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Processing of Gender in Turkish-Dutch and Turkish-Greek child L2 learners*

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1. Introduction

Grammatical gender has been documented as a difficult feature to acquire for second language (L2) learners. The majority of previous studies has examined gender production, comprehension and processing in adult L2 learners, in an attempt to unravel whether or not the abstract representation of a gender feature is learnable (Bruhn de Garavito & White, 2003; Grüter, 2011; Franceschina, 2005; Montrul, et al., 2008; Hawkins & Franceschina, 2004; Valenzuela, Kozlowska-MacGregor & Leung, 2004). The results from these studies have drawn a mixed picture as to whether problems in production are output related, as the Missing Surface Inflection Hypothesis (MSIH, Haznedar & Schwartz, 1997) would suggest, or represent underlying problems with L2 gender feature specification (Hawkins & Franceschina, 2004). Nevertheless, most studies converge on that adult L2 learners make use of morpho-phonological cues on nouns for assigning nouns to a gender class. (Bruhn de Garavito & White, 2003, Franceschina, 2005).

The importance of morpho-phonological cues in determining grammatical gender was initially reported in studies with monolingual (L1) children. (Kamiloff-Smith, 1979; Pérez-Pereira, 1991). These studies showed that L1 children acquiring French or Spanish tend to rely more on morpho-phonological cues for gender assignment than on semantic (animacy/sex of the noun) or syntactic (form of related articles, adjectives etc.) information. These morpho-phonological cues refer to the grammatical gender being predicted by statistical probabilities between the gender of the noun and the noun ending (Tucker, Lambert & Rigaut, 1977).

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To date, there are no studies examining the effect of the make-up of the target gender system and the presence of morpho-phonological cues on the acquisition of gender in L2 children. Existing studies on gender acquisition by L2 children have been limited and have primarily focused on production (Chondrogianni, 2008; Unsworth et al., 2011; Blom et al., 2008). The very few studies on off-line and on-line comprehension (Blom & Vasic, 2010; Unsworth & Hulk, 2010) have shown that production data may not reveal whether or not a learner's gender representation is intact.

The present study aims to fill this gap by examining processing of grammatical gender in two very different gender systems, Dutch and Greek, by L2 children whose L1 (Turkish) does not grammaticalise gender. In this way, we first examined whether L2 children's develop knowledge of grammatical gender despite lack of gender in the L1 and a late onset. We further examined the role of the target language properties on the processing of grammatical gender, that is, whether or not the presence of morpho-phonological cues in the target system influences child L1 and L2 processing. Finally, we investigated whether L2 children show the same processing profile as the L1 children.

2. Gender and its acquisition in Dutch and Greek.

Dutch has a two-way gender system with common and neuter gender nouns. Common nouns are preceded by the definite article *de*, as in *de auto* 'the car', whereas neuter nouns take the definite article *het* as in *het huis* 'the house'. The gender of Dutch root nouns is arbitrary (Haeseryn, et al., 1997) and observable on other words, such as articles, adjectives and relative pronouns, which agree in gender with the noun. However, derived or inflected nouns have predictable gender,. For instance, the diminutive suffix *–je* provides a morpho-phonological cue for neuter gender; e.g. the noun *de muis* 'the mouse' has common gender in its root form, but is neuter gender in diminutive *het muis-je*. The predictive value of the suffix *-je*, i.e. the ability to predict the gender of the noun on the basis of the noun ending, is 100%. That is, when *-je* added to a root common or neuter gender noun, it always predicts the use of the determiner *het*. It represents, therefore, an exceptionally transparent case in an otherwise opaque gender system.

Greek has a three-way system with masculine, feminine and neuter nouns Masculine nouns are preceded by the definite article 'o', feminine nouns by the definite article 'i' and neuter nouns by the article 'to'. Greek nouns have been divided into eight inflectional classes (IC) on the basis of morphological criteria of the entire nominal paradigm (Ralli, 2002). The relationship between morphological class and gender is not a one-to-one, as each IC may comprise one or two genders. For example, nouns ending in *–os* may belong to IC1, but be both masculine, e.g. *o anthropos* ;the man' or feminine, *i eksodos* 'the exit'. What is more important than IC in Greek is that the predictive value of the noun ending is very strong for adult Greek native speakers (Mastropavlou, 2006; Varlokosta, 2011).

Turning to the acquisition of gender, previous research has shown that, even at the age of six, monolingual Dutch children have still not fully mastered grammatical gender; for child L2 learners the acquisition process is even more protracted and it is unclear when, if ever, they fully acquire grammatical gender of Dutch (Blom, et al., 2008; Brouwer, et al., 2008; Cornips & Hulk, 2008; Unsworth, 2008, Blom & Vasic, 2011). In contrast to these findings, the data from Greek L1 children show that grammatical gender is one of the first features to be acquired (Marinis, 2003; Stephany, 1995). In addition, Greek L2 children exhibit problems with gender only at initial stages of acquisition and their production becomes native-like with increasing proficiency (Chondrogianni, 2008).

To date, there is only one cross-linguistic study examining the gender production in L2 children acquiring Dutch and Greek with English as their L1, another language that does not grammaticalise gender (Unsworth et al., 2011). This study showed that sequential bilingual English-Greek children perform better on gender production than their Dutch age-matched peers. Greek L1 and L2 children seem, thus, to have fewer difficulties in acquiring grammatical gender in comparison to Dutch L1 and L2 children.

In the present study we wanted to explore whether, apart from production, the nature of the L2 gender system (Dutch vs. Greek) affects processing of gender mismatches between the article and the noun in L2 children with the same L1 one (Turkish). More specifically, we compared, whether processing an opaque gender system, such as Dutch, vs. processing a transparent gender system, such as Greek, affects the ability to detect gender mismatches between the article and the noun in an on-line processing task. The secondary aim of the present study was to address the issue of transparency within a single language, in this case Dutch. Children's ability to process the more transparent gender type (neuter gender in diminutives) was compared to their ability to process an opaque gender type (common and neuter gender in root nouns).

To this end, we applied the same method, using comparable materials and testing age-matched L1 and L2 children across languages.

2. Research questions

In this study we addressed the issue of transparency, i.e. the availability of morpho-phonological cues on the noun in the gender system of the two target languages, i.e. in Dutch and Greek. We focused both on the cross-linguistic comparison between Dutch and Greek, i.e. opaque vs. transparent gender, and on the transparent gender cases versus opaque gender cases within one language. The research questions we asked were the following: (i) Are Dutch and Greek L1 and L2 children sensitive to the ungrammaticality induced by gender mismatch between the article and the noun, (ii) to what extent is the ungrammaticality influenced by the morpho-phonological make-up of the target system, and (iii) do Turkish-Dutch L2 and Dutch L1 children perform better on the transparent gender type versus the opaque gender types? To investigate

whether any patterns in the data may arise from factors related to L2 acquisition, we compared the L2 group with L1 children in order to check for between-group differences

3. Experiment

3.1. Participants

21 Turkish-Dutch sequential bilingual (L2) children (D-L2) and 22 age-matched Dutch monolingual children (D-L1) were tested ($F(1,37)=3.659$, $p>.06$). The mean age of the D-L2 children was 7;7 at the time of testing (SD: 9.4 in months, range 6;3 to 9;0) and the mean age of the D-L1 group was 7;1 (SD: 6.5, range 6;3-8;1). 26 Turkish-Greek L2 (G-L2) children and 25 age-matched L1 Greek children (G-L1) participated in the Greek study ($t (1, 48) = -.536$, $p > 5.$). The mean age of the G-L2 group was 7;10 at the time of testing (SD: 13 in months, range 5;9-9;9) and the mean age of the G-L1 children was 7;7 (SD: 8.5 in months; age range 6;5-8;8 months;).

All Dutch participants came from the western part of the Netherlands (Randstad). The D-L2 children predominantly used Turkish at home, although they had also been exposed to Dutch at home with variable intensity. They had an average age of onset (AoO) to Dutch of 2.5 years (SD: 6 in months, range: 24-36 months) and their mean length of exposure (LoE) was 5.2 years (SD: 12.6 in months, range 44-84 months). The G-L1 children were recruited in Athens and the G-L2 children in the North-Eastern part of Greece. The G-L2 children spoke predominantly Turkish in the home, had an average AoO to Greek of 5.6 years (SD: 9 in months, range: 49-79 months) and their mean LoE was 2.3 years (SD: 14.2 in months, range 6-54 months).

To compare the general language abilities of the L1 and the L2 children we administered baseline tasks in both Dutch and Greek. For Dutch, the raw-score on receptive grammar of the standardized test *Taaltoets Alle Kinderen* (Verhoeven & Vermeer, 2001) was used. The D-L1 children had a mean raw score of 34.91 (range: 30-42, SD: 3.5) and they performed better than the D-L2 children who had a mean score: 31.48 (range: 23-39, SD: 4.2) on the baseline task ($t(41)=2.954$, $p=.005$). For Greek we analysed the raw-scores on the comprehension of morpho-syntax from the *Diagnostic Verbal IQ test for preschoolers* (Stavrakaki & Tsimpli, 2000).The G-L1 children had a mean score of 27.7 out of 31 (range: 25-30, SD: 1.4) and the G-L2 children a mean score of 21.1 (range: 15-28, SD: 4.2). The two groups differed in terms of their language abilities ($t(1,48) = 7.781$, $p<. 001$).

3.2. Materials and procedure

3.2.1 Task

To test children's processing of grammatical gender, we used an online self-paced listening task. In this task children listened to the grammatical and ungrammatical sentences comprising gender (mis)matches between the article and the following noun. Sentences were divided into segments and each time the child pressed a button, (s)he heard the following segment of a particular sentence. Children were expected to take longer to press, i.e., exhibit longer reaction times (RTs) for segments that are in conflict with their internal grammatical representation (for details, see Marinis, 2010).

The experiment was programmed and administered using the E-prime software (Schneider, Eschmann & Zuccolotto, 2002). At the beginning of each trial, children heard a lead-in sentence setting the context and saw a picture supporting this context and introducing the participants. This was followed by the critical sentence, which was segmented into phrases.

In the Dutch experiment, 27 nouns were tested, 9 for each gender (common, neuter and neuter-cue). The common nouns were: *apple* 'apple', *auto* 'car', *pop* 'doll', *schoen* 'shoe', *vis* 'fish', *poes* 'cat', *school* 'school', *klok* 'clock', *kast* 'cupboard'. The neuter nouns were: *glass* 'glass', *mes* 'knife', *paard* 'horse', *schaap* 'sheep', *vliegtuig* 'airplane', *bed* 'bed', *feest* 'party', *huis* 'house', *raam* 'window'. The neuter-cue nouns: *isje* 'icecream', *koekje* 'cookie', *krijtje* 'chalk', *meisje* 'girl', *snoepje* 'candy', *rietje* 'straw', *broodje* 'sandwich', *dropje* 'liquorice', *gebakje* 'cake' and these were lexical diminutives[1]. Examples in (1) illustrate the grammatical and ungrammatical sentences in the three experimental conditions in Dutch. All Dutch nouns were selected on the basis of familiarity, which, in turn, was based on age of acquisition (Schlichting & Lutje Spelberg, 2002; Damhuis, de Glopper, Boers & Kienstra, 1992).

(1) a. Neuter gender condition:
Deze spin viert zijn verjaardag. De spin / houdt / vanmiddag / **het**NEUT (***de**COM) feest / in zijn web / op de zolder.
'*This spider is celebrating his birthday. The spider / organises / in the afternoon / the party / in his cobweb / in the attic.*'
b. Common gender condition:
Deze olifant krijgt fruit te eten. De olifant / pakt / heel handig / **de**COM (***het**NEUT) appel / uit de bak / met zijn slurf.
'*This elephant gets to eat fruit. The elephant / takes / very handily / the apple / from the box / with his trunk.'*
b. Neuter-cue condition:

[1] In this condition we only used lexicalized diminutive nouns, which do not have root noun counterparts. This was done in order to avoid data loss; children could not resort to using a root noun, which in principle, would be a correct answer.

Sanne tekent graag op de stoep. Sanne / pakt / gauw / **het**NEUT (***de***COM) krijtje / uit het doosje / met het stoepkrijt.
'*Sanne likes to draw on the pavement. Sanne / takes / quickly / the chalk / out of a box / full of chalk.'*

In the Greek experiment, there were 24 nouns, 8 for each gender (masculine, feminine and neuter). All nouns were inanimate to avoid any semantic cues and were matched for frequency across conditions. The masculine nouns belonged to IC1, that is to nouns ending in *–os* (*fakos* 'torch', *elios* 'sun', *skufos* 'cap' *himos* 'juice') and IC2, that is to nouns ending in *–as* (*pinakas* 'board', *kuvas* 'bucket', *kimas* 'mince', *harakas* 'ruler'), the feminine nouns to IC3, that is to nouns ending in *–a* (*porta* 'door', *ntomata* 'tomato', *rodha* 'wheel', *banana* 'banana') and to IC4, that is to nouns ending in *-i* (*vrisi* 'tap', *tileorasi* 'television' *zoni* 'belt' *mihani* 'machine'), and the neuter nouns to IC5 and IC6, that is to nouns ending in *-o* (*milo* 'apple', *tilefono* 'telephone', *vilvio* 'book', *aftokinito* 'car') and in *–i* (*molivi* 'pencil', *kluvi* 'cage', *luludhi* 'flower', *klidhi* 'key') respectively. Sentences in (2) exemplify the three experimental conditions in Greek.

(2) a. <u>Masculine gender condition</u>:
O Jiorjos ithele na paei gia banio. Me hara / idhe / oti / o.MASC (to.NEUT) ilios / ston ourano / itan lamperos/ ke harike poly.
'George wanted to go for a swim. He saw that the sun was shining in the sky and was very happy'.
b. <u>Feminine gender condition</u>:
O Janis ithele na fai ena fruto. Tote/ idhe / oti / i.FEM (toNEUT) banana.FEM / sto kalathi / itan orimi / ke harike poly.
'John wanted to eat a fuit. He saw that the banana in the basket was ripe and was very happy;
b. <u>Neuter gender conditon</u>:
I Keti eftiakse ena gliko me fruta. Tote / idhe / oti / toNEUT (o.MASC) milo / stin pita / itan poli gliko / ke harike poli.
;Kate made a fuit cake. Then / she saw / that / the apple / in the pie / was very sweet / and she was very happy'.

To make sure that the intonation of each sentence was preserved, both the grammatical and ungrammatical versions of each sentence were recorded as a whole for both Dutch and Greek, as opposed to splicing the correct determiner out of a sentence and inserting the incorrect determiner in its place.

We used a single-case design, which means that each participant heard a grammatical and ungrammatical version of each sentence. The two versions were presented in separate sessions with a weekly interval between the sessions. The participants were all tested in a quiet room at their school. Each experimental session was preceded by a practice session, which could be

repeated twice if necessary. None of the children failed to complete the practice session.

3.3. Results

We calculated the residual RTs by subtracting the actual length of the critical segments from the raw RTs for both Dutch and Greek. This was done to control for length differences between critical segments in the grammatical versus ungrammatical conditions.

We calculated extreme values by using the boxplot procedure in SPSS and removed and replaced by mean residual RTs per condition. In order to obtain normality, the outliers were calculated per condition by adding up the mean residual time plus two times (SD). These were also removed and replaced by the mean residual RTs per condition.

A third of the trials was followed by comprehension questions to make sure that children were attending to the task. In the Dutch experiment, the accuracy of the D-L1 group was 95.9% (range: 80%-100%, SD: 5.4) and of D-L2 children 91.6% (range: 68%-100%, SD: 8.6). We excluded 1 L2 child from further analysis because his score was below the mean plus two times SD and in the L1 group none of the children was excluded on the basis of this criterion. In the Greek experiment, the accuracy of the G-L1 children was 91.5% (range: 77.3%-100%, SD: 7.1) and of the L2 children 68.2% (range: 50% - 77.7, SD: 7.8). The two groups differed in terms of their accuracy in the comprehension questions ($t(1,48) = 9.578$, $p<.001$). Separate analyses were performed on the Dutch and the Greek data. To examine whether L1 and L2 children were sensitive to ungrammaticality due to gender mismatch, we run a repeated-measures ANOVA with gender Type (for Dutch: common, neuter and neuter-cue; for Greek: masculine, feminine, neuter) and Grammaticality (grammatical, ungrammatical) as the within subjects factors and Group (L1, L2) as the between subjects factor in a per participants (F_1) and a per items (F_2) analysis for the critical segment (in Dutch: segment 4; in Greek: segment 4) and the post-critical segment (in Dutch: segment 5; in Greek: segment 5). See Table 1 for mean RTs for Dutch conditions and Table 2 for mean RTs for Greek conditions.

The analyses of segments prior and following the critical segment did not exhibit any significant difference, which is why we only report the results of the critical segment.

The analysis of the Dutch data, for the critical segment 4, revealed a main effect of Type ($F_1(1,40)=28.707$, $p<.001$, $\eta^2 =.589$; $F_2(1,15)=5.435$, $p=.017$, $\eta^2 =.420$) and a significant interaction between Grammaticality and Group ($F_1(1,40)=8.319$, $p=.006$, $\eta^2 =.169$; $F_2(1,15)=4.866$, $p=.042$, $\eta^2 =.233$). In order to further assess the interaction between Grammaticality and Group, we ran a repeated-measures ANOVA with Grammaticality (grammatical, ungrammatical) as the within subjects factor for each type of gender and each group separately (L1, L2). For the D-L1 group we observed a grammaticality effect for the neuter-cue gender ($F_1(1,21)=9.437$, $p=.006$, $\eta^2 =.310$) and no effect of

grammaticality for common and neuter gender types. In the D-L2 group no effect of grammaticality was found at the critical fourth segment for any gender types.

We also analysed the post critical segment 5, in order to check for a spill-over effect. A main effect of Type ($F_1(1,39)=4.321$, $p=.02$, $\eta^2 =.181$) and Grammaticality ($F_1(1,40)=10.130$, $p=.003$, $\eta^2 =.202$; $F_2(1,15)=6.133$, $p=.025$, $\eta^2 =.277$) and a significant interaction between Type, Grammaticality and Group ($F_1(1,39)=4.555$, $p=.017$, $\eta^2 =.189$; $F_2(1,15)=4.960$, $p=.022$, $\eta^2 =.398$) was found. To unpack the interaction between the Type, Grammaticality and Group we ran a repeated-measures ANOVA with Grammaticality (grammatical, ungrammatical) as the within subjects factor for each type of gender and each group separately (L1, L2). In the D-L1 group we found a grammaticality effect for common ($F_1(1,21)=5.304$; $p=.032$, $\eta^2 =.202$, $F_2(1,8)=8.640$, $p=.019$, $\eta^2 =.519$) and neuter gender ($F_1(1,21)=5.759$, $p=.026$, $\eta^2 =.215$); no grammaticality effect was observed in the neuter-cue condition. In the D-L2 group an effect of grammaticality was observed in the neuter-cue condition ($F_1(1,19)=9.039$, $p=.007$, $\eta^2 =.322$; $F_2(1,8)=16.858$, $p=.003$, $\eta^2 =.678$). The gender types that give rise to the grammaticality effect in the L1 group do not show an effect of grammaticality in the L2 group. The only condition that exhibits a grammaticality effect in the L2 group, neuter-cue, does not do so in the L1 group on the post critical segment.

In the Greek experiment and in the critical segment (segment 4), there was a main effect of Gender Type ($F_1(1, 51) = 74.238$, $p<. 001$, $\eta^2 = .593$, $F_2(2, 28) = 4.483$, $p<. 05$, $\eta^2 = .243$) reflecting processing differences between the three genders, a main effect of Grammaticality in the per participant analysis ($F_1(1, 51) = 32.438$, $p<.001$, $\eta^2 = .389$, $F_2(2,28) = 1.303$, $p >.2$, $\eta^2 = .085$), reflecting longer RTs for DPs with the wrong gender, a main effect of Group ($F_1(1,51) = 25.941$, $p <.001$, $\eta^2 = .337$, $F_2(2,28) = 22.678$, $p <.001$, $\eta^2 = .618$) due to longer RTs for the L2 children compared with the L1 children, a significant interaction between Gender and Group in the per participant analysis ($F_1(1, 51) = 8.658$, $p<.001$, $\eta^2 = .145$, $F_1(2,28) = .053$, $p >.8$, $\eta^2 = .004$) and significant interaction between Grammaticality and Gender in the per participant analysis ($F_1(1, 51) = 3.933$, $p<.05$, $\eta^2 = .072$, $F_2(2,28) = .941$, $p>.1$, $\eta^2 = .037$).

Consecutive pairwise comparisons using Bonferroni correction revealed that the grammaticality effect was much stronger for the feminine gender condition ($p <. 001$) compared to the masculine ($p >.1$) and the neuter ($p < .05$) gender conditions. Consecutive pairwise comparisons for each group separately also revealed that the L1 children had significantly shorter RTs for the masculine gender compared with the feminine ($p = .001$) and the neuter ($p <. 001$) gender, and the feminine gender had significantly shorter RTs compared with the neuter ($p < .01$) gender. The L2 children, on the other hand, had significantly shorter RTs in the masculine condition compared with the feminine and the neuter ($p <.001$ in both cases), but they did not differentiate between the feminine and the neuter gender in terms of processing speed. This gave rise to the Gender by Group interaction.

Table 1: Mean RTs in milliseconds for segments 2-6 in Dutch common, neuter and neuter-cue gender conditions.

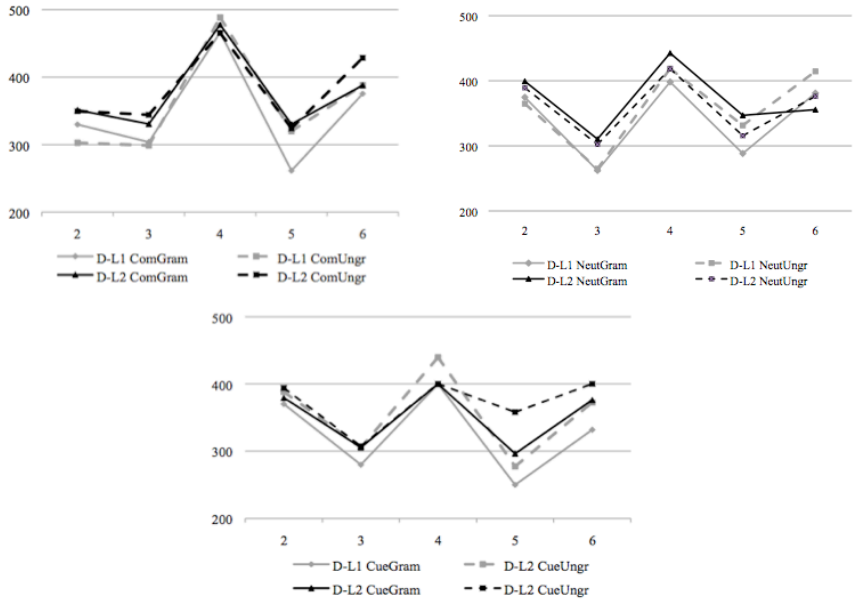
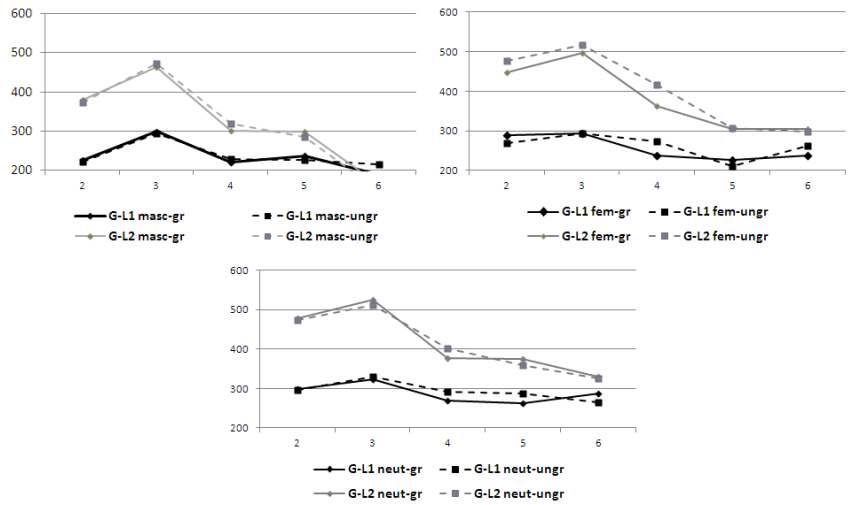


Table 2: Mean RTs in milliseconds for segments 2-6 in Greek masculine, feminine and neuter gender conditions.



4. Discussion

The present study explored the on-line processing of grammatical gender by L1 and L2 Dutch and Greek children in an attempt to unravel whether they are sensitive to gender mismatches in the target system. Secondly, it examined the extent to which this sensitivity is affected by the make-up of the gender system in the target language. The Dutch gender system is much less transparent than the Greek gender system. The influence of transparency was furthermore tested within the Dutch gender system, by comparing (opaque) root and (more transparent) derived nouns.

The results showed that sensitivity to gender mismatches is influenced by the target system and the presence of transparent morpho-phonological cues, regardless of language status. This effect was attested both across languages and within a specific language system, i.e. Dutch.

Starting from Greek, the G-L1 and G-L2 children were sensitive to gender mismatches between the article and the noun despite gender being problematic for Turkish learners of L2 Greek (Chondrogianni, 2008, Tsimpli, 2003). Dutch L1 and L2 children exhibited a more complicated picture. The presence of morpho-phonological cues not only affected their ability to detect gender mismatches, but also influenced the timing of the grammaticality detection. The L1 children were sensitive to the ungrammaticality in the mismatch condition in all gender types. Dutch L2 children, on the other hand, showed sensitivity to ungrammaticality only in the neuter-cue condition, which carries the strong morpho-phonological cue, but no effect in the common and neuter gender conditions.

Looking more closely at the timing of the grammaticality effect in Dutch data, we found a mixed picture. For the L1 children, the grammaticality effect in the neuter-cue condition was found on the critical segment, whereas in the common and neuter gender conditions it was observed post-critically, pointing towards a spill-over effect and a delayed grammaticality detection. The morpho-phonological cue on the noun facilitated the processing of gender in this condition and enabled L1 children to notice the mismatch straight away. In the L2 group, the only observed grammaticality effect was induced on the post-critical segment in the neuter-cue condition. That is, the only condition the L2 children are sensitive to is the one with the morpho-phonological cue which provides them with information on gender. However, in this condition, they exhibit a delayed grammaticality effect. Comparing, thus, the Dutch L1 and L2 children we can deduce that for both groups morpho-phonological cues play a role and affect their processing speed. Furthermore, it seems that the L2 children have not yet acquired the Dutch target system, since they do not show sensitivity to gender mismatch in the opaque gender types.

The Dutch processing findings presented here are compatible with previously reported production data from Turkish-Dutch L2 children that also showed L2 children's inability to systematically distinguish between common and neuter root nouns (Blom & Vasic, 2010). These data showed that, in

production, the L2 children showed dramatic overuse of the common article *de* with neuter root nouns, whereas the reverse pattern hardly ever occurred. At the same time, children used more often the correct article *het* with neuter nouns that had a morpho-phonological cue.

Comparing the two sets of data from both languages, it can be concluded that the L1 children have acquired feature specifications for all gender types in both Dutch and Greek and they can use these in online processing.

For the L2 children this was not the case, as we observed differences in processing across the two languages. Greek L2 children were sensitive to gender mismatches, despite the fact that they had fewer years of exposure than their Dutch peers. It also took them considerably longer to process the sentences than their L1 age-matched peers, and had lower accuracy on the comprehension questions in the task. We can deduce that children the G-L2 have acquired the abstract gender feature representations as suggested by the MSIH, and can use gender information online.

Dutch L2 children, on the other hand, were only sensitive to gender mismatch in the condition that provides them with a clear morpho-phonological cue for gender assignment. However, the extent to which the Dutch L2 children have really mastered this condition or are merely sensitive to a phonological pattern between *het - N+je* remains to be explored. Additionally, their failure to process the mismatches between the article and the noun in the case of the common and neuter genders without a cue suggests that they have not yet acquired the opaque Dutch gender system.

It can thus be concluded that, transparency, which is provided by morpho-phonological cues, affects the nature and the timing of the grammaticality effect in both L1 and L2 children. Furthermore, morpho-phonological cues provide L1 and L2 learners with the information that is necessary for breaking into the target gender system. When and whether L2 learners will be able to ultimately master the target system, especially the opaque cases, is an issue that merits further investigation (see also Cornips & Hulk, 2008).

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