How syntactic gradience in L1 affects L3 acquisition

A longitudinal study

Sylwiusz Żychliński, Anna Skałba, Magdalena Wrembel, and Kamil Kaźmierski
Adam Mickiewicz University

The article reports on a longitudinal study of syntactic cross-linguistic influence (CLI) among L1 Polish learners of L2 English and L3 Norwegian. The study mainly aimed to determine the influence of gradience in L1 on third language acquisition. To this end, four syntactic properties were tested, two of which exhibit similarity between Polish and Norwegian (subject-oriented possessive pronouns and adverb placement), and the other two – between English and Norwegian (definite and indefinite articles). A group of 24 learners of Norwegian participated in an acceptability judgment task, which was administered at three data collection times in all three languages. It aimed not only to determine the presence (and sources) of CLI, but also to observe how gradience in L1 affects the assessment of equivalent properties in L3. In order to assess the role played by gradience, the trilinguals' performance was compared to that of a control group of English-Norwegian bilinguals. The data were analyzed with mixed-effects ordinal logistic regression modelling, which showed statistically significant differences in the ratings of articles between the two groups. We attribute this finding to gradient acceptability characterizing subject-oriented pronouns and adverb placement in Polish, which is a potential source of non-facilitative CLI.

Keywords: L3 acquisition, cross-linguistic influence, acceptability judgments, syntactic gradience, longitudinal

1. Introduction

Modern theories of grammar are largely fueled by linguistic examples whose status is usually perceived as a categorical distinction, such as grammatical vs.

https://doi.org/10.1075/lab.23011.zyc | Published online: 22 December 2023
Linguistic Approaches to Bilingualism ISSN 1879-9264 | E-ISSN 1879-9272

ungrammatical, or acceptable vs. unacceptable. However, gradient acceptability, i.e., non-binary judgments concerning the status of linguistic expressions, has received considerable attention in the last few decades, culminating in a number of recent publications, such as Schindler et al. (2020); Goodall (2021), and Francis (2022). Even though more credit is being given these days to the role and interpretation of partially acceptable judgments, this issue is rarely, if ever, acknowledged in Ln acquisition studies. Thus, one of the main aims of this article is to fill that gap and potentially spark the discussion about not only the morpho-syntactic cross-linguistic influence (CLI) in the presence of linguistic gradience in the first language (L1), but also, vice versa, the influence of additional languages (L2, L3, Ln) on the perception of gradience in the L1.

CLI[1] is defined as any effect that languages exert on one another in a person's mind, irrespective of their number or directionality (Sharwood Smith & Kellerman, 1986). While determining the source of CLI is rather straightforward in the case of bilingual speakers, the situation becomes much more complex for people knowing more than two languages. In the light of the multilingual reality we live in, research into CLI patterns has become both a challenge and a necessity.

The growing number of studies about influence among three languages in the multilingual mind have required the formalization of CLI in the form of L3 models of syntactic CLI. They are traditionally divided into similarity- and default-driven approaches. The former postulates the transfer of individual properties from a given language, which is not determined *a priori*, depending on the similarity of constructions, and is represented by the Cumulative-Enhancement Model (CEM; Flynn et al., 2004), the Typological Primacy Model (TPM; Rothman, 2010, 2011, 2015), the Scalpel Model (Slabakova, 2017), and the Linguistic Proximity Model (LPM; Westergaard, 2021a). Although all these models predict that the similarity of constructions determines the source language from which transfer occurs, they differ in whether CLI has its source in one or more languages. While Rothman (2010, 2011, 2015) advocates for transfer from one primary source of influence, i.e., the language which is typologically closest to the L3, the other researchers maintain that both L1 and L2 contribute to CLI. In other words, CLI functions on a property-by-property basis, without being committed to a single language. Another factor differentiating the models within the similarity-driven approach relates to the stage of L3 acquisition at which CLI can occur. The TPM (Rothman, 2010, 2011, 2015) focuses primarily on initial stages of L3 acquisition, the remaining three models make predictions about CLI after that

1. As another term, *transfer*, is sometimes used in similar contexts, we refer readers to Schwartz and Sprouse (2021: 19–24), where both terms are discussed and teased apart.

stage. Hence, the predictions of these models can be tested only within a limited time window.

In contrast to the similarity-driven approach, the stronger version of the default-driven approach predicts that the source of influence is known *a priori*. While some researchers (e.g., Jin, 2009) advocate for the native language being the main source of CLI, others attribute such effect to the L2 (the L2 Status Factor model; Bardel & Falk, 2007), given the cognitive and situational similarities between L2 and L3 learning (Falk et al., 2015). However, more recent research has shown that the distinction is not that straightforward, as such factors as metalinguistic knowledge and working memory can modulate the degree of CLI from L1 and L2 (Bardel & Sánchez, 2017). Thus, the default-driven approach has already shifted from the commitment to CLI coming from one language only.

Models of L3 acquisition of syntax are primarily informed by studies investigating syntactic CLI in constructions characterised by categorical acceptability. Given the relative lack of studies addressing the notion of gradience as a factor influencing CLI, the present longitudinal study aims to contribute to a growing body of research on the acquisition of L3 syntax and patterns of cross-linguistic interactions by including constructions eliciting gradient judgments among L1 participants. The context of acquisition investigated in this study involves L1 Polish speakers with L2 English, learning L3 Norwegian in a classroom context. This language combination has rarely been investigated in research on multilingualism, and even less so from a longitudinal perspective.

2. Syntactic gradience and its status in Ln acquisition studies

Gradient acceptability judgments characterize constructions which are partially acceptable within a given population of speakers. In this study, we are focusing on two types of sources of gradience in L1, i.e., prescriptive ungrammaticality and markedness. Constructions which are prescriptively ungrammatical can still be considered (partially) acceptable by speakers if the ungrammaticality is related to a less productive rule of grammar and does not hinder the comprehension of a sentence. Such is the case with 3rd person possessive pronouns (see Section 3.1), the distribution of which is seldom taught explicitly in Polish schools. Even though using those pronouns with reference to subjects does introduce a degree of ambiguity, they can still be understood without major complications and at least some speakers consider using them acceptable. On the other hand, we have marked constructions, often involving non-canonical word order (see Section 3.2), whose grammatical status is never questioned, at least in a language that allows for more freedom in word order, such as Polish. Though grammatical,

these constructions are typically rated lower than their unmarked counterparts by virtue of being used less frequently. In the end, both in the set of ungrammatical and marked constructions we find variation in the degree of acceptability.

A different question yet is what happens to L1 gradience in the course of Ln acquisition. In other words, if equivalent constructions in L1 and Ln are considered, should we expect gradient judgments to be transferred to Ln. The question is far from obvious as the factors influencing gradience are numerous and they can well vary cross-linguistically.

Regarding previous studies tackling the notion of gradience in the context of Ln acquisition, Sorace and Keller (2005) and Amaral and Roeper (2014) come to mind.

Sorace and Keller (2005) attempt to build gradient acceptability into a theory of language. Although their ideas are not strictly meant for acquisition studies, the predictions they make can be tested in L3 acquisition (L3A). Sorace and Keller suggest that the difference between binary judgments and gradient judgments comes from the different nature of violations which trigger ungrammaticality or partial acceptability. In short, these violations can be divided into soft and hard constraints, where breaking soft constraints leads to gradient judgments, whereas breaking hard constraints leads to ungrammaticality. What is important, the status of constraints should remain intact cross-linguistically, which is a potential avenue for exploration.

More recently, Amaral and Roeper (2014) develop the theory of Multiple Grammars. Although not strictly a theory of linguistic gradience, their theory addresses a related concept of intra- and cross-linguistic variation and optionality, where gradience can be explained in terms of parallel sub-grammars available to speakers and triggered on the basis of productivity and frequency. If we take construction X in L1 to be partially acceptable, in practical terms it means that for some speakers it will be rated higher, and for others lower. In the Multiple Grammars approach, this variation will be accounted for by the existence and availability of two (or more) parallel rule-sets regulating the distribution of construction X. If for most speakers construction X is rated high, it means that the rule which regulates it is very productive and readily accessible to speakers. For those who rate construction X low on the scale of acceptability, they must access (for whatever reason, which will not be explored here) the less productive rule, which is also available. The valid question in the context of Ln acquisition is what happens when the equivalent of construction X in L1 is acquired in Ln. Are the parallel L1 rule-sets transferred to Ln? Does the existence of parallel rule-sets (which translate into gradience) in L1 affect the CLI (and if so, how)? One of the main aims of the study described below is to address these questions in the context of L3A.

3. The (morpho)-syntactic properties under investigation

In this study, four (morpho-)syntactic properties have been selected for cross-linguistic investigation. The central rationale was to focus on properties pointing to a similarity between L1 Polish and L3 Norwegian on the one hand, and L2 English and L3 Norwegian on the other. The first two properties include reflexive possessive pronouns (direct similarity between Polish and Norwegian; English does not have reflexive possessives) and adverb placement (indirect similarity between the marked word order in Polish and the unmarked word order in Norwegian). Importantly, both properties are associated with gradience in Polish (i.e., native speakers' ratings of the said constructions vary considerably, which is reflected in the results presented in Section 6.1.1), while it is not the case in Norwegian.[2] The second group of properties involved the distribution of definite and indefinite articles, which is largely similar in English and Norwegian, as opposed to Polish, an article-less language. Each of the properties will be briefly described below.

3.1 Subject-oriented possessive and reflexive possessive pronouns

Both Polish and Norwegian have a distinct pronominal category of the reflexive possessive pronoun, which is obligatorily subject-oriented (or co-referent with the local subject), as in (3a–b):

(3) a. Jan znalazł *swoje* klucze. (Polish)
Jan found self's keys
b. Jan fant nøklene *sine*. (Norwegian)
Jan found keys self's

For the antisubject-oriented[3] reading (no co-reference with the local subject), both languages require the possessive pronoun, which, prescriptively speaking, cannot be co-referential with the local subject:

2. This is certainly true for adverb placement. For subject-oriented possessives, some Norwegian informants report their increased acceptance. This optionality in native Norwegian, however, should not be something readily accessible to L3 Norwegian learners at lower proficiencies.

3. The term *antisubject orientation* was used in Hestvik (1992) in the discussion of Norwegian possessive pronouns.

(4) a. Jan_1 znalazł $\text{jego}_{\%1/2}$ klucze. (Polish)
Jan found his keys
b. Jan_1 fant nøklene $\text{hans}_{*1/2}$. (Norwegian)
Jan found keys his

However, despite the normative incorrectness of the subject-oriented reading in (4a) (Jadacka, 2013), Polish native speakers seem to find this reading at least partially acceptable with possessive pronouns (the percentage mark in [4a] has been used to indicate that speakers' intuitions vary in the assessment of the acceptability of *jego* = *Jan's*). Polish is not exceptional in this respect, as other authors report similar judgments from other languages (e.g., Nikolaeva, 2014 for Russian). Crucially, though, this reading is impossible in Norwegian (Hestvik, 1992).

In English, on the other hand, the possessive pronoun is used in both subject-oriented (*his* = *John's*) and anti-subject-oriented (*his* = *someone else's*) contexts, as in (5).

(5) John_1 found $\text{his}_{1/2}$ keys.

Hence, although Polish is identical to Norwegian in employing the reflexive possessive for the subject-oriented reading, it also aligns with English in partially allowing for the possessive pronoun to be subject-oriented.

3.2 Adverb placement

For adverb placement, Polish and English are superficially similar in placing the adverb before the verb, as opposed to Norwegian, in which the adverb follows the verb:

(6) a. Jan *rzadko* czyta e-booki.
Jan seldom reads e-books
b. Jan *seldom* reads e-books.
c. Jan leser *sjelden* e-bøker.
Jan reads seldom e-books

The difference stems from the fact that neither English nor Polish is a V2 language,[4] which means that the verb does not have to move to a higher functional projection (from which it would linearly precede the adverb), whereas Norwegian verbs move to the head position of the Complementizer Phrase (CP) (Vikner,

4. English may be described as a residual V2 language, which manifests itself in subject-auxiliary inversion for questions (or in stylistic inversion, etc.), but this property is irrelevant for adverb placement.

1995). However, despite showing a preference for a pre-verbal placement of adverbs, Polish does allow for the verb to move up over the adverb position.

(7) %Jan czyta *rzadko* e-booki.
Jan reads seldom e-books

The resulting word order is somewhat marked (the adverb receives more emphasis), yet fairly acceptable among speakers of Polish. Thus, it is more accurate to say that while Polish and English are similar (and different from Norwegian) for the unmarked (pre-verbal) adverb placement, Polish and Norwegian are also similar in the marked (post-verbal) word order in Polish and the unmarked, fully grammatical (post-verbal) word order in Norwegian.

3.3 Definite and indefinite articles

As both English and Norwegian possess definite and indefinite articles and Polish is an article-less language, we included them in our study in order to test constructions which cannot benefit from L1 facilitation, in contrast to adverb placement and possessive pronouns, whose distribution in Polish and Norwegian overlaps to a certain degree. As we focused primarily on definiteness and indefiniteness of countable nouns, obligatorily requiring the presence of either a definite (8) or an indefinite article (9) in English and Norwegian, in this case gradience was not of significance.

(8) a. The dog / *Ø dog is very small.
b. Hunden / *hund-Ø er veldig liten.

(9) a. I met an / *Ø old friend from high school.
b. Jeg møtte en /*Ø gammel venn fra videregående.

Despite the obligatory presence of definite and indefinite articles, English and Norwegian also diverge. As can be seen in (8b), the definite article in Norwegian is post-nominal and suffixal, which makes it somewhat similar to inflectional suffixes in Polish.

4. Literature review

Selected aspects of the morpho-syntactic phenomena examined in this study have been investigated in some previous studies briefly reviewed below; however, especially for subject-oriented pronouns and adverb placement, the relevant L3 literature is scarce. Thus, the present paper is intended to shed more light on these phenomena in the context of linguistic gradience.

Pronominal resolution (i.e., establishing the relation between the anaphor and its antecedent) has been the subject of L3A studies, e.g., Gračanin-Yuksek et al. (2020), and Lago et al. (2018), but we have not found previous studies where the non-complementary distribution of reflexive possessive and pronominal possessives was studied as the potential source of the syntactic CLI. Still, we will mention two studies which deal with the quirky distribution of possessive pronouns with implications for the languages involved in our main study. Mertins (2021), employing the comprehension study design, shows that for native speakers of Czech possessive pronouns are in direct competition with reflexive possessives, with the former being interpreted as subject-oriented in at least one third of all cases. While the study was not designed to measure the degree of gradience, we take it as further support for the claim we are making that in Polish partial acceptability must be taken into account when investigating the subject-oriented possessive pronouns. In the very same study, a speculative question is raised about the acquisition of Norwegian possessives by L1 Czech speakers (more specifically, the question is whether L1 Czech speakers would recognize the interpretation of the non-reflexive 3rd person possessive pronoun as ambiguous between subject-oriented and non-subject-oriented), but no follow-up study is reported.

Helland (2017) reports on the study of L1 French, L2 Norwegian and L1 Norwegian, L2 French bilinguals and their comprehension of the possessive pronouns in the two languages. In this pairing of languages, French is more like English,[5] with the French pronoun *se* capable of being used either reflexively, in the subject-oriented way, or non-reflexively, while Norwegian distinguishes between the two types of reading via the choice of the pronoun. The results show that the acquisition of the two different pronominal systems is very challenging both ways. While L1 French learners tend to overgeneralize the use of the reflexive possessive in Norwegian to cases where the possessive should be used, L1 Norwegian learners fail to recognize that French has distinct forms of the 3rd person possessive based on the number of the possessor (Norwegian only has separate forms for the non-reflexive possessive and identical ones in the reflexive-possessive paradigm). This study gives us an important clue about the (possibly late) learnability of constructions involving the two types of pronouns and the general interpretive difficulty they pose.

Word order is a rather frequently investigated syntactic property in the research on L3A. However, we are not aware of other studies which would examine similar word-order phenomena in the same language configuration as in our study. Hermas (2010) reports on the results of an experiment (involving an

5. Helland (2017) is a bit unclear about it, but apparently for both groups English was the L2 in the strict sense.

acceptability judgment task and preference tests) focusing on adverb placement acquisition by L1 Moroccan Arabic, L2 French (post-intermediate to advanced) learners of L3 English. In Moroccan Arabic, as in Polish, the adverb may surface either before or after the verb.[6] In French, on the other hand, the adverb surfaces after the verb, which makes French different from English, with its pre-verbal adverbs. The results demonstrated that L1 is facilitative for the correct adverb placement in L3 English and non-facilitative for the incorrect adverb placement at an early stage of L3A.[7] Although participants showed high accuracy for the correct adverb placement in English (Adv-V), they also displayed very low accuracy for the incorrect placement (V-Adv), suggesting that the English verb / adverb position parameter was not acquired at an early stage of acquisition.

In Westergaard et al. (2017), the syntactic CLI in L3 English was tested for adverb placement and subject-auxiliary inversion in a group of L1 Russian, L2 Norwegian speakers and their results were compared with a group of L1 Russian speakers and another group of L1 Norwegian speakers. The results showed that for adverb placement the bilingual Russian-Norwegian group of L3 English learners experienced significant facilitation, despite the typological distance. The results are thus different from those presented in Hermas (2010), though in Moroccan Arabic two different adverb placements are in parallel distribution, whereas in Russian only the pre-verbal order is considered (in Jensen et al. [2021: 7] the post-verbal adverb placement in Russian is described as "strongly dispreferred", which marks a noteworthy difference between Russian and Polish).

The acquisition of articles in the multilingual context, also from article-less languages, has been recently studied in, among others, Hermas (2018); Agebjörn (2021); Jensen et al. (2021); Ionin et al. (2022), or Cho (2022). Agebjörn (2021), though focusing on L2A, provides data which could inform the interpretation of our results. The participants in the study were L1 Russian learners of L2 Swedish (in contrast to Russian, an article-less language, Swedish has a complex system of marking definiteness similar to Norwegian). The participants were predicted to omit articles more frequently in NPs with a pre-modifying adjective than in bare NPs. The results of the acceptability experiment ran counter to expectations, as the learners performed similarly for both definite and indefinite articles, and the known effect of the overuse of the definite article (e.g., Huebner 1983; Master

6. No information is given about whether both word orders are unmarked, or one is marked (as in Polish).

7. The L2 French could potentially be taken as the source of non-facilitation in the case of the incorrect word order. However, the authors amass arguments (referring to the accuracy of the experimental group in L2 and also comparing the results of the experimental group with the L1 French, L2 English control group) that in their view support the exclusive L1 influence.

1997) was not observed. In Jensen et al. (2021) adverb placement and definiteness were among the properties tested for the CLI on a group of Russian-Norwegian bilinguals acquiring L3 English. The results point to facilitation from Russian for adverb placement and from Norwegian for definiteness. However, what makes the study different from ours (apart from the lack of optionality in the L1 word order) is the higher proficiency of L3 among the participants.

To recapitulate, in the present study we attempt to deepen our understanding of some of the issues that have not been fully addressed in the extant literature on syntactic L3A to date. For pronominal resolution and adverb placement, it is mainly the effect of L1 gradience and markedness on L3A. Definite and indefinite articles, on the other hand, provide a counterweight to the first two properties in that they are both expected to elicit categorical judgments from the participants, making it easier to compare the two groups of properties.

5. The study

The study constitutes part of a larger, multi-modal longitudinal project on multilingual acquisition, in which CLI was investigated among the speakers of L1 Polish, L2 English, and L3 Norwegian throughout three in-person data collection sessions (December 2021, March 2022, and June 2022). The syntactic part, being the focus of the present article, was one of the components under examination, along with language perception and language production parts. Syntactic constructions under investigation were, as specified in Section 3, subject-oriented reflexive and possessive pronouns (henceforth *SO pronouns*), (pre- and post-verbal) adverb placement, and definite and indefinite articles. The main study had been piloted online in June 2021.[8] It involved two more constructions, which we decided not to include in the main experiment, as the results revealed that they were too complex for the participants at their proficiency level. The pilot study also revealed a trend of greater acceptability of L1 marked constructions with growing L3 Norwegian proficiency (we address that in Section 6.3).

8. The pilot study had 15 participants, all of whom were students of Norwegian philology at a Polish college. The main aims of the pilot study were to test the experimental procedures and the constructions. We are not reporting on the detailed findings of the pilot study as substantial changes were made in the main experiment.

5.1 Research questions and hypotheses

The main aim of the study was to investigate the way gradience in L1 influences syntactic CLI over the first year of instructed learning of L3 Norwegian. Since all the participants were also learners of L2 English, we formulated our hypotheses on the basis on the afore-described similarities and differences between these three languages. Table 1 presents a summary of the properties under investigation. Fully acceptable and unmarked constructions are marked in white, whereas shades of grey reflect degrees of markedness, up to unacceptability (the darker the shade, the less acceptable the construction). An absence of a construction in a given language is marked by a cross.

Table 1. Summary of constructions under investigation in Polish, English, and Norwegian

	Polish	English	Norwegian
SO reflexive pronouns	+		+
SO possessive pronouns	–/+	+	–
pre-verbal adverb placement	+	+	–
post-verbal adverb placement	+/–	–	+
article before definite nouns		+	+
no article before definite nouns		–	–
article before indefinite nouns		+	+
no article before indefinite nouns		–	–

Legend:
unacceptable **rather unacceptable** **partially acceptable / marked**
acceptable **absent**

As can be seen in Table 1, these constructions can be divided into those present and absent in L1 Polish. Due to this categorical distinction, we put forward our hypotheses for each pair of constructions separately. The first type of comparisons relates to the constructions which exist in all three languages, namely subject-oriented pronouns and adverb placement. As Polish is characterised by a relatively

free word order, the difference between pre- and post-verbal positions of adverbs of frequency would be expected to be smaller than that between the use of reflexive possessive vs. possessive pronouns in subject-oriented interpretations. In turn, the distinction in English is categorical, hence the differences on an acceptability scale would be similar. Given the opposite patterns for these two constructions in English and Norwegian, we predicted higher acceptability ratings in L3 Norwegian for subject-oriented reflexive possessives (grammatical in Polish, absent in English) than for post-verbal adverb placement (partially acceptable / marked in Polish, ungrammatical in English) in the grammatical condition. In the ungrammatical one, we assumed that the use of possessive pronouns for subject orientation (partially acceptable in Polish, grammatical in English) would be rated lower than pre-verbal adverb placement (grammatical both in Polish and English). This line of reasoning enabled us to put forward the following hypotheses:

H1: grammatical sentences: lower ratings for adverb placement than for pronouns
H2: ungrammatical sentences: higher ratings for adverb placement than for pronouns

Due to the absence of definite and indefinite articles in Polish, the next two predictions were more straightforward. Given the similarity between Norwegian and English in the use of articles and the higher learnability of definite than of indefinite ones, participants were expected to rate them in an English-like manner. Hence, the former were assumed to be rated higher than the latter in the grammatical condition, and vice versa in the ungrammatical one, which was formulated as follows:

H3: grammatical sentences: higher ratings for definite articles than for indefinite articles
H4: ungrammatical sentences: lower ratings for definite articles than for indefinite articles

This division also reflects the contribution of gradience in L1 Polish to CLI in L3 Norwegian. Hence, we decided to collapse the four constructions into pairs on the basis of their presence in L1 Polish (present in L1 Polish: adverb placement and SO pronouns; absent in L1 Polish: definite and indefinite articles), which enabled us to formulate two additional hypotheses. Although it is well-documented that the acquisition of articles poses a challenge to native speakers of article-less languages (e.g., Jaensch, 2008; Hermas, 2018), possibly due to negative influence from the L1, the presence of definite and indefinite articles in L2 English contributes to positive influence, especially at higher levels of L2 proficiency (Arıbaş & Cele, 2021). In turn, the situation of SO pronouns and adverb placement is

somewhat more complex. Not only are they subject to negative influence from L2 English, since English and Norwegian are polar opposites in terms of their usage, but also to gradient acceptability of marked constructions in L1 Polish, leading to difficulties in establishing the right patterns in L3 Norwegian. Therefore, we assumed that definite and indefinite articles would be rated more target-like than adverb placement and SO pronouns, due to the cross-linguistic complexity of the latter pair. These hypotheses were formulated as follows:

H5: grammatical sentences: lower ratings for constructions present both in L1 and L2 (adverb placement, possessive pronouns) than for constructions absent in L1 (definite and indefinite articles)

H6: ungrammatical sentences: higher ratings for constructions present both in L1 and L2 (adverb placement, pronouns) than for constructions absent in L1 (definite and indefinite articles).

5.2 Participants

Polish undergraduate first-year students of Norwegian as their L3 were recruited for the experiment. At Time 1 (T1), the experimental group consisted of 24 participants (mean age = 20, $SD = 0.87$, range = 3), at Time 2 (T2) there were 17, and at Time 3 (T3) – 16 participants. In order to collect information about the participants' linguistic profiles, they completed the Polish version of the Language History Questionnaire (LHQ; Li et al., 2020). Their self-reported proficiency in English, understood as a mean value of listening, speaking, reading, and writing skills rated on a 7-point Likert scale, ranged from 4.25 to 7 ($M = 5.77$; $SD = 0.64$). The group had little linguistic background in Polish.[9] As for Norwegian, at T1 the participants had had around 80 hours of intensive Norwegian instruction (in 4 main components, which included pronunciation, speaking, grammar, and writing), followed by 195 hours at T2, and 300 at T3.

Apart from English and Norwegian, the majority of the participants also knew other foreign languages, namely German (12 participants), Spanish (4), Russian (2), French (1), and Korean (1). As for the participants who reported knowledge of German, the mean values of listening, speaking, reading, and writing skills rated on a 7-point Likert scale ranged from 1 to 4.25 ($M = 2.29$; $SD = 1.18$),

9. Students of foreign philologies in Poland do not typically have courses in the descriptive grammar of Polish (and the scope of descriptive grammar taught at the pre-university level is very limited). Therefore, it is a fair assumption that on average students participating in such studies are first and foremost guided by their linguistic intuitions and not specific rules of grammar (especially when the rules in question are lesser known or not known at all, as was the case with the structures we tested).

for Spanish the mean values ranged from 1 to 5.75 ($M = 3.31$; $SD = 1.94$), for Russian they ranged from 1.75 to 5.50 ($M = 3.63$; $SD = 2.65$), and for French and Korean the means amounted to 5.25 and 2.50, respectively. Although we cannot be sure that these other languages did not constitute a source of CLI, the skills in additional languages were limited for the majority of the participants. Additionally, more advanced knowledge did not concern a single language, which alleviates the risk of systematic CLI on the group level. While testing participants without any knowledge of additional languages would clearly benefit the study of CLI, finding such people is virtually impossible in Poland, since all students obligatorily learn two foreign languages starting from primary school.

Additionally, L2 and L3 proficiencies were assessed via more objective measures, namely the LexTALE test (Lemhöfer & Broersma, 2012) for English and an adapted version (measuring proficiency up to the A2 level) of the Norwegian placement test used for estimation purposes at UiT (the Arctic University of Norway). Since we were interested in the participants' learning trajectories, these tests were administered at each testing session. The results confirmed that the participants were upper intermediate learners of English[10] and beginner to elementary learners of Norwegian.[11] Details regarding their scores in both tests are presented in Table 2.

Table 2. Means and standard deviations (in parentheses) of scores in English and Norwegian tests at each testing session (T1, T2, T3)

	T1	T2	T3
English LexTALE (Lemhöfer & Broersma, 2012)	67.20% (9.01%)	73.41% (15.35%)	77.25% (12.32%)
Norwegian placement test	41.17% (14.61%)	58.71% (17.42%)	68.81% (17.52%)

Finally, we recruited a control group of English-Norwegian bilinguals ($N = 16$), whose performance in L2 Norwegian was compared with that of the experimental group.[12] The group's mean result on the Norwegian placement test

10. LexTALE scores between 60% and 80% are related to the upper intermediate (B2) proficiency level of L2 English (Lemhöfer & Broersma, 2012).

11. Even at T3, the participants did not perform at ceiling on a test measuring proficiency in Norwegian up to the A2 level.

12. The control group was recruited online at St. Olaf College, MN and the University of Wisconsin-Madison; both institutions offer Norwegian as a foreign language. We would like to thank Marit Westergaard, who helped us disseminate information about the study at both places.

was 84.91% (*SD* = 13.45%). Although their Norwegian proficiency was somewhat higher than that of the Polish participants, finding comparable groups matched on all variables would not have been feasible.

The inclusion of an English-Norwegian control group enabled us to use the subtractive language group design (Westergaard et al., 2017), which allows to assess the influence of previously learned languages on an L3. This can be achieved by comparing the performance of participants learning a common target language (Norwegian), but with different L1s and/or L2s (Polish and English vs. English). If a certain effect is observed in one group only, then it can be attributed to differences in linguistic background between the experimental and the control groups.

5.3 Stimuli

For the main experiment, we constructed sets of experimental items featuring sentences with reflexive possessive and possessive pronouns, pre-verbal and post-verbal adverbs, and definite and indefinite articles (or lack thereof). Table 3 displays constructions along with examples of experimental items (preceded by context sentences) for each of the three languages. The full list of stimuli is available at an open repository (linked to at the end of the article).

Table 3. List of constructions with examples of experimental items (a context sentence followed by the critical item)

Construction	Experimental item
1a/ reflexive SO pronouns	Paweł i jego wspólniczka Helena zarobili na giełdzie sporo pieniędzy. Paweł wydał **swoje** pieniądze na nowy samochód. (Polish) *Peter and his business partner Helen made a lot of money on the stock exchange. Peter spent **own** money on a new car. (English) Per og partneren Ellen tjente mye penger på børsen. Per brukte pengene **sine** på en ny bil. (Norwegian)
1b/ possessive SO pronouns	?Paweł i jego wspólniczka Helena zarobili na giełdzie sporo pieniędzy. Paweł wydał **jego** pieniądze na nowy samochód. (Polish) Peter and his business partner Helen made a lot of money on the stock exchange. Peter spent **his** money on a new car. (English) *Per og partneren Ellen tjente mye penger på børsen. Per brukte pengene **hans** på en ny bil. (Norwegian)
2a/ pre-verbal adverb placement	Wszyscy czytają teraz e-booki zamiast papierowych książek. Ale Grzegorz **rzadko czyta** e-booki. (Polish) E-books are really popular these days. But William **seldom reads** e-books. (English)

Table 3. *(continued)*

Construction	Experimental item
	*Alle leser e-bøker og ikke papirbøker nå. Men Øystein **sjelden leser** e-bøker. (Norwegian)
2b/ post-verbal adverb placement	%Wszyscy czytają teraz e-booki zamiast papierowych książek. Ale Grzegorz **czyta rzadko** e-booki. (Polish) *E-books are really popular these days. But William **reads seldom** e-books. (English) Alle leser e-bøker og ikke papirbøker nå. Men Øystein **leser sjelden** e-bøker. (Norwegian)
3a/ definite article	Mary has a dog and a cat. **The** dog is really small. (English) Mari har en hund og en katt. Hund**en** er veldig liten. (Norwegian)
3b/ no definite article	Mary has a dog and a cat. ***Ø** Dog is really small. (English) Mari har en hund og en katt. *Hund-**Ø** er veldig liten. (Norwegian)
4a/ indefinite article	I walked around the city yesterday. I found **a** nice restaurant near the Old Market. (English) Jeg gikk rundt i byen i går. Jeg fant **en** fin restaurant i nærheten av det gamle markedet. (Norwegian)
4b/ no indefinite article	I walked around the city yesterday. *I found **Ø** nice restaurant near the Old Market. (English) Jeg gikk rundt i byen i går. *Jeg fant **Ø** fin restaurant i nærheten av det gamle markedet. (Norwegian)

Overall, there were 50 experimental items in Norwegian (ten for each of the constructions and ten fillers),[13] 30 in English, and 20 in Polish. Each target sentence had its grammatical and partially acceptable (for Polish) / ungrammatical (for English and Norwegian) variants, which were equally distributed between two experimental lists in a way that one participant would see only one variant of a given sentence.

5.4 Procedure

At each of the three testing times of the entire study (comprising both syntactic and phonetic parts), the order of language blocks remained constant (L3 Norwegian => L2 English => L1 Polish).[14] In the syntactic part, we used 5-point Likert

13. The low number of additional fillers was motivated by the large number of tested properties which acted as fillers for one another.

14. Polish was only tested at T1 and T3.

scale acceptability judgment tasks. Each experimental item consisted of two sentences: a background sentence establishing the context, and a target one (see Table 3), which was followed by the question 'Does this sentence sound right to you?'. Possible answers ranged from 1 ('definitely no') to 5 ('definitely yes'). At the beginning of the task, two sample sentences were provided for reference, an ungrammatical one rated 1, and a well-formed one rated 5. Although the task was not timed, participants were instructed to focus on their intuitions and first impressions, and not on grammatical rules (at least not primarily). The average completion time for the Norwegian segment was 11 minutes 45 seconds at T1, 8 minutes 45 seconds at T2, and 8 minutes 30 seconds at T3.

6. Results

All statistical analyses were performed in R (R Core Team, 2022). Significance testing was performed with mixed-effects ordinal logistic regression modelling using the *clmm* function from the *ordinal* package (Christensen, 2022), followed by post-hoc pairwise comparisons using the *emmeans* package (Lenth et al., 2023). For all analyses performed, effects with *p*-values smaller than .05 were deemed significant.

As the participants performed the same acceptability judgement task in L1 Polish, L2 English, and L3 Norwegian, their results will be presented separately for each language, with most attention paid to the L3 data.

6.1 Descriptive statistics

6.1.1 *L1 Polish*

Acceptability ratings in L1 Polish were performed with only two constructions, namely adverb placement and SO pronouns. As can be seen in Table 4 below, for both constructions, grammatical sentences were rated higher (mean ratings over 4) than partially grammatical / marked ones (mean ratings below 4), both at T1 and T3. Additionally, we can observe that differences in mean ratings between grammatical and marked sentences are greater at T3 than at T1 (adverb placement: $\text{difference}_{T_1} = 0.64$, $\text{difference}_{T_3} = 1.07$; SO pronouns: $\text{difference}_{T_1} = 0.76$, $\text{difference}_{T_3} = 1.03$).

6.1.2 *L2 English*

More data was collected in L2 English and L3 Norwegian, as the participants were also tested on definite and indefinite articles. The English data (presented

Table 4. Means and standard deviations (in parentheses) of ratings of each construction in L1 Polish at T1 and T3

	Grammatical		Ungrammatical	
	T1	T3	T1	T3
adverb placement	4.25 (1.1)	4.56 (0.7)	3.61 (1.4)	3.49 (1.2)
SO pronouns	4.57 (0.8)	4.69 (0.7)	3.81 (1.4)	3.66 (1.5)

in Table 5) shows that grammatical sentences were always rated higher than ungrammatical ones. However, there is some variability in ratings across constructions. The lowest mean scores for grammatical sentences are associated with adverb placement (from 3.91 at T1 to 4.25 at T3), whereas the three remaining grammatical constructions were rated relatively higher (up to 4.65 for indefinite articles at T3). In the case of the ungrammatical condition, the participants rated sentences with adverb placement and pronouns lower than those with definite and indefinite articles. In addition, the ratings of grammatical sentences with adverb placement and indefinite articles increased across the three testing times.

Table 5. Means and standard deviations (in parentheses) of ratings of each construction in L2 English at T1, T2, and T3

	Grammatical			Ungrammatical		
	T1	T2	T3	T1	T2	T3
adverb placement	3.91 (1.25)	4.20 (1.01)	4.25 (1.04)	3.10 (1.46)	2.47 (1.32)	3.04 (1.43)
definite articles	4.41 (1.02)	4.35 (0.93)	4.48 (0.74)	3.74 (1.35)	3.59 (1.30)	3.92 (1.15)
indefinite articles	4.22 (1.33)	4.43 (0.88)	4.65 (0.73)	3.51 (1.50)	4.00 (1.20)	4.12 (1.06)
SO pronouns	4.42 (0.93)	4.45 (0.76)	4.39 (1.00)	3.13 (1.62)	2.82 (1.57)	2.83 (1.45)

6.1.3 *L3 Norwegian*

Similarly as in L2 English, the participants generally rated grammatical sentences higher than ungrammatical ones in L3 Norwegian, apart from SO pronouns at T1 and T2 (see Table 6 below). However, the differences in ratings were very small (0.03). Irrespective of grammaticality, the highest ratings are associated with definite articles and the lowest with adverb placement and SO pronouns. Across all syntactic constructions, there are growing trends in acceptability ratings of gram-

matical sentences across the testing times. What is more, the ratings of ungrammatical sentences with indefinite articles and SO pronouns increased with time.

Table 6. Means and standard deviations (in parentheses) of ratings of each construction in L3 Norwegian at T1, T2, and T3

	Grammatical			Ungrammatical		
	T1	**T2**	**T3**	**T1**	**T2**	**T3**
adverb placement	3.45 (1.44)	3.60 (1.16)	3.84 (1.10)	3.32 (1.31)	3.28 (1.37)	3.30 (1.38)
definite articles	4.20 (1.18)	4.45 (0.89)	4.51 (0.88)	4.12 (1.16)	4.02 (1.24)	4.15 (1.04)
indefinite articles	3.72 (1.36)	4.09 (1.09)	4.32 (0.84)	3.56 (1.38)	3.91 (1.18)	4.08 (1.11)
SO pronouns	3.16 (1.35)	3.49 (1.25)	3.83 (1.13)	3.19 (1.37)	3.52 (1.31)	3.74 (1.11)

The first testing session (T1), conducted two months after the participants started studying Norwegian at a university level, served as baseline data, with which the two remaining sessions were subsequently compared. As shown in Table 6 above, there was little variation in participants' ratings. Small differences between grammatical and ungrammatical sentences started to emerge at T2 and continued at T3, for all the constructions except pronouns. This can be seen in Figure 1, presenting the ratings of grammatical and ungrammatical constructions in L3 Norwegian at T3.[15]

6.1.4 *English-Norwegian control group*

Differences between grammatical and ungrammatical constructions were more pronounced for the L1 English – L2 Norwegian control group, whose Norwegian proficiency was higher than that of the experimental group, even at T3. Yet, similarly as in the case of the experimental group, English-Norwegian bilinguals rated definite and indefinite articles in the grammatical condition higher than adverb placement and SO pronouns. In turn, the ratings in the ungrammatical condition were reversed, with articles being associated with lowest acceptability. More

15. As there was little variation in the three diagrams showing ratings of grammatical and ungrammatical constructions in L3 Norwegian, we have included only the one presenting data at T3, where the differences are most pronounced. The two remaining diagrams can be found in the supplementary materials.

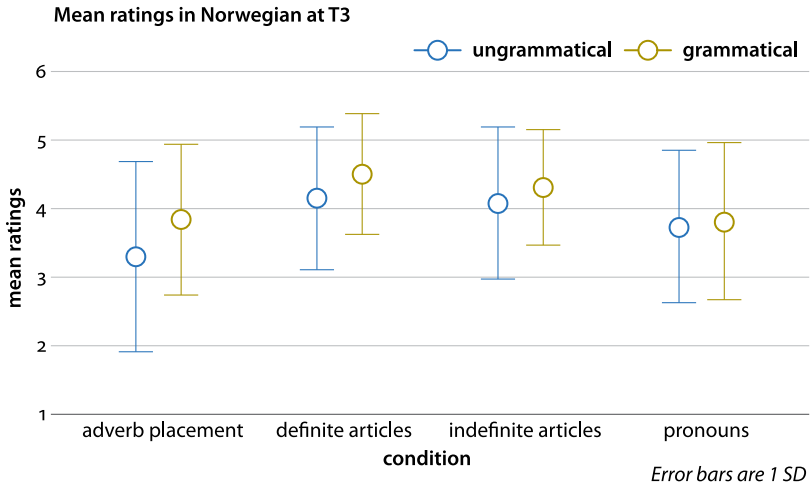

Figure 1. Mean ratings of grammatical and ungrammatical sentences in Norwegian for each syntactic construction at T3

details are presented in Table 7, showing means and standard deviations of the ratings, and in Figure 2, visualising the data.

Table 7. Means and standard deviations (in parentheses) of ratings of each construction in L2 Norwegian by the English-Norwegian control group

	Grammatical	Ungrammatical
adverb placement	3.75 (1.52)	2.75 (1.53)
definite articles	4.65 (0.90)	2.00 (1.43)
indefinite articles	4.40 (1.04)	2.19 (1.41)
SO pronouns	3.70 (1.48)	3.11 (1.48)

6.2 Cross-linguistic influence

In our analyses, we made comparisons across constructions in L3 Norwegian. Given differences in learnability levels across the constructions under investigation, this choice obviously introduced some bias to the data, since differences in ratings cannot be attributed only to CLI. Additionally, we compared the performance of the experimental group with that of a control group of English-Norwegian bilinguals (subtractive language group design; Westergaard et al., 2017).

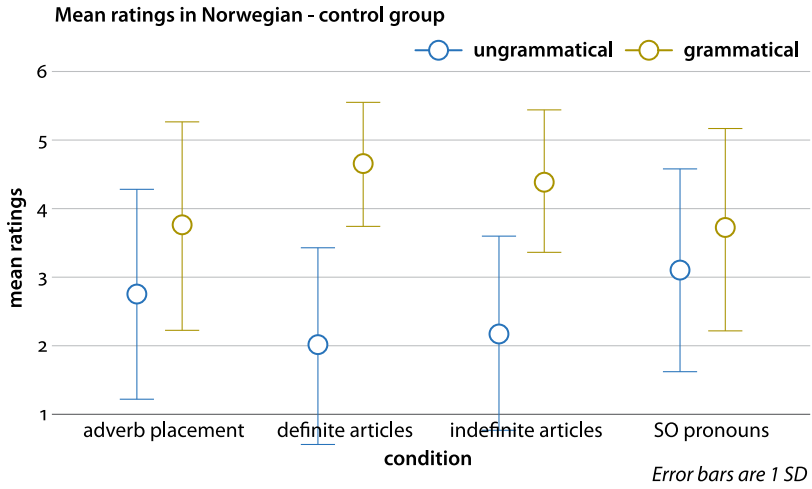

Figure 2. Mean ratings of grammatical and ungrammatical sentences in Norwegian for each syntactic construction by the English-Norwegian control group

These methodological choices obviously have some limitations. Firstly, although we managed to find a control group of English-Norwegian bilinguals, it would be ideal to test an L1 Polish – L2 Norwegian group, who had no knowledge of English. However, finding such participants would be unfeasible, especially in a classroom context in Poland, since all students have already had at least some experience with English throughout their formal education. This is even more true for students of Norwegian at a university level, since they also follow an intensive course in English. Secondly, if our participants had comparable proficiency levels in L2 English and L3 Norwegian, we could make comparisons across languages. However, this was not the case (they were upper intermediate learners of L2 English and beginner / elementary learners of L3 Norwegian), so it would be impossible to disentangle learning differences from those arising from CLI.

In order to trace CLI from L1 Polish and L2 English in L3 Norwegian, we built a mixed-effects ordinal logistic regression model. The structure of the model was guided by the predictions regarding the effects of *testing time* (T1, T2, T3, compared with the control group), *grammaticality* (grammatical, ungrammatical), and *construction* (adverb placement, definite articles, indefinite articles, SO pronouns) on acceptability ratings in L3 Norwegian. The interaction of these three variables was entered as a fixed effect, and *participants*[16] and *sentences* as random intercepts. We did not include the fixed effect of Norwegian proficiency or

16. All analyses are based on data from 16 participants who took part in all three testing sessions.

random slopes for convergence reasons. The predictor variables were treatment coded, with *control* being the reference level for *testing time, grammatical* sentences for *grammaticality*, and *definite articles* for *construction*.[17] Table 8 shows a shortened tabulated summary of the model.

Table 8. Tabulated summary of the model for Norwegian data

	Rating		
Predictors	**Odds Ratios**	**CI**	***p*-value**
1|2	0.01	0.00-0.02	**<0.001**
2|3	0.02	0.01-0.05	**<0.001**
3|4	0.06	0.03-0.11	**<0.001**
4|5	0.19	0.09-0.40	**<0.001**
time [T1]	0.43	0.18-1.06	0.066
time [T2]	0.49	0.20-1.19	0.116
time [T3]	0.46	0.19-1.12	0.086
grammaticality [ungrammatical]	0.01	0.00-0.01	**<0.001**
construction [adverb placement]	0.13	0.06-0.30	**<0.001**
construction [indefinite articles]	0.43	0.19-0.99	**0.049**
construction [SO pronouns]	0.12	0.05-0.26	**<0.001**

Random Effects	
σ^2	3.29
$\tau_{00\ \text{sentence}}$	0.15
$\tau_{00\ \text{participant}}$	0.44
ICC	0.15
$N_{\ \text{participant}}$	32
$N_{\ \text{sentence}}$	40
Observations	2527
Marginal R^2 / Conditional R^2	0.221 / 0.339

While the model did not reveal a statistically significant effect of *testing time* (T1: $\beta = 1.54$, $p = .066$; T2: $\beta = 1.63$, $p = .116$; T3: $\beta = 1.58$ $p = .086$), there were statistically significant effects of *grammaticality* ($\beta = 1.01$, $p < .001$) and *construction*

17. This decision was driven by the highest ratings for definite articles in comparison with the remaining three conditions.

(adverb placement: $\beta = 1.14$, $p < .001$; indefinite articles: $\beta = 1.54$, $p = .049$; SO pronouns: $\beta = 1.13$, $p < .001$).

In order to investigate differences between the three testing times and the control group, we performed pairwise comparisons with the *emmeans* package (Lenth et al., 2023), separately for each construction and grammaticality condition. *p*-values were corrected for multiple comparisons using the Bonferroni method. The ratings of definite and indefinite articles in the ungrammatical condition were significantly different between the control group and the experimental one at each of the testing times ($p < .001$). Further across-group significant differences were found between the control group and experimental group at T1 for grammatical sentences including indefinite articles ($p = .038$) and ungrammatical sentences with adverbs ($p = .046$). The only significant effects within the experimental group concerned the differences between T1 and T3 in the case of SO pronouns both in the grammatical ($p = .038$) and the ungrammatical condition ($p = .042$).

We performed further post-hoc analyses using the *emmeans* package (Lenth et al., 2023) to test the specific predictions posited as hypotheses H_1-H_4 in Section 5.1 (repeated in Table 9 below; "<" and ">" signs refer to higher / lower ratings). Table 8 presents *p*-values of the pairwise comparisons of *time, grammaticality*, and *construction* (with Bonferroni corrections for multiple comparisons) related to our hypotheses. The only statistically significant effect following the predicted direction was found between definite and indefinite articles in the grammatical condition at T1 and T2. Although the difference in ungrammatical sentences for the same construction is also statistically significant, definite articles are rated higher than indefinite ones, contrary to H_4.

Table 9. *p*-values of post-hoc analyses referring to hypotheses H_1-H_4

Hypothesis	T1	T2	T3
H_1: grammatical sentences: adverb placement < pronouns	.113	.672	.929
H_2: ungrammatical sentences: adverbs placement > pronouns	.621	.375	.129
H_3: grammatical sentences: definite articles > indefinite articles	**.003**	**.019**	.087
H_4: ungrammatical sentences: definite articles < indefinite articles	.007	.461	.815

Figures 3 and 4 show probabilities of selecting a given rating (from 1 to 5) for each construction for grammatical and ungrammatical sentences, respectively.

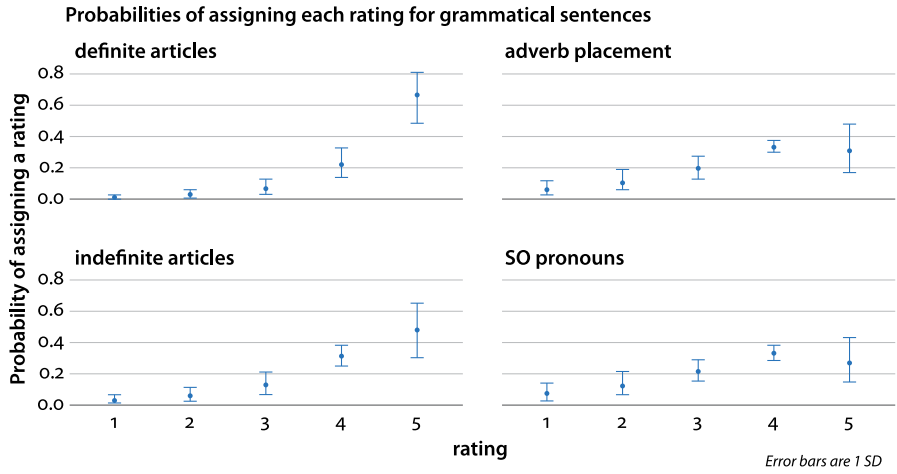

Figure 3. Probabilities of assigning each acceptability rating for grammatical sentences for each syntactic construction

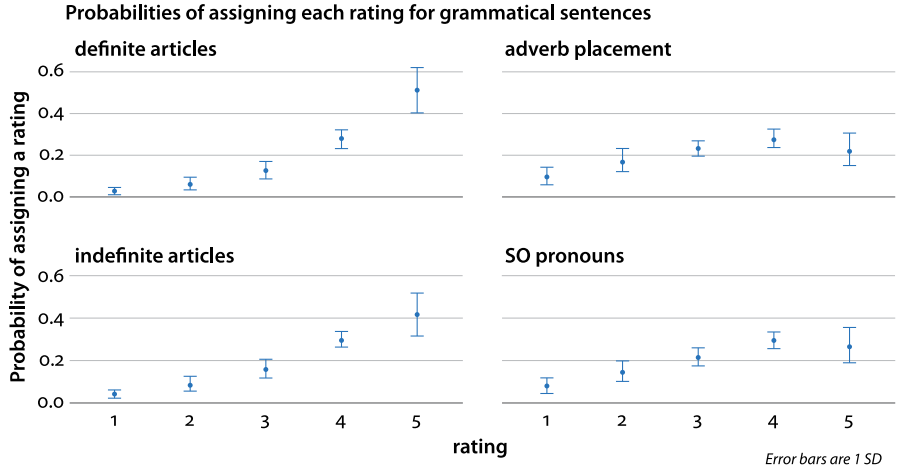

Figure 4. Probabilities of assigning each acceptability rating for ungrammatical sentences for each syntactic construction

The hypotheses related to the presence vs. absence of a feature in the participant's native language required collapsing the four constructions into two as a function of their presence in Polish. The former comprised SO pronouns and adverb placement, and the latter – definite and indefinite articles. We built a mixed-effects ordinal logistic regression model, including as fixed factors *testing time* (T1, T2, T3), *presence in L1* (yes, no), *grammaticality* (grammatical, ungrammatical), and interaction thereof, as well as Norwegian proficiency.

The results showed a statistically significant effect of presence of a given feature in L1 ($\beta = 1.25$, $p < .001$), but the interaction between the predictor variables was not significant. We further analysed the data with pairwise comparisons for presence in L1 and grammaticality at each testing time, using Bonferroni corrections for multiple comparisons. While statistically significant effects were found in favour of H_5 at all three testing times, this was not the case for H6. Although the difference between constructions present and absent in L1 is significant in the ungrammatical condition at T1 as well, this result is in the opposite direction to the posited hypothesis. As a matter of fact, constructions absent in Polish were always rated higher than those present in the participants' L1. Table 10 shows the *p*-values of the performed comparisons.

Table 10. *p*-values of post-hoc analyses referring to hypotheses H_5-H_6

Hypothesis	T1	T2	T3
H_5: grammatical sentences: present in L1 < absent in L1	**< .001**	**< .001**	**.02**
H_6: ungrammatical sentences: present in L1 > absent in L1	.009	.07	.11

6.3 Proficiency effects

Although the main aim of the study was to examine the role of gradience in CLI from early stages of L3 learning, initial analyses from the pilot study revealed an increase in acceptability of L1 marked constructions with growing L3 Norwegian proficiency. Therefore, this prediction was further investigated in the experimental data. As no Polish session was included at T2, the only comparison can be made between T1 and T3. Figures 5 and 6 present correlations between the ratings of SO pronouns and adverb placement in the ungrammatical condition in L1 Polish and proficiency in L3 Norwegian at T1 and T3, respectively.

Despite an absence of statistically significant effects in the T1 data, the Pearson correlation coefficient points to a weak positive correlation between the ratings of SO pronouns and Norwegian proficiency ($r = 0.27$). This correlation is moderate at T3 ($r = 0.51$), where it is statistically significant ($p < .05$). Although the same correlation coefficient is associated with mean ratings of sentences with adverb placement at T3, this effect is not statistically significant ($p = .26$).

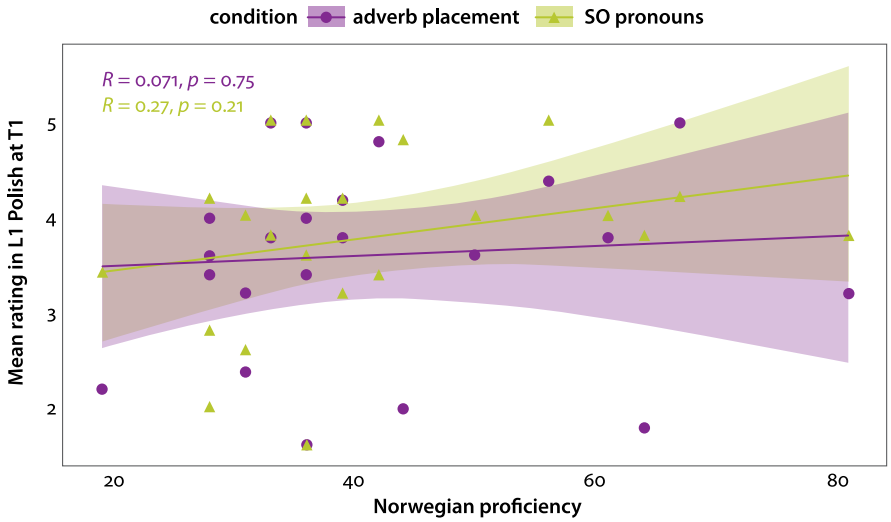

Figure 5. Correlation between the ratings of incorrect sentences with SO pronouns and adverb placement in L1 Polish and L3 Norwegian proficiency (in %) at T1

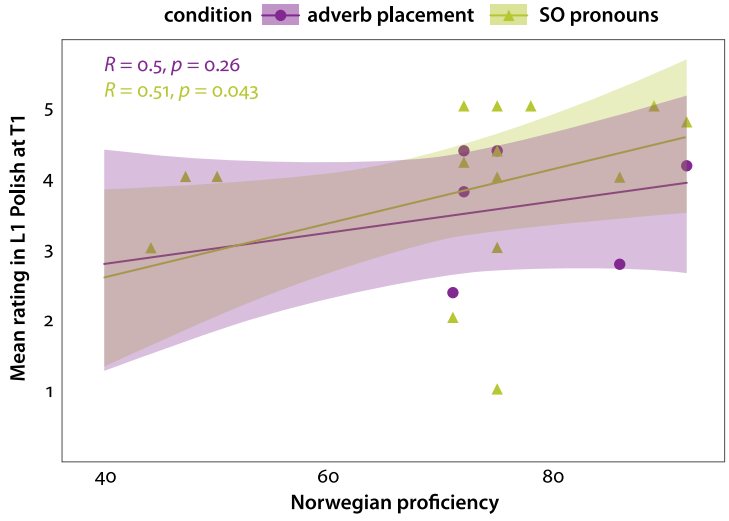

Figure 6. Correlation between the ratings of incorrect sentences with SO pronouns and adverb placement in L1 Polish and L3 Norwegian proficiency (in %) at T3

6.4 Gradient acceptability in L1 Polish

Apart from the main analyses directly related to the research question, we also performed other analyses with a view to providing more context to elucidate the

findings. One of them concerned gradient acceptability of marked constructions in L1 Polish. As there were more participants at T1 than at T3, we checked whether there were any differences between these testing sessions for the 16 participants who completed the whole study. We built a mixed-effects ordinal logistic regression model, with an analogical structure to the one with Norwegian data. *Time, grammaticality*, and *construction* were entered as fixed effects, whereas participants and sentences – as random intercepts. As this set of data concerned the participants' native language, proficiency was not included. The model did not show statistically significant differences for time ($\beta = 3.78$, $p = .57$). Therefore, we focused our analysis on the T1 dataset, which included more participants.

Aiming to determine whether all participants could be grouped according to their level of linguistic conservativism, manifested in a reluctance to accept marked forms, we plotted each participant's mean differences between grammatical and ungrammatical sentences, shown in Figure 7. Each line connects one participant's ratings of two sentences from a pair.

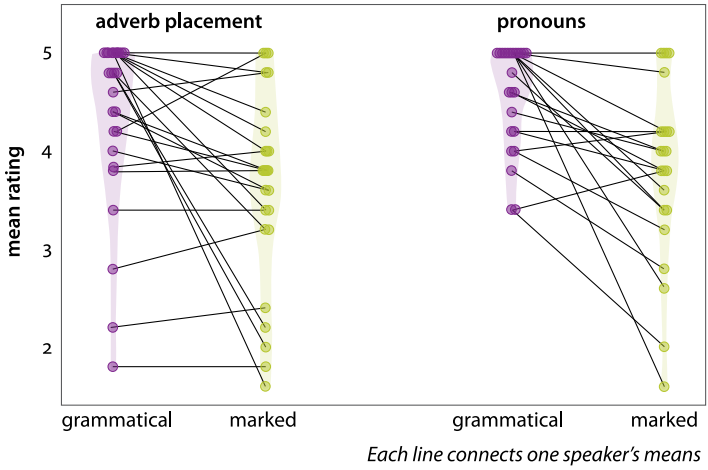

Figure 7. Ratings of grammatical and marked sentences in L1 Polish at T1 for each participant

Subsequently, we fitted a mixed-effects ordinal logistic regression model to the Polish data from T1, with *grammaticality* and *construction* as fixed effects, and *participant* and *sentence* as random intercepts. The model ($\sigma^2 = 3.29$; $ICC = 0.39$; marginal $R^2 = 0.104$; conditional $R^2 = 0.457$) showed statistically significant differences for both *grammaticality* ($\beta = 1.32$, $p < .001$) and *construction* ($\beta = 9.68$, $p = .02$). To gain more insight into the results, we performed *post-hoc* analyses with Bonferroni correction for multiple comparisons. Within each construction, statistically significant results concerned the differences between grammatical and

marked sentences ($p < .001$), whereas the differences between the ratings of adverb placement and those of SO pronouns did not turn out to be statistically significant either for grammatical ($p = .13$) or for ungrammatical sentences ($p = .76$).

7. Discussion

The aim of the study was to address the role played by gradience in L1 in syntactic CLI in L3 Norwegian from the early stages of its acquisition. While differences between grammatical and ungrammatical conditions were negligible at T1, they began to emerge three months later at T2. They were most pronounced for definite articles, which are generally easier to acquire than indefinite ones, and for adverb placement. Unsurprisingly, the participants fared worst in sentences including SO pronouns, which are characterized by a relative difficulty of acquisition (e.g., Helland, 2017). Similar patterns can be observed at T3, i.e., after one academic year from the start of intensive learning of L3 Norwegian. Hence, differences between grammatical and ungrammatical sentences across constructions, more pronounced for adverb placement and definite articles, corroborated previous findings related to differential learnability levels (e.g., Slabakova, 2017).

More importantly for the present purposes, statistical analyses provided rather inconclusive results pertaining to CLI. Firstly, the statistically significant outcome of the mixed-effects ordinal logistic regression model confirmed differences in learnability between constructions, as the participants fared best in their ratings of definite articles in both the grammatical and the ungrammatical condition. However, from the specific hypotheses, only the effects following from H_3, which is the one predicting higher ratings for definite than for indefinite articles in the grammatical condition, were statistically significant, which confirms the selective nature of CLI. In turn, a lack of significant results for the hypotheses including adverb placement and SO pronouns might be related to the neutralization of effects of positive and negative CLI (Westergaard, 2021b), possibly further influenced by gradience in L1 Polish (i.e., parallel rule-sets underlying gradience in L1 may, in fact, be transferred to L3, as hypothesized in Section 2).

While the ratings of grammatical sentences increased with time as predicted, so did those of ungrammatical sentences. This counter-intuitive outcome can be attributed to different processes underlying accepting correct sentences and rejecting incorrect ones. Unless a mistake is detected, there appears to exist a tendency to accept a given sentence. In turn, rejecting an incorrect one requires spotting the mistake, which involves more conscious knowledge of grammatical rules. Hence, the participants might have been relatively lenient in their acceptability judgments as they had yet to establish clear mental representations of the recently

learnt constructions. Presented with a sentence which did not include errors hindering comprehension, they might have been less attentive to detail.

The comparisons between the experimental Polish-English-Norwegian group with the subtractive control group of English-Norwegian bilinguals showed significant differences in the ratings of definite and indefinite articles, whereas almost no significant effects were observed for adverb placement and SO pronouns. We attribute the difference in performance of the two groups on constructions absent in the experimental group's L1 (definite and indefinite articles) and those present in all three languages (adverb placement and SO pronouns) to facilitative CLI for articles for English-Norwegian bilinguals. While native speakers of an article-less language like Polish have difficulty acquiring this construction, potentially due to non-facilitative L1-based CLI, the English-Norwegian bilinguals can only benefit from L1 facilitation, since articles in English and Norwegian are used in a fundamentally similar way. Alternatively, it could be claimed that the significant differences resulted from learning. Yet, although differentiating positive CLI from learning poses a considerable challenge (see Westergaard, 2021b), this explanation is less plausible given the different performance across constructions. If significant differences between groups were driven by learning, they would have probably occurred for all conditions, and not just two of them which are largely similar between Norwegian and English.

The next set of analyses, related to the presence vs. absence of a syntactic construction in the L1, yielded expected results, yet only in the grammatical condition. As predicted, significantly higher ratings were associated with definite and indefinite articles, whereas the performance on sentences with SO pronouns and adverb placement seems to have been negatively influenced by gradient acceptability in L1 Polish and considerable differences with L2 English. In turn, no interaction between *presence in L1* and *grammaticality* detected at any of the testing times indicated a lack of greater differentiation between grammatical and ungrammatical sentences for each pair of constructions.

In order to explore the possibility of the ratings of ungrammatical/marked sentences being influenced by the participants' growing degree of multilingualism, we performed correlations between the two Polish constructions under investigation (adverb placement, SO reflexive pronouns) and Norwegian proficiency. This hypothesis found some confirmation in our data. While correlations between Polish constructions (adverb placement, SO reflexive pronouns) and Norwegian proficiency did not show any statistically significant effects at T1, this changed at T3, where the prescriptively unacceptable use of SO pronouns was positively correlated with Norwegian proficiency. This finding sheds some light on potential results of gradience in L1 on CLI, which could be further explored

based on data from more advanced learners, accompanied by a comparison with Polish monolingual speakers.

Apart from the results related to L3 Norwegian, the collected data provided evidence for gradient acceptability in Polish. As Polish is characterized by a relatively free word order, changing the placement of adverbs of frequency yields acceptable, yet marked sentences. The situation of SO pronouns looks quite different, though. Due to the anti-subject orientation of possessive pronouns, it is prescriptively obligatory to use reflexive possessives for subject-oriented readings. Yet, the participants of our study generally assigned higher ratings to the prescriptively ungrammatical sentences than the grammatical yet marked ones. This quite unexpected finding might have its origins in the process of multilingual acquisition – according to Dewaele and Wei (2013), the acquisition of additional languages increases the tolerance of marginally grammatical, or even ill-formed sentences in the L1. Hence, the study participants, L3 Norwegian students, who were quite proficient in English and knew some additional languages, might have been less sensitive to ungrammaticality in L1, especially for structures which might have been affected by CLI from L2 English.

Given some inconclusive results, especially in the context of CLI, we deem it important to look closer at the limitations of the study. First of all, since our experimental group was rather small due to the inherent nature of longitudinal investigations related to drop-out rates, our results might not be generalizable to other populations. At T1, the group consisted of 24 participants, which dropped to 17 and 16 participants in T2 and T3, respectively. Yet, dropout in longitudinal studies seems inevitable. At the same time, as Norwegian learners are rather rare in Poland, we failed to find more participants at the time of testing. Therefore, in a follow-up study it might be interesting to investigate Polish native speakers who have been acquiring Norwegian in a naturalistic setting to test further our predictions regarding the source(s) of CLI.

A further limitation concerns the participants' level of Norwegian at T1. Although the main aim of this longitudinal study was to trace the learning trajectory of L3 Norwegian from early stages, insufficient competence surely limited the possibility of drawing strong conclusions regarding the contribution of gradience in L1 to CLI. Hence, it might be a good idea to use the cross-sectional design by presenting the same task to a different, more advanced group in future research.

Another issue concerns the stimuli themselves. As there are not many similar syntactic structures between Polish, a synthetic language belonging to the Slavic branch of the Indo-European family, and English and Norwegian, largely analytic Germanic languages, differences in learnability between the selected constructions had to be overlooked. Contrary to the predictions, CLI proved insufficiently

strong to overrule acquisitional difficulties. Nonetheless, learnability cannot be measured in a way enabling us to include this factor into statistical analyses.

What also merits attention is the complexity of the stimuli across constructions. Sentences with definite articles, which are overall relatively easy to acquire, were slightly shorter than those in the remaining three constructions. This might explain higher ratings for both grammatical and ungrammatical sentences including definite articles. Additionally, better performance with definite than indefinite articles might have been strengthened by the absence of adjectives in the former construction, and presence in the latter, for which the sentences were not controlled. As Agebjörn (2021) points out, articles in adjectivally-modified noun phrases are more likely to be omitted by foreign language learners owing to their greater complexity and lower frequency.

Despite the afore-mentioned limitations, the study provided novel evidence that gradience in the L1 contributes to the complexity of CLI in an L3. Statistically significant effects between constructions absent in L1 Polish (definite and indefinite articles) and present therein (adverb placement, SO pronouns) suggest that it might be easier to acquire L3 constructions characterized by a categorical distinction in previously learned languages in comparison to those whose distribution is more variable. Hence, the study managed to investigate CLI in a more nuanced way, by including an overlooked variable, which appears to play a meaningful role.

Finally, we will return to the models of syntactic CLI presented in the introduction of this article. Although the study was not designed to explicitly test their predictions, we will attempt to interpret some of the results in the light of the models' assumptions. Since CLI differed as a function of the property under investigation, instead of being restricted to one language only, the data provide a tentative support for property-by-property models, especially the LPM (Westergaard, 2021a) and the Scalpel model (Slabakova, 2017). The selective nature of CLI is apparent in our data in the differences between articles on the one hand, and SO pronouns and word order, on the other. Facilitation in L3 learning of articles can be attributed to usage-based similarities between L2 English and L3 Norwegian, and an absence of gradient acceptability, present in the case of adverb placement and SO pronouns. Yet, no significant differences were found between grammatical and ungrammatical sentences for the latter two constructions, where syntactic cues from both L1 and L2 competed for activation, eventually leading to a neutralization of effects for ratings in L3 Norwegian (Westergaard, 2021b). Additionally, our data support differential learnability of the constructions under investigation, which follow different developmental trajectories (Slabakova, 2017). Furthermore, the comparison between the experimental group of Polish-English-Norwegian multilinguals with a control group of English-Norwegian bilinguals

sheds some light on CLI patterns as a function of the participants' native language, since significant differences were found for definite and indefinite articles, which do not exist in Polish.

8. Conclusions

The study aimed to investigate syntactic CLI from L1 Polish and L2 English in the acquisition of L3 Norwegian over three testing times, which took place within one year of the onset of Norwegian learning. One of the main research questions addressed related to the effect of gradience in the L1 on acquisition of an L3. As this so-far underestimated variable seems to contribute to the complexity of interactions between the languages a person knows, we believe that our study made an important contribution to the discussion on CLI from a more detailed perspective. Hence, we hope to raise the awareness of the role that gradience in L1 might play in CLI.

Therefore, it seems crucial to continue investigating the effects of gradience in the L1 on L3A. For instance, given that the study participants were instructed learners of Norwegian, it would be interesting to compare their performance with that of Polish-English bilinguals acquiring L3 Norwegian in a naturalistic setting. Additionally, a cross-sectional design, in which participants of more advanced L3 proficiency would be tested for other syntactic constructions characterised by gradient acceptability, is worth considering. With the recently observable renewed interest in gradient acceptability in general linguistic research, we hope that incorporating the role of gradience in the Ln acquisition has proven insightful, paving the way for further similar studies.

Funding

This research was funded by EEA Norway Grants/NCN (GRIEG-1 DEC-2019/34/H/HS2/00495) "Across-domain investigations in multilingualism: Modeling L3 acquisition in diverse settings", granted to Magdalena Wrembel and Marit Westergaard.

Data availability statement

Experimental stimuli prepared for the study and statistical analyses performed for the purposes of the present article are available at https://osf.io/wmhc7/.

Acknowledgements

We are very grateful to Marit Westergaard, and the editors and anonymous LAB reviewers for their most detailed and constructive comments on an earlier version of this manuscript. We would also like to thank Witosław Awedyk, Merete Anderssen and Isabele Nadine Jensen for their essential assistance with the Norwegian stimuli.

References

Agebjörn, A. (2021). Swedish noun-phrase structure in Russian-speaking learners: An explorative study of L1 influence and input-frequency effects. *Journal of the European Second Language Association*, *5*(1), 16–29.

Amaral, L., & Roeper, T. (2014). Multiple grammars and second language representation. *Second Language Research*, *30*(1), 3–36.

Arıbaş, D. Ş., & Cele, F. (2021). Acquisition of articles in L2 and L3 English: The influence of L2 proficiency on positive transfer from L2 to L3. *Journal of Multilingual and Multicultural Development*, *42*(1), 19–36.

Bardel, C., & Falk, Y. (2007). The role of the second language in third language acquisition: The case of Germanic syntax. *Second Language Research*, *23*(4), 459–484.

Bardel, L., & Sánchez, C. (2017). The L2 status factor hypothesis revisited: The role of metalinguistic knowledge, working memory, attention and noticing in third language learning. In T. Angelovska, & A. Hahn (Eds.), *L3 syntactic transfer: Models, new developments and implications*. (pp. 85–101). John Benjamins.

Cho, J. (2022). Online processing and offline judgments of L2-English articles. *Linguistic Approaches to Bilingualism*, *12*(3), 280–309.

Christensen, R. H. B. (2022). ordinal – Regression models for ordinal data. R package version 2022.11–16. https://CRAN.R-project.org/package=ordinal

Dewaele, J.-M., & Wei, L. (2013). Is multilingualism linked to higher tolerance of ambiguity. *Bilingualism: Language and Cognition*, *16*, 231–240.

Falk, Y., Lindqvist, C., & Bardel, C. (2015). The role of L1 explicit metalinguistic knowledge in L3 oral production at the initial state. *Bilingualism: Language and Cognition*, *18*(2), 227–235.

Flynn, S., Foley, C., & Vinnitskaya, I. (2004). The cumulative-enhancement model for language acquisition: Comparing adults' and children's patterns of development in first, second and third language acquisition of relative clauses. *International Journal of Multilingualism*, *1*(1), 3–16.

Francis, E. J. (2022). *Gradient Acceptability and Linguistic Theory*. Oxford University Press.

Goodall, G. (Ed.). (2021). *The Cambridge Handbook of Experimental Syntax*. Cambridge University Press.

Gračanin-Yuksek, M., Lago, S., Fatma Şafak, D., Demir, O., & Kırkıcı, B. (2020). The interpretation of syntactically unconstrained anaphors in Turkish heritage speakers. *Second Language Research*, *36*(4), 475–501.

Helland, H. P. (2017). An empirical L2 perspective on possessives: French/Norwegian. *Oslo Studies in Language*, *9*(2), 75–104.

Hermas, A. (2010). Language acquisition as computational resetting: Verb movement in L3 initial state. *International Journal of Multilingualism*, *7*(4), 343–362.

Hermas, A. (2018). Sources of article semantics in L3 English: Definiteness and specificity. *Linguistics Journal*, *12*(1), 139–168.

Hestvik, A. (1992). LF movement of pronouns and anti-subject orientation. *Linguistic Inquiry*, *23*, 557–594.

Huebner, T. (1983). *A longitudinal analysis of the acquisition of English*. Karoma Press.

Ionin, T., Choi, S. H., & Liu, Q. (2022). What transfers (or doesn't) in the second language acquisition of English articles by learners from article-less native languages? *Linguistic Approaches to Bilingualism*, *12*(2), 133–162.

Jadacka, H. (2013). *Kultura języka polskiego: Fleksja, słowotwórstwo, składnia*. Wydawnictwo Naukowe PWN.

Jaensch, C. (2008). L3 acquisition of articles in German by native Japanese speakers. In R. Slabakova, J. Rothman, P. Kempchinsky, & E. Gavruseva (Eds.), *Proceedings of generative approaches to second language acquisition* (pp. 81–89). Cascadilla Press.

Jensen, I. N., Mitrofanova, N., Anderssen, M., Rodina, Y., Slabakova, R., & Westergaard, M. (2021). Crosslinguistic influence in L3 acquisition across linguistic modules. *International Journal of Multilingualism*, *20*(3), 717–734.

Jin, F. (2009). Third language acquisition of Norwegian objects: Interlanguage transfer or L1 influence? In Y-K. I. Leung (Ed.), *Third language acquisition and Universal Grammar*. (pp. 144–61). Multilingual Matters.

Lago, S., Stutter Garcia, A., & Felser, C. (2018). The role of native and non-native grammars in the comprehension of possessive pronouns. *Second Language Research*, *35*(3), 319–349.

Lemhöfer, K., & Broersma, M. (2012). Introducing LexTALE: A quick and valid Lexical Test for Advanced Learners of English. *Behavior Research Methods*, *44*, 325–343.

Lenth, R., Bolker, B., Buerkner, P., Giné-Vázquez, I., Herve, M., Jung, M., Love, J., Miguez, F., Riebl, H., & Singmann, H. (2023). Estimated marginal means, aka least-squares means. R package version 1.8.7. https://cran.r-project.org/web/packages/emmeans

Li, P., Zhang, F., Yu, A., & Zhao, X. (2020). Language History Questionnaire (LHQ3): An enhanced tool for assessing multilingual experience. *Bilingualism: Language and Cognition*, *23*(5), 938–944.

Master, P. (1997). The English article system: Acquisition, function, and pedagogy. *System*, *25*, 215–232.

Mertins, B. (2021). On the interpretation of possessives in Czech: An experimental approach. *Oslo Studies in Language*, *12*(2), 97–126.

Nikolaeva, L. (2014). The secret life of pronouns [Unpublished doctoral dissertation]. Massachusetts Institute of Technology.

R Core Team. (2022). *R: A language and environment for statistical computing* [Computer software]. R Foundation for Statistical Computing. https://www.R-project.org/

Rothman, J. (2010). On the typological economy of syntactic transfer: Word order and relative clause high/low attachment preference in L3 Brazilian Portuguese. *International review of applied linguistics in language teaching*, *48*(2–3).

Rothman, J. (2011). L3 syntactic transfer selectivity and typological determinacy: The typological primacy model. *Second Language Research*, *27*(1), 107–127.

Rothman, J. (2015). Linguistic and cognitive motivations for the Typological Primacy Model (TPM) of third language (L3) transfer: Timing of acquisition and proficiency considered. *Bilingualism: language and cognition*, *18*(2), 179–190.

Schindler, S., Drożdżowicz, A., & Brøcker, K. (Eds.). (2020). *Linguistic intuitions: Evidence and method*. Oxford University Press.

Schwartz, B.D., & Sprouse, R.A. (2021). The Full Transfer/Full Access model and L3 cognitive states. *Linguistic Approaches to Bilingualism*, *11*(1), 1–29.

Sharwood Smith, M., & Kellerman, E. (1986). Crosslinguistic influence in second language acquisition: An introduction. In *Crosslinguistic Influence in Second Language Acquisition*. Pergamon.

Slabakova, R. (2017). The scalpel model of third language acquisition. *International Journal of Bilingualism*, *21*(6), 651–665.

Sorace, A., & Keller, F. (2005). Gradience in linguistic data. *Lingua*, *115*, 1497–1524.

Vikner, S. (1995). *Verb movement and expletive subjects in the Germanic languages*. Oxford University Press.

Westergaard, M., Mitrofanova, N., Mykhalyk, R., & Rodina, Y. (2017). Crosslinguistic influence in the acquisition of a third language: The Linguistic Proximity Model. *International Journal of Bilingualism*, *21*(6), 666–682.

Westergaard, M. (2021a). L3 acquisition and crosslinguistic influence as co-activation: Response to commentaries on the keynote 'Microvariation in multilingual situations: The importance of property-by-property acquisition'. *Second Language Research*, *37*(3), 501–518.

Westergaard, M. (2021b). Microvariation in multilingual situations: The importance of property-by-property acquisition. *Second Language Research*, *37*(3), 379–407.

Address for correspondence

Sylwiusz Żychliński
Faculty of English
Adam Mickiewicz University
ul. Grunwaldzka 6
60-780 Poznań
Poland

sylwiusz@amu.edu.pl

Co-author information

Anna Skałba
Faculty of English
Adam Mickiewicz University
anna.skalba@amu.edu.pl

Kamil Kaźmierski
Faculty of English
Adam Mickiewicz University
kamil.kazmierski@amu.edu.pl

Magdalena Wrembel
Faculty of English
Adam Mickiewicz University
magdala@amu.edu.pl

Publication history

Date received: 9 February 2023
Date accepted: 12 October 2023
Published online: 22 December 2023