

The acquisition of verbal paradigms in Dutch and Greek L2 children: Cross-linguistic differences and inflectional defaults

International Journal of Bilingualism
2016, Vol. 20(4) 386–402
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sagepub.co.uk/journalsPermissions.nav
DOI: 10.1177/1367006915609237
jib.sagepub.com



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Abstract

Previous research with children learning a second language (L2) has reported errors with verb inflection and cross-linguistic variation in accuracy and error patterns. However, owing to the cross-linguistic complexity and diversity of different verbal paradigms, the cross-linguistic effects on the nature of default forms has not been directly addressed in L2 acquisition studies. In the present study, we compared accuracy and error patterns in verbal agreement inflections in L2 children acquiring Dutch and Greek, keeping the children's L1 constant (Turkish). Results showed that inflectional defaults in Greek follow universal predictions regarding the morphological underspecification of paradigms. However, the same universal predictions do not apply to the same extent to Dutch. It is argued that phonological properties of inflected forms should be taken into account to explain cross-linguistic differences in the acquisition of inflection. By systematically comparing patterns in child L2 Dutch and Greek, this study shows how universal mechanisms and target language properties work in tandem in the acquisition of inflectional paradigms.

Keywords

Child second language, Dutch, Greek, inflection, default, underspecification

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Introduction

Previous research with children learning English as their second language (L2) has reported persistent errors with affixal verb morphology. Specifically, English L2 children overuse bare verb forms in third person singular and past tense contexts (Blom, Paradis, & Sorenson Duncan, 2012; Haznedar & Schwartz, 1997; Ionin & Wexler, 2002; Marinis & Chondrogianni, 2010; Paradis, Rice, Crago, & Marquis, 2008). In the wider context of language acquisition research, it has been suggested that early acquired and overused verb forms are default forms (Bittner, Dressler, & Kilani-Schoch, 2003). In the specific context of advanced English L2 acquisition, it has been hypothesized that the bare verb form is a morphological default form that is used in full-fledged syntactic structures (Haznedar, 2001, 2003; Ionin & Wexler, 2002; see, for adult L2 acquisition: Lardiere, 1998, 2000; Prévost & White, 2000). However, whereas L2 children learning English, German or Dutch overuse bare forms (Haznedar, 2001; Ionin & Wexler, 2002; Prévost, 2003; Blom, Polišíenská, & Weerman, 2006), children acquiring Spanish L2 overuse inflected forms (Herschensohn, Stevenson, & Waltmunson, 2005). This contrast raises the issue of cross-linguistic variation in the acquisition of verbal paradigms and the role of defaults therein.

In the present study we investigated cross-linguistic variation in the acquisition of verb inflection by comparing accuracy and patterns of overuse in Dutch and Greek L2 children. In Greek, as in Spanish, the three persons are expressed with separate morphemes in both the singular and plural, whereas this is not the case in Dutch. Thus, we selected the two languages based on inflectional richness, because previous research suggests that this may be a relevant contrast. We focused on L2 children for multiple reasons. First, various studies have revealed persistent errors with verbal inflections in this population (Blom & Baayen, 2012; Blom et al., 2012; Haznedar & Schwartz, 1997; Ionin & Wexler, 2002; Marinis & Chondrogianni, 2010; Paradis et al., 2008). Second, studying the acquisition of verbal inflections in L2 children is advantageous compared to L1 children because, while L1 children's use of verb inflection is influenced by syntactic immaturity (Wexler, 1998), this factor is less relevant for older learners such as L2 children. Finally, studying L2 children has an advantage over studying L2 adults, because the L1 is less entrenched in L2 children than in L2 adults. Furthermore, in the present study, to limit effects of transfer, all L2 children had Turkish as their L1.

The acquisition of agreement inflection and (universal) defaults

Several studies have shown that inflection, agreement included, is a domain where L2 children and adults make errors (Blom et al., 2012; Haznedar & Schwartz, 1997; Ionin & Wexler, 2002; Lardiere, 1998, 2000; Marinis & Chondrogianni, 2010; Oldenkamp, 2013; Paradis et al., 2008; Prévost, 2003; Prévost & White, 2000). Erroneous use of morphology provides insight into default forms, i.e. forms that are inserted in a syntactic context when other, more specific, target forms fail. In the domain of inflectional morphology, defaults have been defined in terms of morphosyntactic underspecification (Halle & Marantz, 1993); it is the least specified, and at the same time, the most underspecified form. The insertion of this form in a specific environment is blocked when more specific, matching inflectional forms are available (Kiparsky, 1973). However, when such blocking mechanisms fail, then the underspecified default form may be selected over the most specified target form. Defaults allow learners to obey the principle that only forms can be inserted with the same features as in syntax, or a subset (Halle, 1997).

In L2 acquisition it has been suggested that processing demands could lead to failures to block the default resulting in errors. For instance, L2 learners could fail to take into account features present in syntax owing to less automatized mapping of features in syntax and morphology (Prévost,

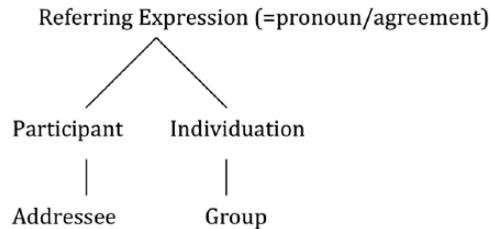


Figure 1. Feature geometry for person and number features (based on Harley & Ritter, 2002; McCarthy, 2012).

2003). It would then be expected that with more L2 experience, failures to block the default will diminish and eventually the use of the default may vanish. However, under more challenging conditions, even highly proficient L2 learners may still resort to inflectional defaults (Lardiere, 2000).

Previous accounts on morphological variation in L2 learners, such as the Missing Surface Inflection Hypothesis (MSIH) (Haznedar & Schwartz, 1997; Prévost & White, 2000), adopt this notion of defaultness, but do not make predictions about which form will be the default in a given language. Therefore, they do not provide a principled approach to morphological variation in language acquisition (McCarthy, 2007, 2012; Slabakova, 2009).¹ To address this issue, McCarthy (2007, 2012) developed the MUH (Morphological Underspecification Hypothesis). According to the MUH, an inborn feature geometry is available from birth.

The MUH departs from the universal feature geometry for person and number features proposed by Harley and Ritter (2002), who argue that monovalent person and number features are hierarchically organized in dependency relations. Number, for instance, is represented by the feature Individuation with its dependent feature Group (plural), as shown in Figure 1. Person is expressed by the feature Participant with its dependent feature Addressee. Unmarked features are underspecified. For instance, plural bears the feature Group and singular is underspecified as it is the absence of Group. First and second person bear the feature Participant, whereas the third person is underspecified and stands for the absence of the Participant (or person) feature. Second person bears the Addressee feature, whereas the (underspecified) first person is the absence of an Addressee feature.²

As it is not possible to inflect a verb overtly for person and number without being finite in Spanish, McCarthy added the feature Finite, with non-finite as the underspecified value.

McCarthy (2007, 2012) assumes that in language acquisition defaults will follow the universal feature geometry proposed by Harley and Ritter (2002) and will be early acquired forms. In this account, non-finite forms should be acquired before finite forms, third person before non-third person, first person before second person and singular before plural. The order of acquisition is best studied in longitudinal data, but can also be inferred through accuracies at a certain developmental stage. The most accurate form can be assumed to be acquired before less accurate forms. However, as McCarthy (2012, p. 43) notes, to establish a form as the default, its use in erroneous contexts should also be examined. For instance, the third person is not associated with any specific person and number features. Consequently, third person forms will have fewer features than first or second person forms, and will be inserted in first and second person contexts, if blocking of the default fails.

Because the feature geometry is universal, its predictions are expected to hold across languages. McCarthy observes that in adult L2 Spanish, third person and non-finite forms act as defaults in terms of overuse and accuracies/developmental path, with finiteness errors being more typical for

lower proficiency learners.³ Regarding number, the error pattern follows the predictions of the MUH, but there is no clear pattern in terms of accuracy and development. Spanish, thus, largely conforms to the predictions of the MUH. However, English poses a problem for the MUH: the third person in the verbal paradigm should act as a default form, but English L2 children and adults have difficulties with using the third person singular and do not overuse this form (Blom et al., 2012; Haznedar & Schwartz, 1997; Ionin & Wexler, 2002; Lardiere, 1998, 2000; Marinis & Chondrogianni, 2010; Paradis et al., 2008). The contrast between Spanish and English suggests that target language properties interact with the MUH.

To summarize, in order to account for variation in the acquisition of pronouns and agreement inflection, researchers have proposed that the acquisition of person and number features is guided by a universal feature geometry, which includes default features (Harley & Ritter, 2002; McCarthy, 2007, 2012). This hierarchy makes predictions that should hold cross-linguistically. In terms of development/accuracy, these predictions are: non-finite forms before finite forms, third person forms before non-third person forms, first person forms before second person forms, and singular before plural. In terms of overuse, the predictions are: non-finite forms in finite contexts, third person forms in non-third person contexts, first person forms in second person contexts, and singular forms in plural contexts. To identify default forms across languages based on language acquisition data, it is important to determine which inflectional paradigmatic form has the highest accuracy and whether the same form is also more overused than the other forms. This method of identifying inflectional defaults is applicable to low-proficiency and high-proficiency learners. The present study takes the MUH as the starting point and investigates cross-linguistic patterns in agreement inflection in proficient child L2 learners of Dutch and Greek.

The Dutch and Greek inflectional systems and predictions for acquisition

The first aim of the present study was to test whether the MUH holds across languages. To achieve this goal, we compared the child L2 acquisition of Dutch and Greek guided by the following research question: (1) Do Dutch and Greek L2 children show the same patterns in the acquisition of agreement inflection and do they follow the MUH predictions? The second aim of the study was to determine how target language properties interact with the MUH. Previous research on L1 acquisition has revealed that phonological factors may be a source of cross-linguistic variation in the development of inflection (Penke, 2012), prompting the following research question: (2) Are differential patterns in Dutch and Greek child L2 acquisition explained by differences in phonological target language properties? Below we first describe the Dutch and Greek inflectional systems, thereby focusing on the present tense indicative paradigm, which is the part of the paradigm investigated in this study. This is followed by the predictions for the study.

Dutch has fairly poor verbal agreement: subject–verb agreement is expressed through contrasts between three different forms (Table 1). Note that the final -n is most often not pronounced, resulting in a suffix -e instead of -en.⁴ Nearly all Dutch verbs, except the suppletive verb *zijn* ‘be’ and modal verbs, such as *willen* ‘want’ and *kunnen* ‘can’, are inflected as in Table 1.

At the morphological level, plural verbs, which are finite forms, are homophonous with infinitives. At the syntactic level, finite verbs in Dutch appear in second position in main clauses and before the object, as in (1), whereas non-finite verbs are placed in the sentence-final position following the object, as in (2). At the phonological level, first person singular is unmarked. All other forms are marked with either a subsyllabic -t (second/third person singular) or a syllabic -en (plural, infinitive).

Table 1. Agreement paradigms in Dutch and Greek of the verb 'drink', 1 is first person, 2 is second person, 3 is third person, SG is singular, PL is plural, INF is infinitive.

	Dutch	Greek	Translation
1SG	Drink	Pin-o	'I drink'
2SG	Drink-t	Pin-is	'you drink'
3SG	Drink-t	Pin-i	's/he drink'
1PL	Drink-e(n)	Pin-ume	'we drink'
2PL	Drink-e(n)	Pin-ete	'you drink'
3PL	Drink-e(n)	Pin-un(e)	'they drink'
INF	Drink-e(n)		

- (1) Wij drinken een kop koffie
 We drink-PL a cup coffee
- (2) Wij moeten een kop koffie drinken
 We must-PL a cup coffee drink-INF

In Dutch L1 children, the first verb forms used by children are infinitives; in spontaneous production, subject–verb agreement becomes more productive around age 2;6 (Blom & Wijnen, 2013). Errors mainly comprise overused bare verb forms (Blom, 2007). An experimental elicited production study has shown that at age three, Dutch children are highly accurate across person and number contexts (Polišenská, 2010).

Greek is a pro-drop language, namely it allows for null subjects, and has a rich agreement paradigm, where each form is distinctively marked for person, number, tense, aspect, and mood (Holton, Mackridge, & Philippaki-Warbuton, 1997) (Table 1).⁵ Alexiadou and Anagnostopoulou (1998), following Speas (1994), argue that verbal agreement in pro-drop languages has strong pronominal features that indicate the person and number features of the subject, and this property allows for pronominal subjects to be dropped (subject pro-drop). Each person-number combination in Greek has a distinct verbal form. Thus, within the Greek agreement paradigm there is no person syncretism. Greek also does not have any infinitives. All suffixes are syllabic, with singular forms being monosyllabic and plural forms being disyllabic.⁶

Studies on the L1 acquisition of Greek subject–verb agreement morphology have shown that morphological errors disappear before the age of three years (Doukas & Marinis, 2012; Katis, 1984; Stephany, 1995; Tsimpli, 1996; Varlokosta, 1998), similarly to the L1 acquisition of Dutch. These studies have shown that the first form to be acquired in Greek is the third person singular, followed by the first person singular, and both forms emerge before the age of two years. The second person singular is a late-acquired form and emerges a year after the other singular forms. Furthermore, the singular is acquired before the plural, with the second person plural being the last form to be acquired in the paradigm.

As pointed out earlier, the MUH predicts patterns that are shared across languages. However, languages vary greatly in the phonological properties of agreement paradigms and research on L1 acquisition has revealed that such properties affect acquisition patterns within languages (Bittner et al., 2004; Penke, 2012; Song, Sundara, & Demuth, 2009). Below, the role of phonological complexity, salience and markedness will be discussed. These three factors yield predictions about acquisition patterns within the Dutch and Greek agreement paradigm, with consequences for the comparison between the two languages and the MUH.⁷

Producing forms that are phonologically more complex, such as inflected forms, adds processing load because it requires additional articulatory planning and gestures. Effects of complexity are thus expected to surface in language users who have processing limitations, such as young children, children with Specific Language Impairment or adults with aphasia, and under more demanding conditions such as dual task management or bilingualism. This is confirmed by findings showing that English toddlers drop the third person singular *-s* more often in complex codas than in singleton codas (Song et al., 2009). Recent research has also revealed effects of consonant cluster complexity on agreement inflection in Dutch impaired populations (Blom, De Jong, & Vasić, 2014).

The acquisition of agreement markers is furthermore influenced by input salience (Hsieh, Leonard, & Swanson, 1999; Legendre, Culbertson, Zaroukian, Hsin, Barrière & Nazzi, 2014). For the present study we focus on syllabicity as a factor that influences duration and stress, which, in turn affect salience (Leonard & Bortolini, 1998). Syllabic forms have longer duration - and are therefore assumed to be more salient - than subsyllabic forms. Syllabicity is relevant for deriving predictions about the Dutch agreement paradigm because it distinguishes singular (subsyllabic) and plural forms (syllabic). It is also relevant for the Greek paradigm because syllabification in the plural creates two consecutive weak syllables as the stress for verbs used in the present study (first conjugation) is carried by the stem of the verb (SWW), as in /'pe-ze-te/ "play.2PL". Contrary to this, the monosyllabic suffix in the singular is closer to the stressed part of the verb and follows a trochaic stress pattern (SW), as in /'pe-zis/ "play.2SG". Finally, if phonological forms within a paradigm differ only in one segment, phonological markedness may play a role (Jakobson, 1941/68; see for recent updates: Fikkert 2000, 2007). Specifically, to derive detailed predictions about the Greek paradigm, it is relevant that at the segmental level, the vowel *-i* is less marked than *-o* (Jakobson, 1941/68).

In Dutch, complexity predicts higher accuracy with the unmarked first person singular compared to the rest of the paradigm. Syllabicity, on the other hand, predicts higher accuracy with plural forms than with singular forms. Second and third person singular *-t* may be particularly difficult if the verbal stem ends in a consonant because of coda cluster complexity. In Greek, all forms carry a monosyllabic (singular) or a disyllabic suffix (plural). As for monosyllabic suffixes, second person singular is more complex than first and third person singular, because the vowel in the second person singular suffix is followed by a final *-s*; hence first and third person singular are predicted to have higher accuracy than second person singular. The first and third person singular forms are equally complex. Following Jakobson (1941/68), *-i* is less marked than *-o*, predicting higher accuracy of third person singular compared to first person singular.

It is important to note that Turkish has a different verb form for each person-number combination (Lewis, 1967). Turkish agreement forms are syllabic, but because of vowel harmony, person and number are most consistently denoted by the final consonant within the agreement suffix. Because of their familiarity with rich agreement in Turkish, the L2 children are predicted to be relatively quick at acquiring subject-verb agreement in both Dutch and Greek (Blom et al., 2012; Blom & Baayen, 2012). Agreement marking creates consonant clusters in Dutch, whereas this is not the case for Greek agreement marking. Turkish allows coda clusters. It is, thus, not expected that L1 phonology causes differential patterns in Dutch and Greek.

In sum, phonological factors predict for Dutch higher accuracy for first person singular than second and third person singular, higher accuracy for first person singular than plural, and higher accuracy for plural than second and third person singular. For Greek it is expected that third person singular is more accurate than first person singular, and first person singular is more accurate than second person singular. In terms of the singular-plural distinction, we predict the plural to have lower accuracy than the singular due to the presence of two consecutive weak syllables as opposed to one weak syllable following a stressed syllable in the singular. Recall that the MUH predicts for both languages for the person dimension: higher accuracy for third person than first person and higher accuracy for first person than second person. For number, the MUH predicts higher accuracy for

Table 2. Predictions for Dutch and Greek based on phonological factors and the universal feature geometry of the MUH, accuracy and error types.

	Phonological factors	MUH
Dutch	Accuracy: ISG > 2SG/3SG ISG > PL PL > 2SG/3SG	Accuracy: Nonfinite > finite (early stage) 3P > 1/2P IP > 2P SG > PL
Greek	Accuracy: 3SG > 1SG ISG > 2SG SG > PL	Error types: Nonfinite in finite context (early stage) 3P in 1/2P contexts IP in 2P contexts SG in PL contexts

singular than plural. Predictions based on phonological factors are more fine-grained than predictions based on the MUH. For instance, whereas the MUH predicts higher accuracy for third person than first person and higher accuracy for first person than second person regardless of number⁸, the phonological approach makes these predictions for the singular part of the paradigm only. There is one instance where the two approaches make the same prediction: for Greek, both approaches predict higher accuracy on the singular than the plural. The predictions are summarized in Table 2.

Method

Participants

The Dutch data presented in this study have been analysed in previous studies for other purposes. L1 control data indicate ceiling performance from the age of three onwards (Polišenská, 2010). Below, we focus therefore on the child L2 data (Blom et al., 2006; Blom & Baayen, 2012), in particular those of the children with Turkish as their L1. This was done in order to have a comparable dataset to the one for the Greek study. In total 27 Turkish-Dutch children participated who were 6;10 on average (range: 4;8–8;5; SD = 12 months). At the time of testing, the children had approximately 35 months of exposure to the L2 (range 8–53 months; SD = 12 months). According to teacher report, the children had no history in speech and language delay/disorders, but they noted low levels of their Dutch when the children began attending primary school at age four. The children were individually tested at their schools in a separate room by native or near-native Dutch researchers.

The Greek data come from a new study. 25 Greek-speaking children with Turkish as their L1 and 31 L1 Greek-speaking children participated in the study. The L2 children had a mean age of 7;9 years (range: 5;9–9;9; SD: 13 months) and the L1 children a mean age of 7;2 years (range: 6;0–8;8; 11 months). At the time of testing, the L2 children had approximately 28 months of exposure to Greek (range: 6–54 months; SD: 13.9 months) and were attending bilingual Turkish-Greek schools in the Northeastern part of Greece. The L2 children were tested in their homes by a bilingual Turkish-Greek research assistant. The assistant also gathered parental questionnaires regarding the children's age of onset to the L2, exposure and history of language development. The L1 children were tested in their schools in Athens by a monolingual Greek research assistant.

The L2 children in this study come from a particular group of bilingual children: they acquire Turkish at home and Dutch or Greek outside their homes. The children are thus exposed to Turkish from birth and to Dutch and Greek at later ages. In this context, Turkish is a minority language, whereas Dutch and Greek are majority languages. The range of exposure in both L2 settings is substantial, and

correlations between accuracy and length of exposure are expected for both languages. There are also notable differences between the Dutch L2 and Greek L2 children: the children in the Greek study lived in Turkish-speaking villages in Thrace and attended a bilingual Turkish-Greek programme; therefore, they had less exposure to the L2 compared to the Dutch children who lived in Dutch-speaking urban settings and were attending a regular school programme in Dutch.

Materials and procedure

A similar task was used in the two languages. The task was not identical; therefore, the task materials and procedures for the two languages will be presented separately.

Dutch. A picture description task was used to elicit responses for third person singular and third person plural. In this task, the children described the contrast between two adjacent photographs. The two photographs depicted the same action but the contrast between them forced the use of a direct object, e.g., the man reads a book versus the woman reads a newspaper. Direct object elicitation was important for deciding if a form was finite (placement of the verb in pre-object position) or non-finite (placement of the verb in post-object position). To obtain responses on first person (singular, plural) and second person (singular), a game was played in which both experimenter and child picked up a card from two ordered piles and turned this card around. The card depicted an ongoing action. After seeing the action, both experimenter and child had to perform the action with the help of various attributes. The task of the subject was to describe the situation. There were two possibilities: Either experimenter and child performed the same action (first person plural), or both performed a different action (first and second person singular). Three verbs were targeted: *tekenen* ‘draw’, *drinken* ‘drink’, *poetsen* ‘brush’. All verbs described clearly depictable actions. Owing to the design of the study, there were two trials for each verb in the third person conditions, and one trial for each verb in the first and second person conditions. Two novel verbs were included, but for the purpose of this study, these verbs were excluded. Including them could create a confounding effect of language and task, both leading to lower performance for the Dutch children compared to the Greek children. The verb *lezen* ‘read’ was used for warm-up items to familiarize the children with the task.

Greek. In the Greek study we also used a picture description task. The picture description task provided data on third person (singular and plural) contexts in declarative main clauses. To obtain responses on first person (singular, plural) and second person (singular, plural) a game was played in which the experimenter would ask the child to imagine doing the same action depicted by the pictures with his friends (first person plural), or the experimenter and the child performed different actions (first singular, second singular and plural). The Greek task contained ten verbs, all belonging to the first conjugation: *mayirevo* ‘cook’, *djavazo* ‘read’, *zoyrafizo* ‘draw’, *deno* ‘tie’, *strono* ‘make the bed’, *pleno* ‘wash’, *potizo* ‘water’, *pino* ‘drink’, *pezo* ‘play’, *mirizo* ‘smell’. The verbs *kovo* ‘cut’ and *skupizo* ‘sweep’ were used as practice items to familiarize the children with the task. There were three trials per verb and six trials for each person in the singular and six for each person in the plural. In each person condition, a different verb was used to ensure productivity. Verbs in the singular and the plural were randomized, so that all children were tested on the same verbs and on the same number of trials for each person and number condition. All verbs described clearly depictable actions.

Data analysis and scoring

Dutch. All verbs that appropriately described the pictures were accepted as scorable responses. Excluded were unintelligible responses, auxiliary verbs (because these tend to have irregular agreement in Dutch), and responses without an object (33%).⁹ Accuracy was determined based on

Table 3. Correct and incorrect responses for Dutch agreement inflection and mean accuracy; 1 is first person, 2 is second person, 3 is third person, SG is singular, PL is plural.

Contexts	Number of correct responses	Number of incorrect responses	Mean accuracy % correct (SD)
1SG	53	1	97.6 (11)
2SG	48	7	82.5 (33)
3SG	102	19	85.7 (24)
1PL	41	4	85 (37)
3PL	89	19	84.9 (31)

the correct verb form used, that is, a bare verb in first person singular, a verb suffixed with -t in the third person singular, and a verb suffixed with -en in the first and third plural. Incorrect responses were either a verb suffixed with -t or -en in the first person singular, a bare verb or a verb suffixed with -en in the third singular, and a bare verb or a verb suffixed with -t in the first and third plural. There were no infinitival forms in this dataset.

Greek. All verbs that appropriately described the pictures were accepted as scorable responses. Unintelligible responses, no responses, repetitions of the experimenter's prompt and responses with light verbs such as kano 'do' were excluded from the calculation (2.4%). When a semantically related verb of the same conjugation as the target verb was produced instead of the target verb, then this response was considered scorable. A response was considered correct if the target verb form was used in the relevant context, e.g. first person -o in a first person context and so on; otherwise, it was considered as incorrect, e.g. first person -o in the context of second person -is.

Results

Dutch

Table 3 presents the accuracy distributions. The results indicate accuracies of more than 80% correct in all conditions, revealing an overall high proficiency level. Note that more responses are included in the 3SG and 3PL than in the other conditions. This was the result of the method used: in the 3SG and 3PL contexts two responses were collected per verb, whereas in the 1SG, 2SG and 1PL contexts one response was collected per verb.

Across children, accuracy ranged between 52–100%, with a mean of 83% (SD=23). Length of exposure correlated significantly with mean accuracy ($r(27)=0.60$, $p<0.01$). In order to further assess effects of exposure, the children were assigned to two groups using visual binning. Group 1 was exposed to Dutch between 8–38 months ($n=14$; Maccuracy=74%; SD=28), while exposure in group 2 ranged between 40–53 months ($n=13$; Maccuracy 92%; SD=11). A repeated-measures ANOVA (analysis of variance) with condition (1SG, 2SG, 3SG, 1PL, 3PL) as the within-subjects variable and group (1, 2) as the between-subjects variable did not reveal any significant main effects or interactions. Therefore, in further analyses, pooled data were analysed. In the following, we first present the outcomes of the statistical analysis for person and number separately in order to assess predictions about accuracy based on the MUH. In the second person, only singular was tested, and therefore, second person could not be taken into account in this first set of analyses. However, the second set of analyses is more fine-grained and includes the second person singular. The latter are more relevant for the predictions based on phonological complexity, salience and markedness.

Two repeated-measures ANOVA analyses with person (1, 3) and number (SG, PL) as the dependent within-subjects variable showed a significant effect for person ($F(1,19)=4.9$, $p<0.05$, $\eta^2=0.21$),

with better performance for first person ($M=91.5\%$, $SD=27$) compared to third person ($M=85\%$, $SD=27.5$). The analysis with number as the independent variable did not yield a significant effect ($M_{\text{singular}}=91\%$, $SD_{\text{singular}}=20$; $M_{\text{plural}}=84\%$, $SD_{\text{plural}}=33$). Because the distributions deviated from a normal distribution, we validated the outcomes based on the ANOVA using chi-square tests. For person, based on a two-by-two contingency table, this revealed a significant effect ($\chi^2(1)=7.8$, $p<0.01$), indicating relatively fewer correct responses in third ($N_{\text{correct}}=191$, $N_{\text{incorrect}}=38$) compared to first person contexts ($N_{\text{correct}}=94$, $N_{\text{incorrect}}=5$). The correct–incorrect distributions for singular ($N_{\text{correct}}=155$, $N_{\text{incorrect}}=20$) and plural ($N_{\text{correct}}=130$, $N_{\text{incorrect}}=23$) did not differ ($\chi^2(1)=0.64$, $p=0.42$). Performance on first person singular showed a higher accuracy than on plural and also showed a higher accuracy than on second/third person singular (Fisher Exact Probability test: $p=0.005$ respectively $p=0.05$, both one-tailed).¹⁰ Correct–incorrect distributions between plural and second/third person singular did not differ ($\chi^2(1)=1.69$, $p=0.19$).

Recall that the MUH does not only make predictions about accuracy, but also about the direction of errors. Because of syncretism in Dutch, errors cannot be unambiguously interpreted in terms of person and number distinctions. That is, incorrect use of the suffix *-t* in first person singular contexts is not necessarily incorrect use of the third person singular form, because the suffix *-t* also represents second person singular. Recall also that in the plural no person distinctions are made. The data in Table 4 contain raw numbers, with the grey-shaded cells containing the correct form in a context. Second person singular contexts are not included to have a symmetrical design and have comparable data across persons and across numbers.

The singular forms (bare and *-t* suffix) are clearly overused, whereas there is no overuse at all of the plural form (*-en* suffix). In fact, all 43 errors were incorrect uses of singular forms, either incorrect bare verb use, which could be interpreted as incorrect use of first person singular forms ($N = 29$), or incorrect *-t* suffix use ($N = 14$), which could be incorrect use of second or third person singular forms.

A repeated-measures ANOVA with error type as the within participants variable indicates a significant effect ($F(2, 34)=27$, $p<0.001$, $\eta^2=0.60$). Subsequent paired samples *t*-tests revealed more overuse of first person singular forms than of plural forms ($t(17)=9.78$, $p<0.001$) and of second and third person singular forms ($t(17)=3.69$, $p=0.002$). Second and third person singular forms were more often overused than plural forms ($t(17)=2.39$, $p=0.029$). This last effect was marginally significant at the Bonferroni corrected α level (0.017), whereas the two other effects were unaffected by this correction for multiple comparisons.

Greek

The L1 children had ceiling accuracy on all person forms in the singular (100% across all persons), and in the plural (1PL: 99%, 2PL: 99%, 3PL: 99%). A repeated-measures ANOVA with person (1,2,3) and number (SG, PL) as the within-subjects factors revealed a main effect of number ($F(1,30)=5.31$, $p<0.05$, $\eta^2=0.15$), because of the ceiling effects in the singular. Owing to the ceiling effect in the L1 group, we focused our analysis on the L2 children.

Table 5 shows the accuracy on all different persons in the Greek data. The results indicate accuracies of more than 80% on all persons apart from the second person singular and plural, revealing an overall high, yet not ceiling, performance.

The analysis of the results followed the same procedure as in the Dutch study to address the predictions of the MUH, but also effects of phonological markedness. In the Greek task, all persons were tested across both numbers, so it is possible to explore performance on all forms of the paradigm.

Across children, accuracy ranged between 21.1–100%, with a mean of 82.7% ($SD=20$). Length of exposure correlated significantly with mean accuracy ($r(25)=0.59$, $p<0.001$). In order to further assess effects of exposure, the children were assigned to two groups on the basis of

Table 4. Types of errors with Dutch agreement inflection; the columns indicate the forms used while the rows refer to the contexts in which the forms were used; 1 is first person, 2 is second person, 3 is third person, SG is singular, PL is plural.

Context	Number ISG forms: bare verbs	Number 2SG/3SG forms: -t suffix	Number PL: -en suffix
ISG	53	1	0
IPL	2	2	41
3SG	19	102	0
3PL	8	11	89

Table 5. Correct and incorrect responses for Greek agreement inflection; 1 is first person, 2 is second person, 3 is third person, SG is singular, PL is plural.

Contexts	Number of correct responses	Number of incorrect responses	Mean accuracy % correct (SD)
ISG	141	17	89.7 (17)
2SG	76	18	75.6 (33)
3SG	113	7	93.4 (16)
IPL	120	20	85.3 (24)
2PL	87	35	68.6 (34)
3PL	104	11	83.4 (26)

their length of exposure to the L2 and following the visual binning of the data. Group 1 was exposed to Greek between 6–30 months ($n=17$; Maccuracy=75.5%; $SD=22$), whereas exposure in group 2 ranged between 42–54 months ($n=8$; Maccuracy 96.3%; $SD=5.2$). A repeated-measures ANOVA with condition (1SG, 2SG, 3SG, 1PL, 2PL, 3PL) as the within-subjects variable and group (1, 2) as the between-subjects variable revealed a significant main effect of condition ($F(5,120)=4.32$, $p<0.01$, $\eta^2=0.15$), a main effect of group ($F(1,24)=7.72$, $p=0.01$, $\eta^2=0.24$), and a significant interaction ($F(5,120)=3.29$, $p<0.05$, $\eta^2=0.12$). The significant interaction between condition and group was caused by the ceiling performance (between 93.3% and 100%) of the group with the higher exposure to L2 Greek across all persons, and variable performance across conditions for the lower exposure group. Therefore, we focused our analysis on the group with the lower exposure to Greek, as this group displayed variability in their performance on the different conditions.

To address the predictions of the MUH, two repeated-measures ANOVAs with person (1,2,3) and number (SG, PL) as the dependent within-subjects variables showed a significant main effect of person ($F(2,32)=16.3$, $p<0.001$, $\eta^2=0.50$). Bonferroni-corrected post-hoc comparisons showed that the second person had significantly lower accuracy than the first ($p<0.001$) and the third ($p<0.01$) which did not differ from each other ($p>0.1$). There was also a main effect of number ($F(1,16)=4.65$, $p<0.05$, $\eta^2=0.23$) with the singular having significantly higher accuracy ($M_{singular}=80.6\%$, $SD=9$) than the plural ($M_{plural}=70.4\%$, $SD=15$). Because the data were not normally distributed, we validated the results using chi-square tests. For person, this revealed a significant effect ($\chi^2(1)=323.3$, $p<0.001$) with fewer correct responses on the second than the first and the third person contexts. The correct–incorrect distributions for singular and plural also differed ($\chi^2(1)=620$, $p<0.001$) with more incorrect responses for the plural ($N_{correct}=189$, $N_{incorrect}=58$) than for the singular ($N_{correct}=200$, $N_{incorrect}=23$).

Table 6. Types of errors with Greek agreement inflection; 1 is first person, 2 is second person, 3 is third person, SG is singular, PL is plural.

Context	Number of ISG forms	Number of 2SG forms	Number of 3SG forms	Number of IPL forms	Number of 2PL forms	Number of 3PL forms
ISG	92	0	3	3	0	3
2SG	4	42	7	1	0	2
3SG	3	0	73	0	0	1
IPL	5	0	7	71	0	0
2PL	5	0	5	5	48	3
3PL	3	0	6	0	0	70

To address issues of phonological markedness, we compared performance among the three persons in the singular. Note that the prediction in this context would be that third person singular *-i* will have higher accuracy than first person singular *-o* and they will be both more accurate than second person singular *-is*. A repeated-measures ANOVA revealed a main effect of person ($F(5,80)=7.6, p<0.001, \eta^2=0.32$). Subsequent paired samples *t*-tests revealed no difference between the first and the third person singular ($t(16)=-1.29, p=0.021$), higher accuracy for first person singular than second person singular ($t(16)=3.06, p=0.007$), and higher accuracy for third person singular than second person singular ($t(16)=-3.38, p=0.004$). These effects remained significant after Bonferroni correction.

Subsequently, we explored whether there was a predominant person form or number form overused. Table 6 displays the raw numbers, with the shaded cells containing the correct form in a context. A repeated-measures ANOVA with error type as the within participants variable showed no significant main effect. Subsequent paired samples *t*-tests revealed that across all persons, singular forms were used instead of plural forms ($t(16)=2.16, p<0.05$), but there was no overuse of a specific person form.

Discussion and conclusion

The goal of this study was to enhance our insight in the interplay of universal and language-specific factors that determine the acquisition of verb inflection by Dutch and Greek L2 children. The following two research questions guided the study: (1) Do Dutch and Greek L2 children show the same patterns in the acquisition of agreement inflection and do they follow the MUH predictions? (2) Are differential patterns in Dutch and Greek child L2 acquisition explained by differences in phonological target language properties? The MUH (McCarthy, 2007, 2012) is a morphosyntactic approach to inflectional defaults in the domain of person and number marking. For language-specific factors we focused on phonological complexity, syllabicity and markedness. The children in this study were exposed to Dutch or Greek for over 2.5 years and were rather accurate at using agreement inflection, but their performance was yet not error-free. For both Dutch and Greek, L1 control data were collected that showed ceiling performance.

It is relevant to note that the samples represented children with a minority L1 (Turkish) who are learning a majority L2 (Dutch, Greek). While the range in the length of exposure was similar in the two groups, the Dutch children had most likely received more majority language input than the Greek children. Namely, the Dutch L2 children lived in urban Dutch-speaking areas and attended

regular schools where they are exposed to Dutch, whereas the Greek L2 children lived in rural Turkish-speaking villages and attended a bilingual programme with exposure to both Turkish and Greek. In both studies, the L2 children achieved high accuracy. Grouping based on length of exposure indicated ceiling performance for the high exposure group in Greek, whereas this was not the case in Dutch. Thus, in Greek, L1 Turkish children seem to need less exposure than in Dutch to become native-like in agreement marking.

Regarding the acquisition of number, the MUH predicted higher accuracy with singular than plural and overuse of singular forms in plural contexts. The Dutch L2 children overused singular forms more often than plural forms, as predicted by the MUH, but no difference emerged between accuracy in the singular and in the plural. For Greek, the predictions on accuracy and errors with number were confirmed, both by the L2 data in this study and by the L1 data from younger children in previous research (Doukas & Marinis, 2012; Katis, 1984; Stephany, 1995; Tsimpli, 1996; Varlokosta, 1998).

In the domain of person, the MUH predicted higher accuracy with the third than the first person, higher accuracy with the first than the second person, overuse of the third person forms in the first and second person contexts and also overuse of first person forms in second person contexts. The Dutch child L2 data in the present study showed lower accuracy for third person than first person; the first person singular form, a bare verb, was more frequently overused than any of the other inflectional forms. Recall that Dutch early stage learners are expected to overuse infinitives. This is a recurrent finding in previous Dutch L1 research with younger children (Blom & Wijnen, 2013). We found no overuse of infinitives in the Dutch L2 children, which is in line with the children's overall high level of proficiency. Greek L1 acquisition closely follows the MUH predictions for person (Katis, 1984; Stephany, 1995; Tsimpli, 1996; Varlokosta, 1998). The Greek child L2 data in the present study showed more accurate use of the third and first person than the second person, in line with the MUH. However, the third person was as accurate as the first person and no specific person was overused.

Turning to the first research question, we conclude that the patterns across the two languages are not uniform. In Greek child L2 acquisition, the MUH predictions were either borne out or were closely followed, and no patterns emerged that opposed MUH predictions. Absence of a difference could be attributable to few errors and little variation in the dependent variable. Findings on younger Greek L1 children in previous research are consistent with child L2 acquisition. Previous research on L1 Dutch revealed early acquisition and overuse of infinitives, in line with the MUH. The Dutch L2 children were presumably beyond this stage. The Dutch child L2 data pattern shows contra the MUH predictions higher accuracy of first person compared to third person and also more frequent overuse of first person compared to third person. Thus, the MUH appears to be more successful at explaining the acquisition patterns in Greek, a language with rich agreement morphology, than explaining the acquisition patterns in Dutch, a language with poor agreement morphology. This resembles the contrast between Spanish, on the one hand, and English, on the other hand, as described in the Introduction.

The second research question asked whether the observed differences in the two languages are attributable to differences in phonological target language properties. For Dutch, phonological factors predicted higher accuracy of the unmarked first person singular compared to the rest of the paradigm, which is phonologically marked, and this was exactly the pattern that emerged from the data. In this respect, child L2 Dutch seems to converge with child L2 English, where it has been found that L2 learners have difficulties with acquiring the marked third person singular *-s* (Blom et al., 2012; Haznedar & Schwartz, 1997; Ionin & Wexler, 2002; Lardiere, 1998, 2000; Marinis & Chondrogianni, 2010; Paradis et al., 2008). The severe difficulties found for the English third person *-s* may suggest that the more prevalent the unmarked forms are in a paradigm, the more difficult it may be to acquire agreement suffixes.

No differences emerged in Dutch between the non-syllabic second/third person singular and syllabic plural that are phonologically different. The absence of a difference in performance could have

two explanations. First, phonological factors could interact with the MUH. The MUH predicts better performance with the second/third person singular –t compared to plural –en, because singular is the default. However, the articulatory difficulties associated with suffixation of –t may have overshadowed morphosyntactic defaultness. Second, it is conceivable that articulatory experience in the L1 enabled the L2 children to perform equally well on the phonologically more complex second/third person singular and the plural. In this respect it is relevant to mention that Turkish does have coda clusters.

For Greek, phonological markedness predicts that the third person singular –i is the least marked, and thus, the earliest acquired form compared to the first person singular –o. Both forms are less marked than the consonant-bearing second person singular –is form. These predictions were partly confirmed. The Greek L2 children showed differences between first/third on the one hand versus the second person on the other hand, but the first and the third person did not differ in terms of accuracy. Note that the predictions regarding phonological markedness in Greek overlap with those of the MUH, and thus, it is difficult to disentangle the relative contribution of phonology and universal features in this language. Syllabicity would also predict that the plural would be less accurate than the singular due to the presence of two consecutive weak syllables. Again, this phonological prediction cannot be disentangled from the predictions of the MUH. However, it is worth pointing out that the L2 children in our study did not resort to syllable reduction in the plural and they did not reduce the syllable values from disyllabic to monosyllabic; they kept the syllabicity of the word the same and made person errors by overusing the third person plural in place of the second person plural.

To conclude, by comparing Dutch and Greek child L2 acquisition, we have shown that morphosyntactic and morphophonological factors together explain accuracy and error patterns in the acquisition of person and number agreement. This study was limited to two languages. Although the agreement paradigms in Dutch and Greek differ strongly, this selection of languages is by no means representative of the variation in agreement paradigms across languages. Future research should continue this line of research by comparing a wider range of languages that allow disentangling the effects of various phonological factors and morphosyntactic defaultness.

Funding

The author(s) disclosed receipt of the following financial support for the research, authorship, and/or publication of this article: This work was supported by two grants from the Netherlands Organisation for Scientific Research NWO project no. 254-70-120 ‘When agreement doesn’t agree: the production and processing of grammatical morphemes by L2 children and children with Specific Language Impairment grant’ and project no. # 254-70-121 ‘Cross-linguistic study of the production and processing of grammatical morphemes in L2 children compared to children with Specific Language Impairment’.

Notes

1. It should be noted that the MSIH regards morphological problems as output related, where the default form is selected during production. In addition, the MSIH (like the Morphological Underspecification Hypothesis) does not distinguish between the notion of default as the underspecified form and defaults that arise in language acquisition. In fact, patterns in language acquisition are used to identify which form is underspecified.
2. Harley and Ritter developed the feature geometry for the pronominal system, and not for agreement markers (Harley & Ritter, 2002, footnote 1). However, given that the same person and number features are involved in pronominal and verb inflection systems (Alexiadou & Anagnostopoulou, 1998), the same universal feature geometry applies also to person and number features expressed through verbal inflection (see Slabakova, 2009; McCarthy, 2012 for agreement acquisition in adult L2 Spanish).
3. The Spanish L2 learners investigated by McCarthy (2012) learned Spanish in instructed settings in the UK. As mentioned by one of the reviewers, instructed learning may have influenced the learners’ performance. In our study, most of the children’s L2 learning took place in a naturalistic setting.

4. For this article, we follow orthographical conventions, referring to the suffix as –en, regardless of pronunciation.
5. The Greek verbal paradigm has two conjugations depending on the stress of the verb. Here, only the first conjugation is presented because the verbs used in the present study belong only to this conjugation. This conjugation is thought to be the simplest one in terms of phonological properties of the suffixes (Holton et al., 1997).
6. The -e in the third person plural is optional and in speech widely used.
7. Because processing morphological forms is influenced by many factors that differ across languages, phonological factors may be more appropriate to compare forms within a paradigm than to directly compare forms across languages.
8. Following McCarthy (2012), we separated defaults for the person and number dimension. If person and number are combined, we are left with two possible acquisition orders: (1) third person singular > third person plural > first person singular > first person plural > second person singular > second person plural or (2) third person singular > first person singular > second person singular > third person plural > first person plural > second person plural.
9. The high number of excluded responses was attributable to children's frequent use of auxiliaries; see Blom and De Korte (2011).
10. One of the cells contained fewer than five observations. A one-tailed p-value was chosen because our hypothesis is directional.

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