 68%. The “ʔинфа:л” JA passive structure comes second at 22%, suggesting that “маф’у:л” passive structure was used more frequently by the participants compared to “ʔинфа:л”. The lowest percentage, 4%, was related to the standard Arabic passive structure. This variation can be attributed to the influence of standard Arabic, which is used by their Arabic teachers at both the Tawasul Center for Autism in Amman, Jordan, and various private schools in the same city. Moreover, children encounter the standard variety through books and media, and the educators at the center, who are highly educated, employ the standard variety for communication with the children. 4% related to the SA passive structure, and the unrelated 6% were excluded from the analysis due to the low percentage. It is worth mentioning that Autistic children use the passive structures of JA more than the passive structures of SA, like most Jordanian children, because our autistic children are exposed to JA both at home and in the center.

The prevalence of “маф’у:л” passive structure, as opposed to the “ʔинфа:л” passive structure and the conventional Arabic passive structure “фа:л”, among children with ASD can be attributed to many variables. The “маф’у:л” passive structure is generally less complex in its construction compared to other passive forms, which can make it easier for children with ASD who struggle with syntactic complexity. The simple arrangement of its structure, where the passive participle comes after the verb, may better correspond to the processing preferences or capabilities of children with ASD, so aiding their understanding and use of this passive form. Furthermore, the “маф’у:л” passive structure may be more common in specific types of communication or situations that are especially noticeable or significant to children with ASD, hence strengthening their inclination towards this structure. Moreover, variations in cognitive and linguistic processing capabilities among children with ASD may potentially impact their utilization of passive structures. Certain children with ASD may find the “маф’у:л” passive structure to be more instinctive or simpler to use and understand, due to their cognitive abilities and limitations. These may include their ability to focus on specific details, their preference for concrete language, or their challenges with abstract thinking (see Zibin et al., 2023).
In addition, “maʃū:l” passive structure is a noun structure, while “ʔinfaʃal” passive structure is an inflected structure. They use “maʃū:l” passive structure more than “ʔinfaʃal” passive structure because acquiring nouns could be regarded easier than acquiring inflected structures. The connection between words and experiences is more straightforward for nouns due to the enhanced perceptual learnability of their corresponding objects in the early experiences of children (Gentner & Boroditsky, 2008). Autistic children exhibit a preference for specific passive structures over others, suggesting a potential universal order in lexical acquisition influenced by fundamental cognitive constraints, as proposed by Gentner and Boroditsky (2001). Gentner (1982) initially introduced the hypothesis that early lexical acquisition is significantly influenced by a universal inclination towards nouns compared to other word types. Substantial cross-linguistic evidence supporting this ‘noun bias’ hypothesis has accumulated over the years (Bates et al., 1994; Bornstein et al., 2004; Gentner & Boroditsky, 2009; Goldfield, 2000). Specifically, the results can be clarified by the inclination of children to favor acquiring nouns, a phenomenon known as noun bias (Swensen et al., 2007). Essentially, when children encounter a new word, they tend to associate it with an unnamed object (later identified) rather than its texture, color, or associated action within the social and cognitive context. This implies that typically developing children tend to generate more nouns compared to other word categories and prefer linking new words to new objects in the given context, rather than new properties or actions (refer to Waxman et al., 2013). While the initial observation was made in the context of typically developing children, the results of the present study suggest that the noun bias principle may also be applicable to children with ASD. This concept might clarify why the passive structure “maʃū:l” is learned before the “ʔinfaʃal” passive structure, given that children typically commence their sentences with a subject that is a noun rather than a verb. Consistent with this finding, other research has suggested a tendency among autistic children to exhibit a preference for nouns, as noted in studies by Tager-Flusberg et al. (1990), Charman et al. (2003), and Swensen et al. (2007).

Moreover, the observation that children with ASD employ the passive structure “maʃū:l” more frequently than the “ʔinfaʃal” passive structure indicates a tendency for their messages to be focused on
entities rather than events. This tendency aligns with the notion proposed by Holes (2004: 250) that messages characterized as “event-oriented” typically take the form of verb structures, whereas those identified as “entity-oriented” are typically expressed through nominal structures. The results signify the importance of this paper to the field of psycholinguistics, as it explores the Jordanian Arabic passive structures employed by children with ASD and elucidates the reasons behind their preferences.

Conclusion and Recommendations

This study has investigated the passive structures that Jordanian children with ASD use more frequently, and the reasons behind this usage. The researchers used illustrative pictures to collect data as they can help children with ASD focus on the task by establishing a connection between the target, the passive structure (in our case), and the referent in the picture. Based on the analysis, mafʕu:l passive structures were used more frequently than ʔinfaʕal passive structures for many reasons; simplicity of the structure, the frequency with which it is encountered, its relevance in different contexts, and individual variations in cognitive and linguistic processing abilities. Gaining an understanding of these aspects can offer useful insights into the language preferences and abilities of children with ASD, hence influencing specific interventions and support techniques aimed at improving their language development and communication skills.

It was also proposed that the noun bias principle could be used to account for the preference of “mafʕu:l” passive structure since it is easier to acquire a noun structure compared to acquiring an inflected word such as ʔinfaʕal, and the type of message being conveyed, i.e., entity- oriented messages are easier to deliver than event- oriented messages. In addition, it can be noted that all the verbs included in this study were action verbs which can easily be parsed as adjectival constructions, as argued by Maratsos et al. (1985) and which goes also in line with the results of the study of Durrleman et al. (2017). Further, neither the adjectival “mafʕu:l” nor the verbal “ʔinfaʕal” constructions involve reassigning thematic roles, which minimizes the cognitive load to construct the sentence and express the message appropriately.
This is compatible with the argument of Jones et al. (2021). Moreover, the flexibility of the word order in JA also plays essential role in simplifying the acquisition of passive by children with ASD. Such result explains the fact that children with ASD, albeit less frequently, could have used the verbal passive structure correctly.

In alignment with the suggestions of Altakhaineh and Alkhatib (2019), it is advisable for educators to employ tailored activities to engage children in classroom tasks. Special emphasis should be placed on the choice of pictures, considering their familiarity and the appropriateness of colors. Additionally, it is recommended that further research be conducted to explore various linguistic aspects among Arabic-speaking children with ASD, along with an examination of the challenges they encounter.

**ADHERENCE TO ETHICAL STANDARDS**

**Ethics declarations.** The ethical approval, designated as Approval No. SL 4/2023/66, was acquired from the administration of Tawasul Center for Autism one week prior to the commencement of the assessments. Additionally, each child's parent signed a consent form, affirming their willingness for their child to participate in the study. Furthermore, the parents were provided assurance that all information and outcomes pertaining to the students would be kept confidential and solely utilized for research objectives.

**Data Availability Statement.** The datasets generated and analyzed during the current study are available on https://zenodo.org/doi/10.5281/zenodo.1081040

**Funding.** No funding was received to conduct this research.

**Conflicts of Interest.** The authors declare no conflict of interest.

**Author Contributions.** The first, second and third authors played integral roles in conceptualizing and designing the study. All authors actively participated in material preparation, data collection, and analysis. Additionally, the initial draft of the manuscript was collaboratively written by all authors. Throughout the process, all authors provided feedback on previous versions of the manuscript and ultimately reviewed and approved the final version for submission.

**Consent for Publication.** The authors approve the publication of the current work. The work has not been, nor has it been submitted to other journals in consideration for publication.

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References


Appendix 1

Below are the images employed to prompt responses from the children at the center.

Picture 1

Picture 2

Picture 3
Продукування йорданських арабських пасивних конструкцій...

**Picture 4**

![Image](image4.png)

**Picture 5**

![Image](image5.png)
АНОТАЦІЯ

Мета. У дослідженні вивчається продукування пасивних конструкцій йорданської арабської мови десятьма дітьми з діагнозом розладу аутистичного спектра (ПАС). Воно має на меті визначити пасивну структуру, якій надають перевагу ці діти, та дослідити причини, що лежать в основі їх переваги.

Методи. Дослідження включало вибірку з 10 дітей чоловічої статі з ПАС, середній вік яких становив одинадцять років, які навчалися в Центрі аутизму “Тавасул”. в Аммані, Йорданія. Вибір йорданської арабської мови (ЯА) як рідної мови учасників сприяв ефективній комунікації, враховуючи, що дослідники також були носіями ЯА. Учасників попросили розповісти про події, зображені на п’ять різних картинках, а їхні відповіді, розділені на дві пасивні структури (mafʕu:l і ḥinfaʕal), були записані.

Результати. За результатами статистичного аналізу було виявлено, що пасивні конструкції mafʕu:l використовувалися частіше, ніж конструкції ḥinfaʕal. Ми стверджуємо, що пасивні конструкції mafʕu:l частіше використовуються дітьми з ПАС, оскільки засвоєння іменників відбувається легше, ніж засвоєння флективних слів, завдяки принципу іменникового ухилу та принципу, орієнтованому на об’єкт. Додаткові фактори включають структурну простоту, частоту вживання, доречність у різних умовах та відмінності в когнітивних і лінгвістичних здібностях.

Ключові слова: оновлення мовою, розлади аутистичного спектру, пасивні конструкції, йорданська арабська мова.