



A review on grammatical gender acquisition in monolingual Spanish-speaking children

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Abstract

Acquisition of grammatical gender has been well addressed in psycholinguistic research with Spanish monolingual typically developing (TD) children but less with children diagnosed with Developmental Language Disorder (DLD). The present article reviews linguistic and psycholinguistic studies on grammatical gender acquisition from different methodologies across monolingual Spanish-speaking children with typical language development and children diagnosed with DLD. Specifically, we explore how typically developing and DLD children assign grammatical gender and establish gender agreement. We discuss the implication of the findings for the design of the future research on gender acquisition.

Keywords: grammatical gender; gender acquisition; gender agreement; gender processing; Spanish.

1. Introduction

Grammatical gender is a common characteristic of many languages across the world. Although some languages do not distinguish the grammatical gender of nouns (e.g., Estonian or Chinese), other languages (e.g., Romance languages, Russian, German, and many non-European languages) group nouns according to their grammatical gender (e.g., common nouns and neutral nouns, masculine nouns and feminine nouns). A language has a gender system if the gender feature of a noun is observed on other items of the sentence. This phenomenon is called agreement (Corbett, 1991, 2006). Examples (1a) and (1b) from Spanish illustrate this grammatical feature:

- (1) a. **El** libro es amarillo
 the_{MASC} book_{MASC} is yellow_{MASC}
 'The book is yellow'
- b. **La** hoja es roja
 the_{FEM} sheet_{FEM} is red_{FEM}
 'The sheet is red'

In (1a), the form of the definite article is *el* and the adjective is *amarillo* since the noun *libro* is masculine. In (1b), the determiner *la* and the adjective *roja* are feminine, as they concord with the noun *hoja*. Furthermore, the determiners and the noun's ending are reported to be potential formal indicators of gender in Spanish, as well as the semantic (sex-based) information (Harris, 1991). According to the morphological shape, Spanish nouns are either transparent (masculine words normally end in -o and feminine nouns end in -a), opaque (those that have -e ending or end in a consonant), or irregular (for example, feminine nouns ending in -o and masculine nouns ending in -a). In fact, research using event-related potentials (ERP) with Spanish-speaking adults provided evidence that these nouns are processed differently, as different ERP signals emerged when a native speaker heard and processed one or another word (Caffarra, Janssen, & Barber, 2014). It was also claimed that formal cues to gender are detected during word recognition process (Caffarra & Barber, 2015).

Grammatical gender acquisition in monolingual contexts has been studied across a variety of languages, such as French, Icelandic, Welsh, German, Dutch, Hebrew, Portuguese, Russian, Norwegian, etc. (Blom, Polisenska, & Weerman, 2008; Boloh & Ibernnon, 2010; Ceitlin, 2005; Corrêa, Augusto, & Castro, 2011; Corrêa & Name, 2003; Gathercole, Thomas, & Laporte, 2001; Gvozdev, 1961; Karmiloff-Smith, 1979; Levy, 1983a, 1983b; Mills, 1986; Mulford, 1985; Popova, 1973; Rodina, 2008; Rodina & Westergaard, 2012, 2013, 2015; Tucket, Lambert, & Rigault, 1977). These studies were mainly aimed to answer two major questions. Specifically, the first one is when children start to establish grammatical gender, do they begin using semantic information or are formal cues to gender discovered earlier? The second

one is do children learn gender of each word or are they able to predict it on the basis of gender relevant information, i.e., gender cues? The vast majority of the cited research has concluded that although some occasional gender assignment errors may be observed in spontaneous productions, gender is acquired quite early (approximately at the age of 3-4). Gender acquisition is reported to proceed from formal to non-formal, i.e., children begin using formal cues of gender assignment and agreement (morphological and syntactic information) and then sex-based information is integrated into this process. For instance, in French, children were reported to be sensitive to a noun's ending in gender assignment task (Karmiloff-Smith, 1979; Tucket, Lambert, & Rigault, 1977). In fact, Karmiloff-Smith (1979) concluded that sex-based information takes precedence approximately from 6 years of age but frequently from 9 years and on. Nevertheless, some studies argued that children acquire grammatical gender on the base of the semantic features and do not take into account formal cues (Mulford, 1985). This study was criticized and reported to be "too extreme" in the statement about the uselessness of the formal cues (Pérez-Pereira, 1991b). In addition, results from Boloh and Ibernón (2010) have shown that French children established gender agreement using "masculine as default" strategy. The authors argue that the complete ability of gender agreement is acquired from age 7 but not before, as was previously suggested. Rodina (2008), on the other hand, proposed a mixed approach to the issue and claimed that from early on children are sensitive to both semantic and formal cues. Her data confirms that young children (2-3 years of age) are able to establish correctly the agreement with semantically masculine nouns that have feminine form (e.g., *papa* 'dad' has a typically feminine ending -a, but semantically this noun is clearly masculine, as it denotes a male).

DLD children and how they acquire gender has also received quite a lot of attention cross-linguistically (for Dutch Duinmeijer, 2017; Keij et al., 2012; Orgassa & Weerman, 2008; for French Jakubowicz & Roulet-Amiot, 2007; Kupisch, Müller, & Cantone, 2002; Roulet-Amiot et al., 2004; Roulet-Amiot & Jakubowicz, 2006; for Portuguese Silveira, 2011; for Greek Varlokosta & Nerantzini, 2013; for Russian Rakhlin et al., 2014; Tribushinina & Dubinkina, 2012; Tribushinina et al., 2018). Results from two experimental tasks with known words in French show that DLD children produced more agreement errors (Roulet-Amiot & Jakubowicz, 2006). Similarly, experiments with nonce words in Portuguese proved that gender agreement is problematic for DLD children, specifically when adjective agreement was involved (Silveira, 2011). Interestingly, outcomes by Rakhlin et al. (2014) with Russian-speaking DLD children were conflicting. On the one hand, children were reported to have a lower accuracy in gender assignment task. On the other hand, they did not differ from the control group as for the sensitivity to agreement features.

This article will focus on discussing studies that analyzed gender acquisition in typically developing and DLD Spanish-speaking children. Specifically, we will discuss whether these groups of children differ in gender assignment and agreement processes.

2. Gender acquisition: evidence from typically developing Spanish-speaking children

Initial insights on grammatical gender acquisition were provided by a longitudinal study by Hernández Pina (1984). Results of her observations suggest that Spanish children acquire gender marking and gender agreement before the age of four (López-Ornat et al., 1994). Biological sex distinction is already observed before the second birthday (e.g., *abuelito/abuelita* ‘granddad/grandmom’ at 21 month, *niño/niña* at 22-25 months). From early on, the child is very sensitive to morphological and syntactic gender cues. Overgeneralization of feminine gender are observed between 1;9 and 2;1, such as **tierra azula* instead of *tierra azul* ‘blue earth’ or **mota rota* instead of *moto rota* ‘broken motorbike’. In contrast, approximately at 1;11, the child frequently overgeneralizes masculine gender with morphologically unmarked nouns, e.g., **un llave* instead of *una llave* ‘a.F key’, **un leche* instead of *leche* ‘milk’ (feminine and uncountable), **un verde* ‘a.M green’ instead of *verde* (to indicate that something is green). A short time later¹, the child uses an inverse strategy of using a feminine article with opaque nouns, such as **una camión* instead of *un camión* ‘a lorry’, **una pez* instead of *un pez* ‘a fish’, etc. At 2;7, the child was reported to have completely acquired agreement between nouns and articles but not between nouns and adjectives. In Mariscal’s study (2008), spontaneous speech samples of four Spanish children (aged 1;10-2;01) were recorded in various time periods. She concluded that children learn the first adjectives linking them to particular nouns. Thus, gender agreement between nouns and adjective is conditioned by this factor and cannot be generalized to other items immediately. Mariscal also points out that acquisition of noun-determiner gender agreement is processed gradually. Children seem to be moderately adding new sources of information (phonological, distributional, and functional), as they extract these from the adult speech input.

An elicited production task by Pérez-Pereira (1991a) explored children’s sensitivity to gender cues. Pérez-Pereira presented pictures of fantasy animals to Spanish children (aged 4-11) with auditory stimuli which consisted in naming a fantasy animal with a novel name. Following that, children were presented with pictures of the same animals but painted in a different color and were asked to name this animal. The results of this study showed that semantic cue (animacy feature) was not important for children. Younger children begin using morphological cue (the noun’s ending) and, as they grow older, they seem to pay more attention to syntactic cues. Masculine gender overuse was also observed in items where morphological and syntactic cues were in conflict, such as *una linolo* ‘a.F linolo.M’ or *un satila* ‘a.M satila.F’. These results can be either related to an earlier acquisition of

1 Hernández Pina does not mention the precise period of time when the child makes use of this strategy.

masculine or a “masculine-by-default” strategy, reported by Boloh and Ibernón in French (2010). Martínez-Nieto (2018) provided evidence for overgeneralization of masculine forms of articles and clitics, as well as a higher accuracy level in masculine forms use in normally developing monolingual Spanish-speaking children and young heritage speakers. A recent study using pseudowords with Spanish monolinguals and Basque-Spanish bilinguals revealed a general preference for masculine gender for both groups (Pérez-Tattam et al., 2019). Similar to Pérez-Pereira (1991a), the authors of this study found that morphophonological cues play a more important role than the biological sex of the referent.

Experimental studies based on comprehension have also become a source of emerging evidence of the importance of gender information. Lew-Williams and Fernald (2007) claimed that children make use of the definite articles in order to predict the upcoming noun. They tested children via eye-tracking procedure. Children (aged 34-42 months) were presented with pairs of pictures with objects either of the same gender (*la pelota* ‘the.F ball.F’, *la galleta* ‘the.F cookie.F’) or different gender (*la pelota* ‘the.F ball.F’, *el zapato* ‘the.M shoe.M’). At the same time, they heard an auditory stimulus with the article and the name of one of the objects (e.g., *encuentra la pelota* ‘find the.F ball.F’). The results showed that children were faster in identifying the target object when the determiner was informative, i.e., when grammatical gender of the objects’ names was different. Arias-Trejo, Falcón, and Alva-Canto (2013) extended the pilot study by Lew-Williams and Fernald (2007), where only transparent nouns were used, and included opaque familiar nouns as well, such as *llave* ‘key’, *calcetín* ‘sock’, etc. Toddlers (24-, 30-, and 36-month-olds) were shown pair of familiar object (e.g., a target *plátano* ‘banana.M’ and a distractor *manzana* ‘apple.F’) and heard an auditory stimulus such as *mira el plátano* ‘look the.M banana.M’. Surprisingly, the youngest experimental group (24-month-old) only made use of indefinite articles *un* ‘a.M’ and *una* ‘a.F’, whereas the elder toddlers (30- and 36-month-old) used both definite and indefinite articles to infer the target object. Another research by Arias-Trejo and Alva-Canto (2012) provided evidence that Spanish-speaking 30-month-old toddlers can make use of grammatical gender information stored in adjectives. Children were trained to associate novel objects (a fire hydrant and a diablo) with a gendered adjective. For example, when seeing a fire hydrant children heard *mira, es rojo* ‘look, it’s red.M’, whereas when they saw a diablo they heard *mira, es amarilla* ‘look, it’s yellow.F’. Following that, children were shown two objects simultaneously and heard an auditory stimulus consisting in a nonce word. For instance, *mira una betusa* ‘look a.F betusa’. The results revealed that toddlers were able to identify the appropriate target object on the basis of -o/-a pattern of the adjective, established previously during training phase.

Similar outcomes were obtained in French with 25-month-olds (Van Heughten & Shi, 2009) and in Czech with 21-24-month-old children (Smolík & Bláhová, 2018) but not in Dutch (Van Heughten & Johnson, 2011). This result can be explained by the transparency of gender system in a language (Arias-Trejo, Falcón, & Alva-Canto, 2013). In Dutch there are two determiners (common and neuter) for three genders (masculine, feminine, and neuter), whereas

in French and in Spanish there are two determiners for two genders (masculine and feminine). Although in Czech there is no obligatory determiner accompanying nouns, there are particular markers of masculine, feminine, and neuter genders.

Together, the results of the research discussed in this section provide evidence that from early on typically developing children are sensitive to gender information embedded in nouns, articles, and determiners.

3. Gender acquisition: evidence from DLD Spanish-speaking children

Alongside the ongoing debate about how grammatical gender is acquired and processed by typically developing children, researchers also investigated this process in children diagnosed with DLD. Children with DLD are reported to have deficits in their grammatical skills (Bottari et al., 1998; Clahsen et al., 1997; Leonard, 2014), thus grammatical gender is considered to be a problematic area. In Spanish, some studies focused on spontaneous productions of DLD children, whereas others took an experimental approach. The results of this research have been conflicting, as research outcomes suggest DLD children are quite accurate with gender (Anderson & Souto, 2005; Bosch & Serra, 1997), others claim deficits in gender agreement (Bedore & Leonard, 2001; Jackson-Maldonado & Maldonado, 2017; Restrepo & Gutiérrez-Clellen, 2001). Other studies aimed to explore DLD children's sensitivity to gender cues (Anderson & Lockowitz, 2009; Perona Jara, 2015).

Bedore and Leonard (2001) explored grammatical morphology deficits in Spanish DLD². Although gender agreement was not the main object of the broad study, and gender errors were not analyzed in detail, authors report some limitations in gender use. For instance, feminine plural adjectives were substituted by masculine plural forms. Omission of the definite and indefinite articles and limitations in use of clitic pronouns were also reported (Bedore & Leonard, 2005). In the same line, results of Jackson-Maldonado and Maldonado's (2017) research showed omissions and substitutions of gendered articles and clitic pronouns. For example, **llevó al niño hasta un montaña* instead of *llevó al niño hasta una montaña* '(he) took the boy to the mountain'.

The study by Bosch and Serra (1997), which investigated spontaneous speech of 12 DLD children (mean age 7;6), included children with phonological disorders. Children's responses

2 Participants in this study were recruited in questionable settings; for example, the authors reported to recruit children with a very limited knowledge of English. However, it is arguable that children acquiring Spanish in Mexican communities of the USA are predominantly monolingual. It is also undeniable that their linguistic experiences differ from those children acquiring Spanish in a Spanish-speaking country (Silveira, 2011).

contained omissions of the articles, evidenced mainly in children with lower phonological abilities. However, when produced, articles matched the noun's inherent gender. Restrepo and Gutiérrez-Clellén (2001) also claimed gender errors in agreement and article use. Nevertheless, the results are questionable, since the participants were recruited from the USA and, thus, cannot be considered completely Spanish monolinguals. Research by Anderson and Souto (2005) aimed to investigate the use of articles by Puerto Rican Spanish-speaking children with DLD (aged 4;3-5;4), and used both observational and experimental approaches. The authors' general conclusions are that DLD children do not present deficits in gender agreement in the use of the articles. However, as will be further discussed, these results are questionable. In spontaneous speech samples, the authors reported 9.5% of gender errors for DLD children. These errors included article omissions and number errors. The authors also performed an analysis of errors according to noun ending (transparent and opaque). Interestingly, 70% of the errors were with typical ending, while 30% occurs with opaque endings. Overuse of masculine gender was also reported in 58% of errors. In the experimental task of this research, a child was elicited the production of gendered determiners. Surprisingly, the analysis showed that 84% (21 out of 25) of gender errors were produced by typically developing children, whereas DLD children showed only 21 (28 out of 180). These results can be explained by the methodological shortcomings of experimental design. For example, as mentioned by Silveira (2011), the authors use the expression "semantic transparency" in a very misleading way, claiming that nouns are semantically transparent if they have "inherent gender". However, in the category feminine / atypical word ending / transparent, the authors group together *la mujer* 'the.F woman.F', *la bebé* 'the.F baby.F/M' and *la piloto* 'the.F pilot.F/M'. The word *mujer* refers only to female reference, whereas the nouns *bebé* and *piloto* can have both female and male referents. Therefore, only the word *mujer* has the inherent gender, whereas the other examples are not semantically transparent, but, on the contrary, they are ambiguous as for their gender. Furthermore, children may have made use only of the morphological cue of the noun *piloto* and classify it as a masculine one. The same arguable condition is observed in masculine / atypical word ending / transparent, where the authors group such nouns as *el policía* 'the.M policeman.M/F', *el astronauta* 'the.M astronaut.M/F', and *el hombre* 'the.M man.M'. Once again, only the noun *hombre* is semantically transparent, whereas the two other nouns are clearly ambiguous. These points make Anderson and Souto's results arguable and further research to confirm them is required.

Anderson and Lockowitz (2009) explored DLD children's (aged 4;3-5;7) sensitivity to gender cues using an invented word task, similar to that of Pérez-Pereira (1991a). Noun words were created and grouped according with four different sub-tests conditions: noun ending, article cue, adjective cue, and semantic transparency. Children were shown a picture of a new object with an auditory stimulus; for example, *aquí hay dos mieslas violetas* 'here are two purple mieslas'. When a second picture was presented, the participant was elicited an answer of what he/she sees. Differences were found between the accuracy rates of answers

for items with article cue, where DLD children showed mean accuracy score of 6.55 whereas typically developing children showed 9.09 (out of 12). There was also an observed trend for DLD children to show lower mean score for accuracy in noun-ending cue items (5.55) in comparison with typically developing children (6.45). The result indicated that DLD children mostly made use of the adjective and article cues. In a similar study, Cantú-Sánchez and Grinstead's (2004) results suggest that there was a significant difference between DLD children and typically developing peers. However, no further information about types of errors made by DLD children is available.

Following the same research line, Perona Jara (2015) studied Spanish-speaking children with DLD (aged 3;3-5;11). In her experiment, both real and nonce words were used. Children listened to an auditory stimulus such as *el perro está descansando* 'a dog.M is resting', while seeing pairs of pictures with female and male animal, e.g. *perra* 'dog.F' and *perro* 'dog.M' (the biological sex of the animal was indicated via typical feminine attributes, such as dresses, necklaces, etc., and via typical masculine attributes like mustache, hat, etc.). Her results showed that typically developing children were more precise in their answers in both conditions (real and nonce words) when they had a typical Spanish gender pattern: *el* 'the.M' + -o or *la* 'the.F' + -a (which was called the "distributional" cue by the author). As for DLD children, Perona Jara (2015) did not find significant differences in real/nonce word condition. The most difficult condition for DLD children, as Perona Jara (2015) claims, is the irregular nonce word, where the determiner and the noun's ending do not agree, e.g. *la coto* 'the.F coto.M'. Comparing age groups, she found that older DLD children show a better answer rate with known words which have the typical gender pattern. In fact, Perona Jara (2015) concludes that DLD children answered randomly in all conditions except for known words with opaque ending (e.g., *el pez* 'the.M fish') and thus do not follow any strategy when assigning grammatical gender to either known or novel nouns. The author explains this surprising result by the processing limitation in DLD, such as working memory and processing speed (Botting & Conti-Ramsden, 2001; Gathercole & Baddeley, 1990; Kail, 1994; Kail & Müller, 2006; Leonard, 2014). According to that, when only syntactic cue is available (i.e., the determiner), DLD children process gender information more easily than when the distributional and morphological cues are available. Another explanation consists in the nature of the noun *pez*, which is epicene and only has one grammatical gender. Thus, it is possible that DLD children have grammatical gender information stored in mental lexicon together with the noun itself. Nonetheless, this study presents some methodological shortcomings; e.g., the possibility to answer correctly was 50%, as children only had to point one of two pictures. Thus, it is difficult to know which answers were made randomly and which were made consciously considering gender information provided in a noun, as no production and actual answer was elicited.

Evidence from previous research suggests that gender acquisition in DLD children seems to differ from this process in typically developing children. Furthermore, the heterogeneity

of the disorder makes it difficult to recruit participants with a very similar diagnosis and in similar settings, thus the results are quite inconsistent.

4. Summary

The empirical studies discussed in the present article have investigated how typically developing and DLD Spanish-speaking monolingual children acquire grammatical gender system in their native language. It is generally agreed that grammatical gender is acquired quite early by Spanish monolingual typically developing children.

However, several issues still remain unsolved concerning the developmental stages of this process. Firstly, it seems that children begin to assign gender to novel nouns using the morphological cue embedded in the ending of a noun (Pérez-Pereira, 1991a; Perona Jara, 2015). Gendered determiners are also reported to be important in gender assignment and agreement from early on, as articles normally accompany nouns in a sentence (Arias-Trejo & Alva-Canto, 2012; Arias-Trejo, Falcón, & Alva-Canto, 2013; Lew-Williams & Fernald, 2007). Further evidence is needed to confirm which linguistic cue takes precedence in gender assignment at the early language development stage and how it evolves. Secondly, evidence suggests that children master masculine earlier than feminine gender (Pérez-Pereira, 1991a; Martínez-Nieto, 2018) and may even use it by default (Boloh & Ibernón, 2010). Up to date, no research suggested Spanish children may use “masculine-by-default” strategy. Future research is essential to confirm these arguments. Thirdly, it remains unclear when exactly children incorporate semantic cue into gender assignment. Rodina’s research (2008) with Russian monolinguals suggests that in some cases the semantic cue takes precedence in gender assignment from a very early stage (for example, in nouns like *papa* ‘dad’, which is semantically masculine as it denotes a male, but formally it is feminine as it ends in -a). However, other nouns, such as double gender nouns and hybrids, are more complex for gender assignment and agreement. Thus, we suggest that future studies considering the gender of these nouns in Spanish is needed.

Furthermore, it is still open to debate whether DLD children make use of different types of grammatical gender information, such as semantic, morphological, syntactic, or distributional, as the existing empirical data is conflicting and cannot provide evidence for resolving this debate so far. To our knowledge, no evidence has been provided on whether DLD children are sensitive to semantic gender cue from early on either. Similarly, DLD children have not been tested on whether they make use of determiners in sentence comprehension task.

In sum, the present article reviewed empirical studies on gender assignment and agreement in Spanish monolingual typically developing and DLD children. We may not have reviewed all relevant studies, but evidence discussed above will provide reference and plausible ideas for future research concerning grammatical gender acquisition in Spanish.

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