Transfer effects in gender assignment and gender concord in L3 Swedish: A case study

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Abstract
This case study examines transfer effects in the acquisition of grammatical gender in L3/Ln. A learner of L3 Swedish, who had previously acquired two grammatical gender systems: one in his native Polish and the other in his non-native Norwegian, participated in three tasks: an online gender decision task, an offline gender decision task, and a speeded acceptability judgement task on determiner phrases (indefinite article + noun). Accuracy scores in all three tasks reveal robust transfer from Norwegian, but not from Polish. The transfer from Norwegian determines two processes inherent to grammatical gender, i.e. gender assignment and gender concord. However, response latencies in the online gender decision task point to competition between the Norwegian and Swedish gender systems at the level of gender retrieval, suggesting that target-like gender representations in Swedish are developing. Since transfer is traditionally claimed to be situated at the level of linguistic representation, it is assumed that the learner in this study temporarily developed a shared grammatical gender system for Norwegian and Swedish.
Key words: third language acquisition, language transfer, grammatical gender, Swedish, Norwegian, Polish

1. Introduction

Languages differ in the way they classify nouns into grammatical gender categories. Many languages, such as Modern English, do not have grammatical gender at all. Of those that do, some display two gender categories, e.g., *common* and *neuter* in Swedish. Yet other languages have three gender categories, e.g., *masculine*, *feminine*, and *neuter* in Norwegian or Polish. These distinctions have to be learned in order to produce grammatically correct utterances, e.g., to compute agreement. Both anecdotal and empirical evidence indicates that the acquisition of grammatical gender poses a great challenge to adult L2 learners (e.g., Andersen 1984, Franceschina 2005; Dewaele & Véronique 2001; Grüter; Lew-Williams & Fernald 2012; Hopp 2016; among others). This is also true for learners whose L1 exhibits grammatical gender, although they may have an advantage over speakers of non-gendered L1s (e.g., Sabourin 2001). A major reason why grammatical gender represents a problem for L2 learners is that it requires both morphological and syntactic knowledge. On the one hand, L2 learners have to assign the correct gender value to a noun based on its morphological properties. On the other hand, they are faced with the task of mastering concord (or agreement), which is a syntactic operation (for a discussion, see Meisel 2011).

Besides these difficulties, it has also been repeatedly demonstrated that the acquisition and use of grammatical gender in L2 is affected by L1 to some extent,

depending on typological distance, gender transparency, and other linguistic and non-linguistic factors (e.g., Sabourin, Stowe & de Haan 2006; Lemhöfer, Schriefers & Hanique 2010; Ellis, Conradie & Huddlestone 2012; Bianchi 2013, for an overview, see Sá-Leite, Fraga & Comesaña 2019). Relatively less research, however, has been conducted on the acquisition of grammatical gender in trilingual speakers. It remains unclear what role previous acquired languages play in this process, and how that process is shaped by other learner-internal and external factors. In addition, previous research has mostly focused on the representation of symmetric grammatical gender systems, ignoring the situation in which gender categories mismatch between languages (but see Lemhöfer, Spalek & Schriefers 2008; Klassen 2016).

The present case study investigates the mastery of grammatical gender in L3/Ln[1] at both representation and processing levels by looking at a language constellation that has not previously been studied. A Polish learner of Swedish who was advanced in English and Norwegian took part in three experiments: an offline gender decision task, an online gender decision task, and a speeded acceptability judgement task on determiner phrases. More specifically, the aim of this study is to examine the influence of previously acquired native vs. non-native grammatical gender systems on gender assignment and gender concord in Swedish as L3/Ln. The study adopts a multi-task approach to determine whether cross-linguistic influence will occur uniformly across the tasks, indicating changes at the level of representation, or only in selective contexts, indicating influence at the processing level (Paradis 2004: 188; Grosjean 2016: 21; Rothman, González Alonso & Puig-Mayenco 2019).

2. Gender assignment and gender concord

In this study, it is assumed that grammatical gender is an inherent property of a noun, as opposed to number and case (Corbett 1991: 146), and that it is represented on the noun's lemma, i.e., as an abstract feature stored in the lexicon (Levelt, Roelofs & Meyer 1999). Accordingly, all nouns are assigned gender in the lexicon. There are, in principle, three types of assignment rules: semantic, morphological, and phonological. Languages differ in the way they make use of these rules. With regard to morphological and phonological cues, languages exhibit different degrees of transparency. Spanish, for example, is considered to have a transparent gender system, in which the gender of almost all nouns can reliably be predicted by their suffix (*-o* for masculine and *-a* for feminine) (Harris 1991). In turn, some languages, such as Norwegian, are characterised by opaque gender assignment. Assignment rules are not further discussed here, since this study only involves non-transparent nouns in order to exclude the possible influence of gender cues and focus exclusively on the impact of previous languages.

[1] In this study, I define L3 as referring to "all languages beyond the L2 without giving preference to any particular language" (De Angelis 2007: 11). I shall use the term *L3/Ln* to indicate third and additional languages (e.g., García Mayo & Rothman 2012, Slabakova 2017).

Unlike nouns that are assigned gender in the lexicon, other elements such as determiners, adjectives, and demonstratives need agreement (concord) with the noun to receive gender. A target-like gender value has to be retrieved from the lexicon in order to select the correct determiner, such as an indefinite article.

3. L2 acquisition of grammatical gender and language transfer

Numerous studies have demonstrated that language transfer plays a crucial role in second language acquisition in many domains (e.g., Faerch & Kasper 1987; Gass & Selinker 1993; Meisel 2000; Odlin 2003; Muysken 2013, among others). In this study, it is assumed that transfer is an instantiation of cross-linguistic influence that refers to reduplication of a representation from a previously acquired language. Transfer thus affects language representations above and beyond their use in comprehension and production (e.g., Rothman et al. 2019: 24). Such a view of language transfer implies that L1 effects in the domain of grammatical gender should be detectable in both gender assignment and gender concord. Moreover, if language representations are involved, transfer should affect offline and online performance to a similar extent. However, influence between two separate language systems is also possible. Such types of cross-linguistic influence are referred to as *cross-language effects* and entail "influence on the processing of any given property among linguistic systems that have stable representations for that property" (Rothman et al. 2019: 24).

Transfer effects have frequently been found in the development of grammatical gender in adult L2 learners (Sabourin et al. 2006; Lemhöfer et al. 2010; Ellis et al. 2012). In their study on L2 knowledge of grammatical gender, Sabourin et al. (2006) investigated the role of transfer in the acquisition of the Dutch grammatical gender system by adult L1 speakers of German, English and a Romance language (French, Italian or Spanish). Whereas German and Dutch have a similar grammatical gender system, the grammatical gender systems of these Romance languages are not congruent with the Dutch system. Moreover, English does not have grammatical gender, but only semantic gender in the pronominal system. In the first task, a simple gender decision task, all groups were equally able to assign the correct gender to Dutch nouns, although having gender in L1 resulted in higher accuracy, especially in the case of similar gender systems. In the second task, agreement between the noun and the relative pronoun was examined. The results showed that the German group performed best (but worse than native speakers), the Romance group performed well above chance (but worse than the German group), and the English group performed at the level of chance. The authors interpreted these results as evidence for transfer from L1, which depends more on the similarity of gender marking in L1 and L2 than on the presence of gender in the L1 itself.

Similarly, Lemhöfer et al. (2010) investigated cross-language effects in the acquisition of the Dutch grammatical gender system by native speakers of German. In a picture naming task, participants were asked to name pictures using gender-marked phrases. Importantly, nouns differed in gender compatibility and cognate status with respect to German. In addition, participants were trained on this task and

given feedback concerning their errors. The results showed that both gender compatibility and cognate status had an impact on response accuracy, assignment certainty, and consistency. Feedback reduced errors by half, but the number of incorrect responses was not affected by the certainty level. The authors concluded that transfer from L1 plays an important role in creating both correct and incorrect L2 gender representations.

Research on grammatical gender in L3/Ln is virtually non-existent. An exception is the EEG study conducted by Keidel Fernández (2016), which examined the processing of gender agreement incongruences in L3 Spanish by native speakers of Swedish that were fluent in L2 English. She found evidence for a stronger influence of L2 English, based on the finding of a P300 effect[2] as a response to the processing of adjective agreement in L3. Since the P300 effect is associated with strategic processing of language, Keidel Fernández (2016) supposed it was possible that the morphosyntactic transfer from L1 Swedish to L3 Spanish was processed in a less automatic mode than from L2 English. In turn, verb agreement, which is present in English, did not engender this effect, thus indicating that L2 English suppressed the influence of the L1 Swedish grammatical gender system.

More recently, Brown (2020) investigated the acquisition of grammatical gender at the initial stage of L3 acquisition. Beginner learners of German with L1 English/L2 Spanish and L1 Spanish/L2 English participated in a grammaticality judgement task in which their ability to identify gender errors was measured. The results showed that L2 Spanish learners outperformed L1 Spanish learners, which provides support for the *L2 Status Factor Hypothesis*. According to Brown (2020), an alternative explanation could be increased metalinguistic knowledge of grammatical gender due to instruction in L2.

Finally, when it comes to grammatical gender acquisition in L2 Swedish among adults, there is, however, at least one extensive investigation available. Andersson (1992) investigated the development of grammatical gender in Swedish as L2 among children, early learners, and late learners with different L1s (e.g., Arabic, Spanish, and Polish). He stated that "there are no clear cases of first language influence on the process of acquiring the Swedish gender system. This can be explained by reference to the fact that there is nothing to transfer" (Andersson 1992: 206). This outcome is surprising insofar as there is indeed something to transfer, because all the L1s of the participants have a grammatical gender system. The author claimed that grammatical gender is not vulnerable to cross-linguistic influence, but he did not exclude transfer as a powerful force of second language acquisition in other language areas.

[2] The P300 component is one of the most studied event-related potentials (ERPs), which refer to the measured electrophysiological brain response that is the direct result of a specific sensory, cognitive, or motor event (Samuels & Zasler 2018). The P300 component can be observed in a time window between 300 to 600 ms after stimulus onset and is generally claimed to reflect the occurrence of cognitive and attentional processes (Polich 2007).

As far as the acquisition (and processing) of grammatical gender in L3/Ln Swedish is considered, there are, to the best of my knowledge, no studies that address this issue.

To sum up, there are only two studies on the acquisition of grammatical gender in L3/Ln (i.e., Keidel Fernández 2016; Brown 2020) and none of them investigated L3/Ln grammatical gender at both processing-level and representation-level. The present study aims to bridge this research gap by combining offline with online measures. The following section addressed the question of how grammatical gender is represented and processed in the bilingual lexicon.

4. Grammatical gender in the bilingual lexicon

The term *mental lexicon* refers, broadly speaking, to a speaker's total knowledge of words in their language, including information about their form, meaning and frequency, as well as about their syntactic constraints and lexical associations (Aitchison 2012). In its early years, research on the bilingual mental lexicon was concerned with the question of whether lexical representations of the two languages are stored together (the integrated view) or distinctly (the separate view) (e.g., Kolers 1963; Kroll & de Groot 1997). Most of the studies on the architecture of the bilingual lexicon have been focused on interactions between L1 and L2 at the conceptual (Kroll & Stewart 1994 Kroll & de Groot 1997) and at the lexical level (de Groot & Nas 1991; Vigliocco, Lauer, Damian & Levelt 2002). The evidence provided by these studies appears to support the view of a partially integrated bilingual mental lexicon, with meanings and/or concepts, being most likely to be shared between the two languages (for an overview, see Bobb & Kroll 2018). To gain insight into the organisation of the bilingual mental lexicon, researchers have mostly used a variety of reaction-time tasks, such as lexical decision or cross-language priming (e.g., Altarriba & Basnight-Brown 2009). In these tasks, reaction times are assumed to indicate (stronger) links between the components of the two mental lexicons being studied.

In contemporary research, the bilingual mental lexicon is no longer seen as a static "store", but rather as a processing system (e.g., Libben & Goral 2015). Accordingly, current accounts of bi- and multilingual lexicons have shifted from the question of shared vs. distinct systems to the question of selective vs. non-selective lexical access. The evidence to date suggests that words from both languages are always active, to varying degrees (Libben & Goral 2015; Bobb & Kroll 2018). For example, studies on the recognition of cognates, i.e., words that share formal and semantic characteristics across languages, have shown that bi- and trilingual speakers react more quickly to cognates than to non-cognates in lexical decision tasks (e.g., Costa, Caramazza & Sebastian-Galles 2000; Szubko-Sitarek 2011).

Focusing exclusively on form and meaning, however, is not sufficient, because words are also related to lexical-syntactic information, such as grammatical gender. Processing of grammatical gender in the mental lexicon has been the subject of many studies (e.g., Costa, Kovacic, Franck & Caramazza 2003; Salamoura &

Williams 2007; Klassen 2016). Most of them have applied online tasks, in which participants are asked to name pictures under time pressure, or perform timed lexical decisions, to make claims about the architecture of the gender system in the bilingual lexicon. In this respect, one can consider two main hypotheses regarding the organisation of the two gender systems. The advocates of an *integrated view of bilingual gender representation* (e.g., Salamoura & Williams 2007; Klassen 2016) contend that gender values are shared across languages in a fused system. The basis for this view is the finding that the activation of the gender of a word in the target language entails the activation of the gender of the corresponding noun in the non-target language. This cross-language activation results in shorter reaction times to nouns that share the same gender in L1 and L2. Conversely, reaction times became longer if the gender differs between L1 and L2.

Under the *autonomous view of bilingual gender representation*, the two gender systems of a bilingual function independently from one another. This view is based on the observation that the processing of grammatical gender in the target language is sometimes not affected by the non-target language; for example, if there is no difference in reaction times in the case of gender match between languages relative to a baseline condition (e.g., Costa, Kovacic, Franck & Caramazza 2003). It must be noted, however, that the evidence in favour of interaction between the two grammatical gender systems clearly prevails. What remains to be examined in more depth is the role of factors modulating cross-language activation of gender, such as the characteristics of the gender systems of a bilingual, and other variables which affect the degree and direction of cross-linguistic influence more generally (for an extensive discussion, see Sá-Leite et al. 2019).

Previous research has also pointed to a dissociation between the knowledge of grammatical gender and the ability to use that knowledge under processing conditions in L2 (Sabourin & Stowe 2008; Bobb, Kroll & Jackson 2015). At the same time, many studies have found that grammatical gender retrieval shows a similar time course in L1 and L2 lexical access (Shantz & Tanner 2016). The proximity of the two gender systems has been argued to facilitate grammatical gender retrieval in L2 (Paolieri, Padilla, Koreneva, Morales & Macizo 2019). It is an open question, however, how previously acquired languages may affect the accuracy of gender processing in L3/Ln.

Bearing the distinction between transfer and cross-language effects adopted in this study in mind, the two grammatical gender systems of a bilingual can interact with each other without being shared (e.g., Jarvis 2009). The activation of the grammatical gender value of a translation equivalent in the non-response language can reflect processing-related cross-linguistic influence, which corresponds to momentary slips and manifests itself inconsistently (Rothman et al. 2019: 24). Accordingly, cross-language effects of gender cannot be related to a shared grammatical gender system at the level of representation unless they are observed consistently. In a multi-task approach, the present case study seeks to determine whether cross-linguistic influence at the level of grammatical gender in L3/Ln will

be observed uniformly across the tasks, thus suggesting transfer, or will be limited to performance under time pressure, thus suggesting cross-language effects.

In what follows, some basic tenets of L3/Ln acquisition research are presented, with particular focus on models and hypotheses relevant to the present case study.

5. Cross-linguistic influence in L3/Ln acquisition and processing

All cases of non-native language acquisition processing have for the most part been analysed in terms of L2, irrespective of the number of languages which have already been acquired. In the last two decades, however, researchers have increasingly begun to differentiate between L2 and L3/Ln (e.g., Hufeisen 2003; De Angelis 2007; Hammarberg 2009). The rationale for the uniqueness of research on trilingualism is the assumption that the acquisition of L3/Ln qualitatively differs from the acquisition of L2 due to several properties which characterise neither L1 nor L2 acquisition (e.g., Aronin & Hufeisen 2009).

In search of the main source of cross-linguistic influence in L3/Ln acquisition, researchers put forward several models and hypotheses accounting for whether L1 or L2 affects L3/Ln the most. However, they are mostly based on off-line methods or refer to production in L3/Ln. One of the possible scenarios is the privileged role of L1, although this somewhat lacks solid empirical underpinning (for an overview, see Slabakova 2017). De Angelis (2007: 29) points out two interacting constraints that concur in inhibiting the L1 in favour of non-native language influence, namely perception of correctness and association of foreignness. The former predicts that multilinguals resist using L1 in L3/Ln as L1 is perceived to be incorrect from the start. The latter is related to the cognitive association which learners establish between their non-native languages. Consequently, L2 has been shown to affect L3/Ln more than L1.

According to the *L2 Status Factor Hypothesis* proposed by Bardel and Falk (2012: 62), "the L2 status is an outcome of higher degree of cognitive similarity between L2 and L3 than between L1 and L3". The existing evidence appears to support the view that the non-nativeness of languages is a driving force in L2 to L3/Ln transfer (Williams & Hammarberg 1998; Bohnacker 2006; Falk & Bardel 2011; Bardel & Falk 2012). Notwithstanding this, some researchers are inclined to the notion that neither L1 nor L2 have a privileged status with respect to cross-linguistic influence (e.g., Flynn, Foley & Vinnitskaya 2004; Slabakova 2017; Westergaard 2021). Under an alternative view, it is language distance (also typological similarity or proximity) which plays the decisive role. Probably the most influential proposal related to this factor is the *Typological Primacy Model* (Rothman 2011; 2015), which assumes that learners are more likely to transfer from the more similar language in global terms. Therefore, both L1 and L2 may constitute a source of influence. It follows that cross-linguistic influence is a multifaceted phenomenon that manifests itself differently depending on several linguistic and non-linguistic factors.

6. Grammatical gender in Swedish, Norwegian, and Polish

The grammatical gender system in modern Germanic languages is either a continuation of the inherited Proto-Indo-European threefold system (German), is reduced to two classes (Swedish), or is fully reduced (English) (Skrzypek 2010: 91). Currently, the Swedish gender system includes two categories: neuter (*neutrum*) and common (*utrum*). The latter value is a continuant of Old and Middle Swedish masculine and feminine which have coalesced into one gender value (Davidson 1990). The diachronic background makes it legitimate to treat modern Swedish common gender as a counterpart of German masculine and feminine. In Swedish, grammatical gender is visible in agreement forms in the singular, e.g., in indefinite and definite articles, and demonstrative pronouns (Hornscheidt 2003: 341). There are two indefinite articles: *en* (common) and *ett* (neuter), as well as two variants of the definite suffix in the singular:

Gender marker	Common gender	Neuter gender
	*häst**en***	*hus**et***
Definite article	'horse-the'	'house-the'
	the horse	the house
	en häst	*ett hus*
Indefinite article	'a horse'	'a house'
	a horse	a house

Swedish also has semantic gender in the third person singular pronouns *hon*/*han*. Definite articles and semantic gender are not further discussed here since they are beyond the scope of the present study.

Norwegian distinguishes between three gender categories: masculine, feminine, and neuter, where masculine is the default (Trosterud 2001). Grammatical gender is visible in agreement forms in the singular, e.g., in indefinite and definite articles, and demonstrative pronouns. There are three indefinite articles: *en* (masculine), *ei* (feminine), and *et* (neuter). All feminine nouns can also be inflected using masculine gender in *Bokmål*. In turn, the use of all three genders is obligatory in *Nynorsk* (e.g., Strandskogen & Strandskogen 1995). *Nynorsk* and *Bokmål* are the two written standards in Norwegian, the latter being the more frequent one (e.g., Venås 1993).

Grammatical gender in Polish traditionally classifies into masculine, feminine, and neuter. This view, however, has frequently been called into question. Descriptive linguists, such as Grzegorczykowa, Laskowski, and Wróbel (1999), put forward that Polish nouns can be divided into five gender classes depending on their form in the accusative: masculine human, masculine animate, masculine inanimate, feminine, and neuter (for more detail, see Kryk-Kastovsky 1999). However, such proposals which go beyond the threefold division are not relevant to the present study, since Swedish, the language under investigation, has no case system. There are no articles in Polish (but see Czardybon 2017), yet grammatical gender is encoded on adjectives and demonstratives.

English does not have grammatical gender at all. Although English has two indefinite articles *a* and *an*, as well as one definite article *the*, they do not carry grammatical gender information and show no morphological agreement.

Swedish and Norwegian are claimed to have non-transparent grammatical gender systems with a small number of reliable assignment rules that have exceptions. In Norwegian, for example, the non-transparency of the grammatical gender system is thought to be the cause of difficulties in the acquisition of grammatical gender among children (Rodina & Westergaard 2015). Polish, in turn, exhibits many gender-to-ending regularities which apply to approximately 99% of all Polish nouns, meaning that grammatical gender assignment in Polish is predictable by the morphological shape of the noun in the nominative singular (Stefańczyk 2007). As concerns gender agreement, in all three languages gender is marked within the determiner phrase (DP) itself, on adjectives and determiners, such as articles or demonstratives, e.g., *ten stół* ('this$_{\text{-M}}$ table'). Traditionally, it is claimed that Polish has no articles. However, the demonstrative *ten* is currently developing towards the grammaticalisation of an (anaphoric) definite article (Czardybon 2017).

7. Research questions and hypotheses

Bearing the previous discussion in mind, the main research questions are as follows:
RQ1 Is there evidence for transfer in gender assignment and gender concord in L3/Ln, and if so, which language constitutes the primary source of transfer: the native or the non-native language?
RQ2 Are there differences between offline and online performance with regard to gender assignment in L3/Ln?

The first hypothesis is that transfer will occur in both gender assignment and gender concord (see Sabourin et al. 2006; Lemhöfer et al. 2010; Ellis et al. 2012; Bianchi 2013), assuming that transfer refers to permanent changes at the level of linguistic representations (Rothman et al. 2019). The second hypothesis is that Norwegian will be the main source of transfer because i) it is the participant's previous non-native language (see Williams & Hammarberg 1998; Bohnacker 2006; Falk & Bardel 2011; Bardel & Falk 2012), and ii) it is typologically related to the target language, i.e., Swedish (see Flynn et al. 2004; Slabakova 2017; Rothman 2015; Westergaard 2021). The third hypothesis is that the participant's performance in the online task will be less accurate than his performance in the offline task because a dissociation between the knowledge of grammatical gender and the ability to use it during processing has been reported in previous literature (see Sabourin & Stowe 2008; Bobb et al. 2015).

8. The case study – Marcel

Marcel is a native speaker of Polish. He studied Norwegian at university in Poland for three years and received a bachelor's degree. He reached C1 level in Norwegian according to the CEFR (*Common European Framework of Reference*) and identifies himself as such. During three years of study, he received ca. 900 hours of professional language instruction and ca. 900 hours of professional courses that

covered topics related to linguistics, literature, history, and culture, taught both by native speakers of Norwegian, and Polish academics. After graduating in Norwegian, Marcel started studying Swedish at university in Poland. At the moment of testing, he had completed the second term and reached A2 level. During both terms, he was provided with 270 hours of instruction in Swedish and 270 hours of professional courses. The experimental session took place two months after the end of the second term. For this reason, Marcel's current contact with Swedish is limited to his individual activities with written texts and podcasts. He is using much more Norwegian and English, since, as he claims, his proficiency level in these languages enables him to read and listen more than in Swedish, and he prefers Norwegian over Swedish. Marcel has also learned English at school since he was 6 and completed C1 level.

In terms of order of acquisition, Polish is his L1, English his L2, Norwegian his L3, and Swedish his L4. Since English has no grammatical gender, there are only two possible sources of influence in that domain: native Polish and non-native Norwegian. Therefore, in this study interactions between three grammatical gender systems are examined.

A language questionnaire was completed by Marcel to provide information on his language biography. Apart from the questions concerning the onset of the acquisition of Swedish and Norwegian, and the length of exposure to these languages in years, the questionnaire included Marcel's self-rated proficiency level in Norwegian and Swedish on a scale of 1–10. Marcel was also asked to assess his recent input, separately for listening and reading, and his recent output, separately for speaking and writing, in hours per week. The questionnaire was administered in Excel. Table 1 presents the information gathered.

Table 1. Language experience and proficiency ratings of Marcel

	Swedish	Norwegian
Proficiency (CEFR)	A2	C1
Self-reported proficiency (1-10)	4	7
Age of onset of acquisition	21;0	18;0
Length of exposure	1;0	4;0
Reading in hours per week (currently)	1	10
Listening in hours per week (currently)	1	7
Speaking in hours per week (currently)	0	1
Writing in hours per week (currently)	0	7

Given the differences between Swedish and Norwegian with regard to proficiency, length of exposure, and current contact with these languages, Norwegian can be clearly classified as Marcel's dominant language.

Additionally, Marcel was asked a couple of questions regarding his multilingualism. He claimed that he consciously made use of Norwegian when learning Swedish. Importantly, he often used Norwegian words and "hoped that they squared with Swedish vocabulary". However, he considered this strategy to be harmful in language learning as "it leads to relying on the lexicon of a non-target language instead of trying to say what has to be said in the target language".

Marcel completed the experiment in two different sessions. In the first session, he i) provided background information, focused on his linguistic experience, ii) performed Experiment 1, which was divided into an online Gender Decision Task and an offline Gender Decision Task, and iii) completed Experiment 2, which consisted in an online Speeded Acceptability Judgement Task. In Experiments 1 and 2, the target language was Swedish. The instructions were always provided in Swedish.

In the second session, which took place a week after the first session, Marcel completed a control task in Norwegian that consisted in an offline gender assignment task, to investigate whether he had acquired the relevant property in Norwegian. This was motivated by the fact that in all L3/Ln studies it is crucial to control whether the relevant property has been acquired in the previous languages and can thus be the source of transfer. This gender assignment task took place a week after the first two gender decision tasks in order to avoid the possible influence of Swedish on gender assignment in Norwegian as a result of being in multilingual mode. The instructions for this task were provided in Norwegian. All tasks were web-based because of the COVID-19 pandemic.

9. Experiment 1: Gender Decision Task (GDT)

9.1 Materials

Grammatical gender congruency between Polish, Norwegian, and Swedish nouns was manipulated to create four conditions, with six target nouns each (see Table 2). The main three conditions concerned the neuter gender, which could be either fully congruent between all languages (*full-congruent neuter*), e.g., *träd* ('tree'), congruent with Norwegian but not with Polish (*Polish-incongruent neuter*), e.g., *spel* ('play'), or congruent with Polish but not with Norwegian (*Norwegian-incongruent neuter*), e.g., *fält* ('field'). In the incongruent conditions, the respective gender of Polish or Norwegian translations could be either feminine or masculine. In the *full-congruent common* condition, the gender of Swedish nouns was always common and the Polish and Norwegian translations were masculine or feminine, e.g., *natt* ('night'). The gender of the Norwegian translations was determined based on Nynorsk, which is what Marcel was learning. The experiment also included forty-six other nouns which were used for another study (not reported here).

The inclusion criterion for the nouns in the present study was a gender match or mismatch between Polish, Norwegian, and Swedish. The nouns were selected so that they were similar with respect to variables that influence lexical processing, if compared across the four conditions. Therefore, they were matched as closely as possible for number of letters, frequency in Swedish using the *Swedish Kelly-list* (https://spraakbanken.gu.se/en/projects/kelly), similarity to Norwegian, English, and Polish, as well as for cumulative similarity. Similarity was measured using the *AWSM Tool* (https://awsm-tools.com) which calculates text resemblance based on Levenshtein distance and length of source/target nouns. There were no significant differences between the four conditions with respect to any of these variables, as revealed by a Kruskal Wallis *H* test (*Mean no. of letters*: $H(3) = 0.70$, $p = 0.951$, η^2

= 0.09; *Mean freq.*: $H(3) = 1.13$, $p = 0.890$, $\eta^2 = 0.08$; *Mean sim. to Norwegian*: $H(3) = 1.28$, $p = 0.865$, $\eta^2 = 0.08$; *Mean sim. to English*: $H(3) = 1.61$, $p = 0.808$, $\eta^2 = 0.07$; *Mean sim. to Polish*: $H(3) = 9.37$, $p = 0.053$, $\eta^2 = 0.15$; *Mean cumulative sim.*: $H(3) = 3.45$, $p = 0.486$, $\eta^2 = 0.02$). Noun ending in Swedish was controlled so that gender could not be predicted by the morphophonological shape of nouns.

Table 2. Characteristics of the target nouns for each of the four conditions

Condition	Mean no. of letters	Mean freq.	Mean sim. to Norwegian	Mean sim. to English	Mean sim. to Polish	Mean cumulative sim.
Full-congruent common	4.7	61.9	69.0	21.0	16.6	35.5
Full-congruent neuter	4.4	73.6	60.8	17.0	8.0	28.5
Polish-incongruent neuter	5.0	65.6	74.5	22.1	3.3	33.3
Norwegian-incongruent neuter	4.6	77.6	73.1	32.0	33.6	46.2

9.2 Procedure

The GDT consisted of two parts. In the first part, which was an online test, Marcel was presented with the stimuli on a computer screen. He was asked to decide as quickly as possible which gender class, *utrum* or *neutrum*, the stimulus belongs to. The arrows 1 (*utrum*) and 0 (*neutrum*) were used, in order to avoid possible confusion with letter signs. The task began with a written instruction in Swedish explaining the experimental procedure. Marcel was instructed that he only had 2 seconds to make decision between the categories *utrum* and *neutrum*. Before each stimulus, a fixation dot was presented for 500 ms. The stimulus remained on the screen for 2000 ms. The inter-trial interval was 1000 ms. The presentation of the stimuli was controlled by PsyToolkit, a web-based software for programming and running reaction-time experiments (Stoet 2010; 2017). This method has been commonly used in psycholinguistic research (e.g., Pot, Keijzer & De Bot 2018).

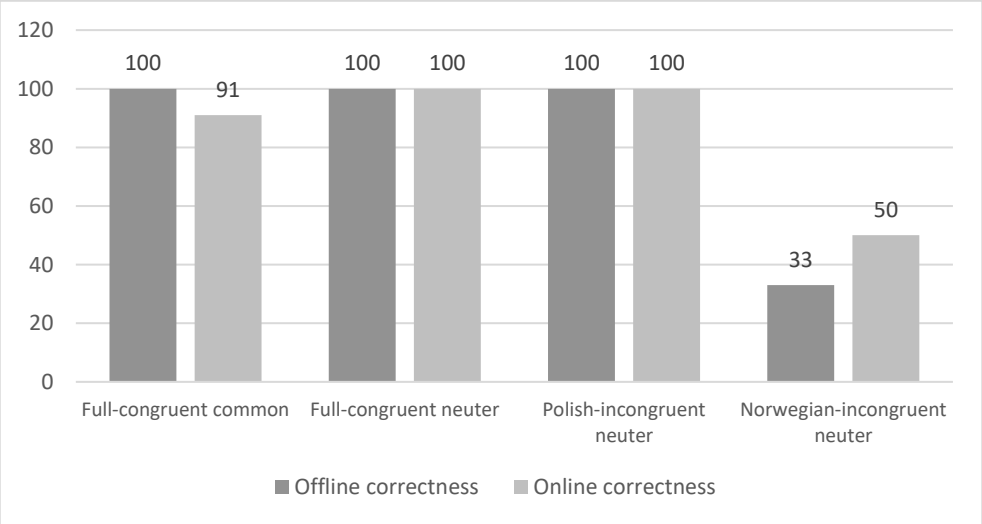
In the second part, which was an offline test, Marcel was first confronted with a list of the same nouns in a text editor and was asked to assign gender categories to them with no time limit imposed. He was instructed to use only two letters: *u* (*utrum*) or *n* (*neutrum*).

9.3 Results

Both offline and online results show that Marcel correctly assigned the gender to all nouns in the *full-congruent neuter* condition (i.e., the nouns of neuter gender in all languages) and the *Polish-incongruent neuter* condition (i.e., the nouns of neuter gender in Swedish and Norwegian, but of masculine or feminine gender in Polish). With reference to the *full-congruent common* condition (i.e., the nouns of common

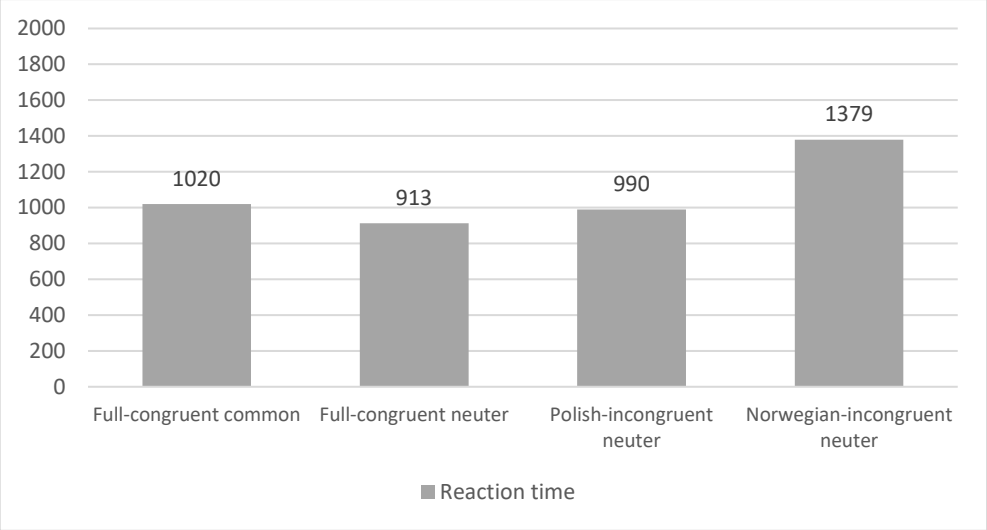
gender in Swedish, and of masculine or feminine gender in Polish and Norwegian), Marcel performed at ceiling in the offline task and scored 91% in the online task. Conversely, in the *Norwegian-incongruent neuter* condition both offline and online correctness were much lower than in the other conditions (33% and 50% respectively). Figure 1 presents the offline and online correctness in all four conditions.

Figure 1. Offline and online correctness in the Gender Decision Task.



When it comes to reaction times, the results demonstrate that online gender assignment lasted approximately 1000 ms in the *full-congruent common*, *full-congruent neuter*, and *Polish-incongruent neuter* condition. The difference between these conditions and the *Norwegian-incongruent neuter* condition is striking. Marcel needed 1379 ms to assign gender to nouns with different gender in Norwegian and Swedish (see Figure 2).

Figure 2. Reaction times in the online Gender Decision Task.



Both offline and online correctness was compared between the main three neuter conditions using the Fisher's exact test with Bonferroni correction (see Table 3). Differences between these conditions with regard to reaction times (RT) were calculated with the Kruskal Wallis *H* test (see Table 4).

Table 3. Comparison of offline and online correctness in the GDT between the three conditions.

		Full-congruent neuter		Norwegian-incongruent neuter		Polish-incongruent neuter			
		n	*%*	*n*	*%*	*n*	*%*	*p*	*V*
Offline correctness	0	0_a	0	4_b	66.7	0_a	0	0.015	0.76
	1	6_a	100.0	2_b	33.3	6_a	100.0		
Online correctness	0	0_a	0	3_b	50.0	0_a	0	0.074	0.63
	1	6_a	100.0	3_b	50.0	6_a	100.0		

Table 4. Comparison of reaction times in the GDT between the three conditions.

	Full-congruent neuter			Norwegian-incongruent neuter			Polish-incongruent neuter			*H*	*p*	η^2
	M_{rang}	*Me*	*IQR*	M_{rang}	*Me*	*IQR*	M_{rang}	*Me*	*IQR*			
RT	5.67	874.50	161.50	14.67	1401.50	478.50	8.17	971.00	255.50	9.09	0.011	0.24

The analyses revealed that Marcel made significantly more errors in offline gender assignment in the *Norwegian-incongruent neuter* condition if compared to the *full-congruent neuter* condition and the *Polish-incongruent condition* ($p = 0.015$). The reaction times in online gender assignment were significantly longer for the *Norwegian-incongruent neuter* condition than for the *full-congruent neuter* condition ($H(2) = 9.09$, $p = 0.011$, $\eta^2 = 0.24$). The differences between these conditions with regard to online correctness were not significant. The *full-*

congruent neuter condition did not significantly differ from the *Polish-incongruent neuter* condition in any of the measures.

10. Experiment 2: Speeded Acceptability Judgement Task (SAJT)

10.1 Materials

The same nouns were used as in Experiment 1. There were four conditions with six items each. The materials were determiner phrases comprising an indefinite determiner and a noun. In each condition, half of the DPs were correct (concord), and the other half incorrect (discord). The incorrect DPs always consisted of a noun and a gender-incongruent indefinite article, e.g., **en träd* ('a tree'). The correct DPs always involved a noun and a gender-congruent indefinite article, e.g., *en natt* ('a night').

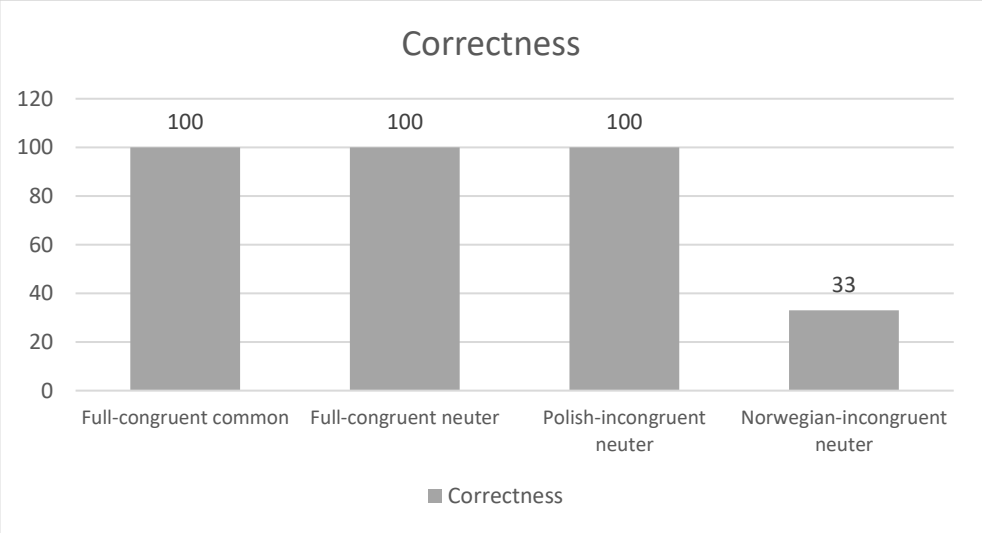
10.2 Procedure

In the SAJT, Marcel was presented with the stimuli on a computer screen. He was asked to decide as quickly as possible whether the determiner phrase on the screen was correct or not. The letters *j* (correct) and *n* (incorrect) were used, which were meant to represent the Swedish words *ja* ('yes') and *nej* ('no'). The task began with a written instruction in Swedish explaining the experimental procedure. Marcel was instructed that he only had 2 seconds to make the judgement. Before each stimulus, a fixation dot was presented for 500 ms. The stimulus stayed on the screen until a deadline of 2000 ms was reached. The inter-trial interval was 1000 ms. As in Experiment 1, the presentation of the stimuli was controlled by PsyToolkit.

10.3 Results

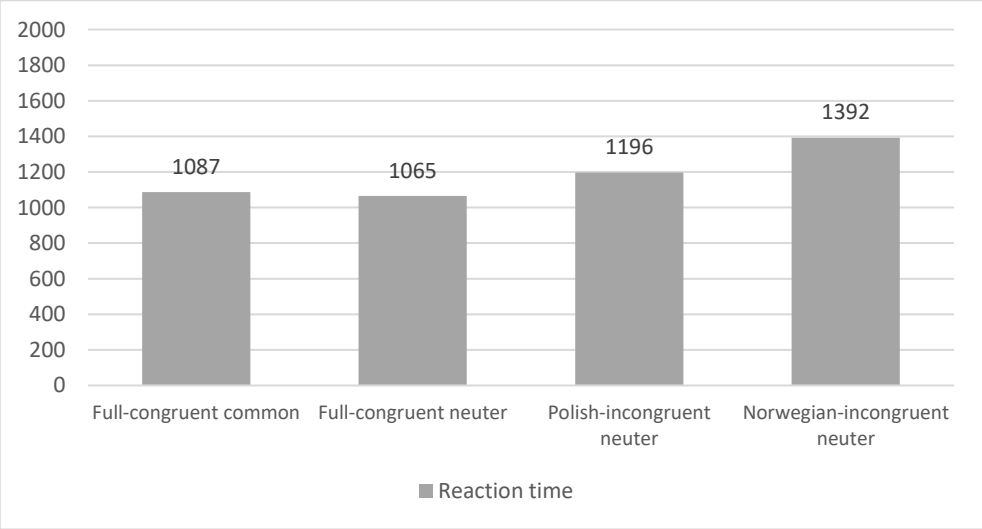
First of all, the results show that Marcel performed at ceiling in the *full-congruent common*, *full-congruent neuter*, and *Polish-incongruent neuter* condition. However, in the *Norwegian-incongruent neuter* condition the correctness was much lower than in the other conditions (33%). Figure 3 presents the correctness in all four conditions.

Figure 3. Correctness in the Speeded Acceptability Judgement Task.



As to reaction times, the results demonstrate that online acceptability judgements required over 1000 ms in all conditions. The difference between the *Polish-incongruent neuter* condition and the other conditions is high. Marcel needed 1392 ms to judge the DPs that differed in gender between Norwegian and Swedish (see Figure 4).

Figure 4. Reaction times in the Speeded Acceptability Judgement Task.



Judgement correctness was compared between the three neuter conditions using the Fisher's exact test with Bonferroni correction (see Table 5). Differences between these conditions with regard to reaction times (RT) were calculated with the Kruskal Wallis *H* test (see Table 6).

Table 5. Comparison of correctness in the SAJT between the three conditions.

		Full-congruent neuter		Norwegian-incongruent neuter		Polish-incongruent neuter			
		n	*%*	*n*	*%*	*n*	*%*	*p*	*V*
Correctness	0	0_a	0	4_b	66.7	0_a	0	0.015	0.76
	1	6_a	100.0	2_b	33.3	6_a	100.0		

Table 6. Comparison of reaction times in the SAJT between the three conditions.

	Full-congruent neuter			Norwegian-incongruent neuter			Polish-incongruent neuter			*H*	*p*	η^2
	M_{rang}	*Me*	*IQR*	M_{rang}	*Me*	*IQR*	M_{rang}	*Me*	*IQR*			
RT	12.67	1089.50	292.00	8.67	1406.50	543.00	7.17	1115.50	598.75	3.40	0.182	0.01

The analyses revealed that Marcel made significantly more erroneous judgements in the *Norwegian-incongruent neuter* condition compared to the *full-congruent neuter* condition and the *Polish-incongruent condition* ($p = 0.015$). The differences between the conditions with regard to reaction times were not significant. The *full-congruent neuter* condition did not significantly differ from the *Polish-incongruent neuter* condition in any of the measures.

11. Control Gender Decision Task in Norwegian

11.1 Materials

Norwegian translation equivalents of the nouns from Experiment 1 and 2 were used.

11.2 Procedure

Marcel was confronted with a list of the nouns in a text editor and was asked to assign gender categories to them with no time limit imposed. He was instructed to use only three letters: *m* (*masculine*), *f* (feminine), or *n* (*neutrum*).

11.3 Results

Marcel performed 100% accurately in this task. His decisions were fully compatible with grammatical gender in Nynorsk.

12. Discussion

Previous research has shown that the category of grammatical gender is not easy for L2 learners to acquire (e.g., Andersen 1984; Franceschina 2005; Dewaele & Véronique 2001; Grüter et al. 2012; Hopp 2016), and that it is vulnerable to cross-linguistic influence (Sabourin et al. 2006; Lemhöfer et al. 2010; Ellis et al. 2012; Bianchi 2013). In this study, two processes inherent to grammatical gender, i.e., gender assignment and gender concord, were investigated. The study tested the offline and online performance of a multilingual learner, Marcel, who has acquired three gendered languages, i.e., Polish, Norwegian, and Swedish, in that order. The data analysis in the previous section answers the study's two research questions.

RQ1 Is there evidence for transfer in gender assignment and gender concord in L3/Ln, and if so, which language constitutes the primary source of transfer: the native or the non-native language?

The data show that Marcel gave more incorrect responses and slower reaction times when the nouns in Swedish were gender-congruent with the translation equivalents in Polish but gender-incongruent with the translation equivalents in Norwegian. This suggests that Marcel assigned grammatical gender to nouns in his L3 Swedish based on the grammatical gender of their translation equivalents in Norwegian, which also affected his judgements on DPs. Thus, it seems that Marcel transferred the grammatical gender categories from Norwegian into Swedish, despite the asymmetries between both gender systems.

On the one hand, the high correctness and short reaction times in the gender decision task suggest that the masculine and feminine genders coalesced into the common gender in the mental lexicon. On the other hand, the low correctness and long reaction times in response to the gender mismatch between Norwegian and Swedish indicate that Marcel transfers the neuter gender from Norwegian, resulting in non-target decisions and judgements on nouns which have the common gender in Swedish. The present study thus confirms that grammatical gender is vulnerable to cross-linguistic influence in adult learners (Sabourin et al. 2006; Lemhöfer et al. 2010; Ellis et al.; Bianchi 2013). The results are also in concord with the findings of Keidel Fernández (2016) and Brown (2020), who provided proof of the influence of a non-native language at the initial stages of L3/Ln acquisition of gender and during L3/Ln gender processing. The results also sustain the conclusion made by Lemhöfer et al. (2010) that transfer contributes to creating both correct and incorrect gender representations.

The occurrence of transfer could have been facilitated by the fact that Marcel started to study Swedish following his graduation in Norwegian, whereby his case represents sequential multilingualism in the strict sense. Furthermore, he claimed that he considered Norwegian and Swedish to be very similar. This assumed similarity could have contributed to the occurrence of transfer (Kellerman 1983).

Further, the results clearly show that Marcel's native language, Polish, did not have any impact on gender assignment and gender concord in L3 Swedish. All in all, these results can support both the *L2 Status Factor Hypothesis* (Bardel & Falk 2012), which views the non-nativeness of languages as a driving force in transfer selection, and the *Typological Primacy Model* (Rothman 2011; 2015), which assumes typological similarity between languages to be the decisive factor in determining the source of influence. To provide clear-cut evidence for one of these two proposals, one should additionally investigate a language pair in which the native language is a Germanic language and the non-native language is a Slavic language.

In the traditional view, language transfer is assumed to operate at the level of linguistic representations. Taking this assumption, the results lend support to the *integrated view of bilingual gender representation* (e.g., Salamoura & Williams

2007; Klassen 2016). If the impact of Norwegian only occurred in the online tasks, but not in the offline tasks, it would suggest cross-language effects during processing of grammatical gender, or more precisely, during gender retrieval. What has been found in this study, however, is an influence across-the-board, irrespective of whether offline or online tasks were used. Based on these consistent results, I assume that Marcel temporarily developed a shared grammatical gender system for Norwegian and Swedish. Note, however, that the integration at the level of grammatical gender does not mean integration at higher levels (Salamoura & Williams 2007).

As concerns acceptability judgements, Marcel was able to recognise incorrect DPs and to judge them as incorrect under time pressure. He performed at ceiling in the two full-congruent conditions and in the Polish-incongruent condition, clearly indicating that he has mastered gender agreement within DPs. This suggests that adult language learners can be sensitive to grammatical gender violations within DPs. Marcel performed significantly worse in the condition in which there was a gender mismatch between Norwegian and Swedish: He accepted incorrect DPs and rejected correct DPs, presumably because they included nouns that differ in gender between Norwegian and Swedish. This suggests that it is the transfer from Norwegian, not a lack of knowledge of agreement, which caused the acceptance of gender discord in L3 Swedish.

RQ2 Are there differences between offline and online performance with regard to gender assignment in L3/Ln?

The data show that it was not easier for Marcel to assign gender to nouns in L3 Swedish without time pressure. This result contradicts the prediction that online performance should be worse than offline performance and counterexemplifies the previously observed dissociation between the knowledge of grammatical gender and the ability to use that knowledge under time pressure (Sabourin & Stowe 2008; Bobb et al. 2015). As a matter of fact, Marcel performed slightly better in the online task. A possible explanation would be that during gender retrieval the weak target gender representations in Swedish may at times supersede the non-target representations transferred from Norwegian. The difference is, however, very small and the results rather demonstrate that both offline and online gender assignment was affected by transfer from Norwegian to a similar extent. The online accuracy thus appears to support the robustness of transfer from Norwegian and the assumption of a shared grammatical gender system (e.g., Salamoura & Williams 2007; Klassen 2016).

However, Marcel needed significantly more time to assign gender to nouns that differ in gender between Norwegian and Swedish. These longer response latencies could be taken as an indication of competition between the two gender systems at the level of gender retrieval. If Marcel had had no knowledge of gender in Swedish, no additional time cost in gender retrieval should have occurred, since gender assignment would have been solely based on Norwegian. Although Marcel

assigned gender to Swedish nouns based on the gender of their Norwegian translation equivalents, which resulted in incorrect responses, the target gender representations in Swedish seem to have been activated to some extent. However, they were arguably too weak to overcome the transfer from Norwegian.

It is important to consider the developmental stage at which Marcel was at the moment of testing. He was highly proficient in Norwegian and had completed a second term of Swedish. Therefore, it is feasible that Marcel will eventually overcome the transfer from Norwegian and acquire the neuter gender of nouns in Swedish, thus leading to the evolvement of target-like gender representations.

The findings of this study must be seen in the light of some limitations. First of all, only one participant was tested, which prompts caution in the generalising of the results. Although the results are suggestive, definite conclusions should not be drawn on the basis of data from a single learner. Another limitation of the study is the limited number of items involved in the tasks. This stems from the fact that creating multiple conditions with gender match and mismatch between Polish, Norwegian, and Swedish is not an easy task. Both limitations were hopefully in part compensated for by the multiple-task approach, which made it possible to observe converging results. A further limitation in this study is the lack of another participant with a different language combination. Because of that, it is impossible to tease apart the effect of non-nativeness and the effect of typological similarity on the occurrence of transfer. The findings are therefore in line with both accounts.

13. Conclusion

This case study is the first attempt to examine transfer effects in gender assignment and gender concord in Swedish as L3/Ln. Although only one participant was examined, his performance revealed a consistent pattern. It was non-native Norwegian, not native Polish, which constituted the main source of transfer. It is claimed that the Norwegian grammatical gender system was temporarily transferred into L3 Swedish, which resulted in target-like responses if there was a gender match between the languages, and non-target-like responses if there was a gender mismatch between them. This was particularly well illustrated by the neuter gender. However, response latencies in the online gender decision task illustrate competition between the Norwegian and Swedish gender systems at the level of gender retrieval, indicating that target-like gender representations in Swedish are developing. Further investigation into the acquisition and processing of grammatical gender in L3/Ln is required to understand the nature of cross-linguistic influence with regard to one of the most puzzling grammatical categories.

Acknowledgemets

This work was supported by the National Science Centre, Poland (Narodowe Centrum Nauki) under Grant 2019/33/N/HS2/00349. I am grateful to the anonymous reviewers for their thoughtful and constructive comments on an earlier version of this manuscript.

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