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GENDER ASSIGNMENT IN L2 FRENCH BY SPEAKERS OF POLISH: THE EFFECTS OF WORD ENDINGS, L1 TRANSFER AND MASCULINE BY DEFAULT

Keywords: grammatical gender, gender assignment, crosslinguistic influence, L2 French,
L1 Polish

Abstract

This study examined the relative influence of three factors on gender assignment in L2 French by Polish learners in cases where the noun's gender was unknown to them. Those three factors are as follows: the form of the noun, transfer effects from the first language (L1), and the assignment of masculine by default. Our participants were 1,115 adult native speakers of Polish who belonged to all levels of French proficiency. We selected 24 words for which both correct and incorrect gender assignment can be explained by only one of the three factors. Those words were presented sequentially online, in isolation, in the form of images accompanied by recordings of their pronunciation. Participants had to indicate which gender they thought the word possessed (masculine or feminine).

Bayesian analyses showed all three factors to contribute to gender assignment, explaining up to 43% of the assignment process. Their combined explanatory power decreases as learners become better in French, and it is greater in the case of incorrect gender assignment. While relying mostly on masculine by default at beginning levels, as learners progress in French, they are influenced more by L1 transfer and word endings.

1. Introduction

Grammatical gender, an often idiosyncratic characteristic of nouns, sits at the interface of the lexicon and grammar, in that it interacts with agreement mechanisms across the clause. Those languages which encode gender often feature a ternary (masculine-feminine-neuter) system, as does Polish, or a binary one, with only the feminine and the masculine, as is the case with French. For speakers of an L2, the knowledge of many lexical items may be partial; if the L2 has grammatical gender, there is the possibility that the form and meaning of a word is known, but its gender is not remembered correctly. With such limited linguistic knowledge at their disposal, L2 learners are often forced to make a decision about the grammatical gender of a noun just to proceed with constructing an utterance. This study investigates the issue of which grammatical gender learners choose to use with L2 French nouns when they do not know their gender and are forced to make a guess. Previous research revealed the following three factors as potentially affecting L2 gender assignment in such situations: crosslinguistic influence, masculine as the default gender, and L2 word form (i.e. intralexical cues). Those three factors have been discussed in a vast number of studies guided by different theoretical perspectives, but it seems that their impact has never been directly compared, which is something that this study sets out to do.

2. Literature review

Below, we summarize the key points made in the literature about the three factors listed above.

2.1. Masculine by default

In the majority of languages, masculine appears to function as the default grammatical gender (Harris 1991; Finnemann 1992; Alkohlani 2016; Klassen 2016). The reasons for this remain unclear, even though various tentative explanations have been proposed within historical linguistics, typology, language acquisition, cognitive science, and sociolinguistics, a discussion of which would go beyond the scope of this paper. It should be noted that exceptions to this tendency exist, with neuter apparently being the most common alternative to masculine as the default gender, and that the criteria for identifying the default gender in a language often differ from study to study and may be specific to a given language.

Children's natural tendency to assign masculine by default has been observed extensively in L1 development for a wide range of languages; for example, French (Karmiloff-Smith 1979), Hebrew (Levy 1983), Czech (Henzl 1975), Spanish (Pérez-Pereira 1991), and Norwegian (Rodina & Westergaard 2015). Masculine by default has also been extensively noted in L2 acquisition, for a range of languages such as French (Holmes & Dejean De La Bâtie 1999; Bartning 2000), German (Klassen 2016), and Spanish (White et al. 2004; McCarthy 2008; Montrul et al. 2008; Grüter et al. 2012). For an informative review on this topic, see Bellamy and Parafita Couto (2022: 25), who conclude that "the clear preference for a masculine default is striking".

For French, the interpretation of semantically ambiguous statements favours the masculine (Gygax et al. 2008; see also Ayoun 2018 for an overview of gender conflict resolution in French). In Polish, the masculine functions as the generic gender for animate nouns (references to mixed gender groups take the masculine, for both nouns and the conjugation patterns of verbs).¹

2.2. Crosslinguistic influence (transfer) effects

Crosslinguistic influence in grammatical gender has been documented extensively through studies of lexical processing in adult bilinguals representing various L1–L2 pairings. For bilinguals with two gendered languages, a common finding is the gender congruency effect, whereby gender assignment and agreement are more accurate and/or faster for nouns that share the same gender across the bilingual's two languages (see, e.g. Salamoura & Williams 2007; Bordag & Pechmann 2008; Lemhöfer et al. 2008; Paolieri et al. 2020; for recent reviews, see Sá-Leite et al. 2019; Johannessen et al. 2024; and for research documenting the gender congruency effect in successive bilingual children, see Lemmerth & Hopp 2019). In a study of L1 Polish learners of Swedish, Długosz (2023) found that gender assignment was more accurate for Swedish nouns whose gender corresponded to that of their Polish equivalents.

2.3. L2 word form

The morphology and phonology of a word often provide cues to its grammatical gender, and their effect on gender assignment may be powerful (Seigneuric et al. 2007). These noun-internal (or intralexical) cues are, in most cases, realized at the end of the word (Bordag et al. 2006; Kempe & Brooks 2008). However, particular languages differ widely in how predictably noun gender can be inferred from such formal properties of the noun itself. Polish, for example, is very regular, with *-a* and *-o* endings (in the nominative singular) typical of feminine and neuter nouns, respectively, with a small number of exceptions to that pattern. French, in contrast, displays more limited regularities, which apply to subsets of nouns only, and are often

¹ However, in a less canonical view, neuter can also be seen as the default gender, based on the form of verbs and predicate adjectives when the controller of agreement is gender non-specific or absent (Fuchs 2024).

undermined by numerous exceptions. (More on the reliability of intralexical gender cues in French will be said later, in the Method section.) The reliability of intralexical cues is responsible for the level of gender transparency of a given language.² The level of transparency of the gender system of a language has been found to impact the speed of L1 acquisition (Velníć 2020) and is likely to affect the speed of L2 acquisition (Edmonds & Gudmestad 2021; Gómez Carrero & Ogneva 2024).

2.4. Proficiency

Generally, and unsurprisingly, correctness in gender assignment increases with proficiency (see, e.g. Kupisch et al. 2013 for L2 French). However, in some cases word form cues may remain difficult to master throughout the learning process, as “even advanced learners are simply unaware that the cue exists or are unsure of the reliability of the cue” (Walter & MacWhinney 2015: 31). After relying heavily on default strategies and showing limited use of form-based cues such as noun endings (Sagarra & Herschensohn 2010), learners become increasingly sensitive to gender and morphophonological regularities. The influence of word endings on gender assignment therefore rises with proficiency during early and intermediate stages. This influence appears to peak before advanced proficiency, at which point gender knowledge becomes more strongly lexicalized. As a result, the relative contribution of endings diminishes, with learners relying primarily on stored lexical representations while continuing to use form-based cues as a secondary resource for unfamiliar items (Grüter et al. 2012; Hopp 2013). It is with the latter case that this study is concerned.

As far as L1 transfer is concerned, its effects tend to wane above a threshold of language proficiency (Sato et al. 2013). Several studies investigate how the masculine by default tendency might be influenced by L2 proficiency. Sabourin and Stowe (2008: 25) observed that “for the lower frequency items, the use of a default gender was more likely to occur”. Likewise, in a study with beginning learners of L3 German, Ecke (2022) discovered a stronger impact of default gender than that of L1 influence. Recently, in a study by Johannessen and her colleagues (2024: 25) with learners of L2 Norwegian from three different L1 systems, for an object-naming task, “lower proficiency participants used masculine as a default gender value to a greater extent compared to the higher proficiency speakers”.

3. Research question

To the best of our knowledge, no researcher has sought to compare the relative impact of all three of the above-mentioned factors, or has proposed a methodological

² However, the term “transparency” may also refer to the overall level of transparency of the gender system of a language, i.e. including, for example, gender markings on modifiers (e.g. Edmonds & Gudmestad 2021).

design to do so. This study aims at filling this gap by examining the way in which L2 learners assign gender to newly encountered words, in light of all three factors combined. Our research question is as follows:

What is the relative impact of masculine by default, L1 transfer, and L2 word form in the assignment of grammatical gender in L2 French to words whose gender is *unknown* to the learner, and how does it change with the level of proficiency in French?

The absence of studies that incorporate all three factors means that there are no findings which can be directly used to predict the outcome of this study, especially that the relative impact of these factors will be examined for various levels of proficiency. For example, Klassen (2016) hypothesized that masculine by default should supersede L1 transfer, but her study did not investigate the impact of L2 word form, and the relative impact of both factors was not examined across proficiency levels. However, on the basis of our literature review, the following prediction can be made concerning gender assignment to newly encountered words. As learners' proficiency increases:

- the impact of L2 word endings should increase,
- L1 transfer should diminish,
- reliance on masculine by default should diminish.

The existing literature does not allow us to predict with certainty which of the last two variables will show faster decline with increased L2 proficiency.

4. Method

4.1. Isolated nouns

Many studies have looked at errors in gender marking in L2 production, where errors are thought to reflect lack of gender knowledge. However, such studies make it difficult to distinguish gender assignment errors from gender agreement errors. For example, in **Des_{M/F} équipes_F olympiques_{M/F} vraiment forts_M* ["Very strong Olympic teams"], it is not clear whether the noun *équipe* was wrongly assigned the masculine gender, or if the adjective *fort* was not inflected properly for gender. Also, in language production, the accuracy of gender marking depends on the level of processing involved. A learner who knows the correct gender of a noun may still fail to correctly mark it when under some kind of strain, such as time pressure, or when the marking needs to be done on elements that are far removed from the noun in a sentence (see Edmonds & Gudmestad 2018; Edmonds et al. 2020). As far as receptive aspects are concerned, if given context, learners may infer a noun's gender from surrounding cues. In this study, we aim to look at gender assignment only, and to limit the available cues solely to intralexical ones. To this end, we investigate learners' decision concerning isolated nouns.

4.2. The L1-L2 combination

A considerable number of studies have tested native speakers of English, a genderless language, who were learning a gendered second language (e.g. Finnemann 1992; Carroll 2005; Kempe & Brooks 2008), making it impossible to examine the effects of language transfer. This study aims to examine three key factors influencing L2 gender assignment and therefore requires participants who speak a gendered L1, specifically a ternary one, such as Polish, which was selected for this research. Neuter is necessary for our research design, as will be explained in more detail later, while a higher number of genders than three would unnecessarily complicate the analyses. To clarify, Polish has three core (global) genders: masculine, feminine, and neuter, based on the fact that *in the nominative singular* every noun has to be assigned one of these three genders. However, based on the inflectional patterns of noun modifiers, more gender classes can be identified in Polish (see also Swan 2015, for an overview in English). The canonical, best-known distinction was made by Mańczak (1956); it posits five genders. However, as this study deals with isolated nouns presented in the nominative singular, the ternary distinction is the most relevant here; it is also the distinction best established in applied contexts (see Stefańczyk 2021).

As Bordag et al. (2006) note, much prior research has examined languages with highly regular, strongly gender-biased noun endings, which may limit comparisons across multiple cues. This limitation is mitigated in the case of French, whose two-gender system has been described as *quasi-regular* (Taft & Meunier 1998). French occupies an intermediate position on the transparency continuum: although approximately 80% of noun endings provide some indication of grammatical gender (Lyster 2006), the strength and reliability of these cues vary considerably. Some endings are strongly associated with a particular gender, whereas others are weakly informative or effectively unmarked. This graded distribution of cue strength is central to the present design, as explained below.

Table 1 presents the possible scenarios for gender assignment made by a learner in the absence of lexical knowledge. The table presents the factors to which particular decisions may be attributed. In the first two columns we find the nouns' actual gender followed by the gender of their ending. Gendered endings are biased above 90%, while ambiguous endings have a gender ratio between 40% and 60%. (The operationalization of endings will be detailed later in the *Test items* section.) The third column displays the gender of the Polish equivalent. The last two columns list the factors which may be responsible for the decision to assign a particular gender to a given noun; correct assignment (4th column) is when participants provide the gender listed in the first column.

To clarify the reasoning behind each category, we refer the reader to the first row of Table 1. A word in this category might be *mûre* ("blackberry"). Its gender in French is feminine, its ending ([yr]) is feminine, and its gender in the participants' L1 is also feminine (*jeżyna*). If a participant correctly assigns the feminine gender to *mûre*, it could be based on the transfer of its gender from Polish (variable B), or on the word's ending (variable C). However, if the participant mistakenly assigns

Table 1: All gender assignment possibilities and the associated factors (for guesses made in the absence of lexical knowledge)

French noun		L1 gender	Possible factor(s)	
gender	ending		Correct assignment	Incorrect assignment
Feminine	Feminine	Feminine	BC	A
Feminine	Masculine		B	AC
Feminine	(ambiguous)		B	A
Masculine	Feminine		A	BC
Masculine	Masculine		AC	B
Masculine	(ambiguous)		A	B
Feminine	Feminine	Masculine	C	AB
Masculine	Feminine		AB	C
Feminine	Feminine	Neuter	C	A
Feminine	(ambiguous)		–	A
Masculine	Feminine		A	C
Masculine	(ambiguous)		A	–

A = Masculine by default; B = L1 transfer; C = L2 word ending

Table 2: Answer possibilities with only one associated variable (for guesses made in the absence of lexical knowledge)

French noun		L1 gender	Variable	
gender	ending		Correct assignment	Incorrect assignment
Feminine	(ambiguous)	Feminine	B	A
Masculine	(ambiguous)		A	B
Feminine	Feminine	Neuter	C	A
Masculine	Feminine		A	C

A = Masculine by default; B = L1 transfer; C = L2 word ending

the masculine gender, the only possible explanation is defaulting to the masculine form (variable A).

The set of items we had selected was further narrowed by retaining only the cases where both the correct and incorrect answers can be explained by only one variable. The resulting “trimmed” table (Table 2) served as the basis for constructing our word set. This table demonstrates that variable C can only be examined using words that are neuter in the L1.

Following the elimination process from Table 1 to Table 2, Variable A remains a possible explanation in half of the cases. It is now in opposition to either B or C in every gender combination.

4.3. Task and procedure

Many studies (e.g. Karmiloff-Smith 1979; White et al. 2004; Bordag et al. 2006; Lemhöfer et al. 2008; Klassen 2016) relied – exclusively or not – on tasks that involve picture naming. As pointed out by Seigneureic and colleagues (2007), this method carries the risk of confusing gender assignment and gender agreement, which is something that was mentioned earlier.

To avoid those pitfalls, isolated words can be tested. For example, Afonso et al. (2014) used a gender decision task with Spanish nouns presented visually on a screen, with measurement of reaction times and error rates. Since we sought to avoid the additional interfering cues that come with written language in French, we used a categorization task similar to that adopted by Monnery et al. (2002), but conducted online, using *LimeSurvey*. After self-assessing their French proficiency, the participants heard each French word while viewing a corresponding image. The use of images in addition to sound allowed participants to be aware of the meaning of words they did not know. For reasons of ecological validity, we tried to place participants in a decision-making situation evocative of real-life language use, where speakers must make a binary decision, for example between *J'en veux un_M* and *J'en veux une_F*, [I would like one] for ordering something.

Participants were asked (in Polish) about which gender they thought the word possessed (masculine or feminine) and whether they already knew the word's gender. The order of presentation for the 24 items was randomized. The software was designed to force participants to select an answer in order to move on to the next item.

4.4. Test items

Despite the well-established advantages of nonce words in grammatical gender research, particularly for controlling lexical familiarity and isolating specific cues, such items would have prevented the examination of L1 gender transfer, a central factor of our design. Access to L1 gender would have required images or explicit L1 translations, and given the high frequency of many target French word, introducing novel or altered forms would likely have interfered with existing lexical representations and disrupted performance. Finally, real words offered a clear motivational

advantage, as assessing one’s knowledge of familiar items increased participant recruitment and engagement.

We avoided interference of biological or semantic gender by eliminating nouns that refer to humans or to higher mammals and for which a different word exists for each sex.

The test items were extracted from the Lexique3 database (New et al. 2004) in its most exhaustive version to date (3.83). It allows for selecting words based on more than a dozen search criteria related to word length, frequency, spelling, and pronunciation, thus making it possible to evaluate the strengths of ending-gender correspondences more reliably than in previous research.

Word endings: Spoken vs. written

This study centres on spoken language, making it essential to select word endings based on their pronunciation, despite the longstanding tradition in French gender research of focusing solely on written forms. For instance, Sonet and Shortliffe (1954) found that roughly 90% of nouns ending in *-oir* are masculine, based on a corpus of 5,000 nouns. However, since the feminine ending *-oire* is pronounced the same, this distinction becomes meaningless in a spoken context.

Word endings: Threshold for gender bias

To examine the effects of word form on L2 gender assignment, two categories of French words were selected. The first includes gender-biased words – those with endings that strongly suggest a specific gender, defined as having over 90% association with either masculine or feminine, consistent with previous studies (e.g. Lyster 2004; Presson et al. 2014). The second category consists of gender-neutral words, which offer no clear cues, as indicated by a gender association rate between 40% and 60%. We selected endings from figures provided by Lyster (2006) and by Tucker et al. (1977), which we refined with the help of Lexique3. The resulting selection and the corresponding bias percentages are presented in Table 3, where M = masculine, and F = feminine.

Table 3: The French endings selected

Gender biased (>90%)	Gender neutral (40%–60%)
-ment [mā] (M 99.5%)	-el/elle [ɛl] (41% M)
-age [aʒ] (M 98.6%)	-ule [yl] (42% M)
-ton [tɔ̃] (M 98.6%)	-erre [ɛʁ] (46% M)
-ier [je] (M 94.5%)	-eil/eille [ej] (46% M)
-anse [ās] (F 98.6%)	-ique [ik] (47% M)
-ine [in] (F 91.7%)	-isse [is] (55% M)
-ure [yʁ] (F 90.3%)	
-ette [ɛt] (F 90%)	

Table 4: Words selected

L1 gender	French gender	French ending	Explanatory variable(s)		French words
			Correct assignment	Incorrect assignment	
Feminine	Feminine	(ambiguous)	B	A	<i>chandelle</i> [candle], <i>échelle</i> [ladder], <i>aisselles</i> [armpits], <i>truelle</i> [trowel], <i>libellule</i> [dragonfly], <i>œillères</i> [blinkers], <i>crinière</i> [mane], <i>congère</i> [snow-bank], <i>gouttière</i> [gutter]
	Masculine	(ambiguous)	A	B	<i>réverbère</i> [street lamp], <i>lampadaire</i> [floor lamp], <i>lance-pierres</i> [sling-shot], <i>dentifrice</i> [toothpaste], <i>arc-en-ciel</i> [rainbow], <i>élastique</i> [rubber band], <i>maïs</i> [corn]
Neuter	Feminine	Feminine	C	A	<i>brûlure</i> [burn], <i>semence</i> [seed], <i>couture</i> [sewing], <i>piqûre</i> [sting], <i>fracture</i> [fracture], <i>soudure</i> [welding], <i>savonnette</i> [soap bar]
	Masculine	Feminine	A	C	<i>magazine</i> [magazine]

A = Masculine by default; B = L1 transfer; C = L2 word ending

Word frequency

Although word frequency is not expected to directly influence this study due to its design, we followed the common practice in gender assignment research of using mid-frequency words. The final list included 24 nouns, presented in Table 4.

It is worth noting that the imbalance in the number of items per category stems from the languages under investigation and the criteria we retained. For some of the categories, the choice of suitable words was very limited.³

4.5. Participants

Our participants were 1,115 adult university students, native speakers of Polish. Their mean age was 21.0 years old (SD: 2.27) with a range of 19 to 32, and none of the proficiency subgroups was statistically different from any other group in terms of age. A recruitment email approved by a Canadian Research Ethics Board, containing a link to the test as well as its description and selection criteria, was sent to colleagues and French language instructors throughout Poland. These instructors subsequently forwarded the email to their students, without knowing which individuals would choose to volunteer.

L2 proficiency

Since L2 proficiency is likely to interact with all three variables under investigation, as discussed in the literature review, we covered the widest possible range of L2 proficiency (A1 to C2) to make this phenomenon observable.

For the sake of efficiency, we opted not to conduct formal assessments of our participants' French proficiency levels and instead relied on their self-assessment, which is often considered a reliable method for identifying L2 proficiency levels when a very precise competence score is not needed (Mistar 2011; Li & Zhang 2021). Also, we expected our participants to be very familiar with the scales of the Common European Framework of Reference for Languages (CEFR; Council of Europe 2011), which we adopt in this study. Those scales, which range from A1 to C2, are widely used in Poland to label language courses at schools and universities as well as textbooks and other resources. Considering the participants' age, it was reasonable to assume they had recently completed secondary or tertiary education in Poland, which includes foreign language instruction classified according to the A1–C2 scale. However, to foster the most accurate possible self-assessment, we included descriptions of these proficiency levels in case any participants needed clarification.

When asked about other languages they spoke, participants overwhelmingly declared English as their main additional L2 ($n = 854$). Fortunately, English is considered non-influential in terms of gender assignment for French, due to its lack of grammatical gender (see Spino 2022). The main additional languages participants

³ Imbalance caused by language choice is not exceptional in grammatical gender studies. For example, for one of their word categories, van Osch and colleagues (2022) could not reach the desired number of eight neuter gender object nouns in Dutch.

reported some knowledge of were Spanish ($n = 193$), German ($n = 114$), and Russian ($n = 88$), typically at a very basic level – below the minimum of two years of language study used by Spino to exclude participants and minimize potential crosslinguistic influence.

5. Data coding

After eliminating participants who completed fewer than three items on the task, data from 955 participants were retained for analysis. The distribution of participants by competence level is as follows: A1 (116), A2 (130), B1 (259), B2 (223), C1 (159), C2 (68). Our data matrix yielded a total of 22,273 response-items. Out of these, we retained the ones for which the participants claimed not to know the word's gender, i.e. the cases where the participants claimed to be guessing whether the word is feminine or masculine. Unsurprisingly, the number of guessed items was inversely related to the participants' level of proficiency, declining steadily from 73.5% at the A1 level to 23.1% at the C2 level.

6. Data analysis

A Bayesian multilevel categorical regression analysis was carried out using R (R Core Team, 2025) with the *brms* package (Bürkner 2017). The participants' L2 proficiency levels were treated as an ordinal scale ranging from 0 (A1) to 5 (C2). We entered three levels: answers, items, and subjects. We compared two models: one with an intercept, and one with proficiency level as a predictor. The three factors that were expected to contribute to L2 gender assignment are labelled *Explanations*, and their self-explanatory labels are *L1_Transfer*, *MAS_Default* and *Word_Ending*. The priors were the default Student-t priors implemented in *brms*: (*Student_t* (3, 0, 2.5)). A Markov Chain Monte Carlo (MCMC) sampling was run with 2,000 iterations, 1,000 warmups and four chains.

7. Results

7.1. Descriptive analyses

Figure 1 displays the first output of descriptive results from our data set. It is important to keep in mind that Figure 1 reflects percentages and not raw numbers; the better our participants are in French, the fewer guesses they make, which causes those column groupings to be based on a constantly lower number of guesses as we move from left to right.

Figure 1 shows that, as our participants' French proficiency improves, so do their reliance on word ending cues and their tendency to transfer grammatical gender from their L1. On the contrary, the assignment of the masculine gender by default decreases steadily as participants make progress in French.

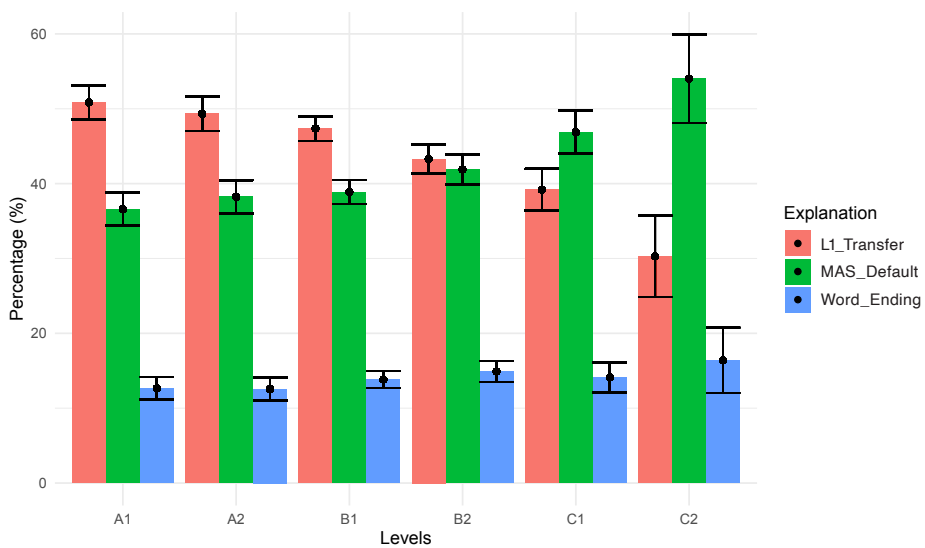


Figure 1: Impact percentages of explanations by proficiency levels.

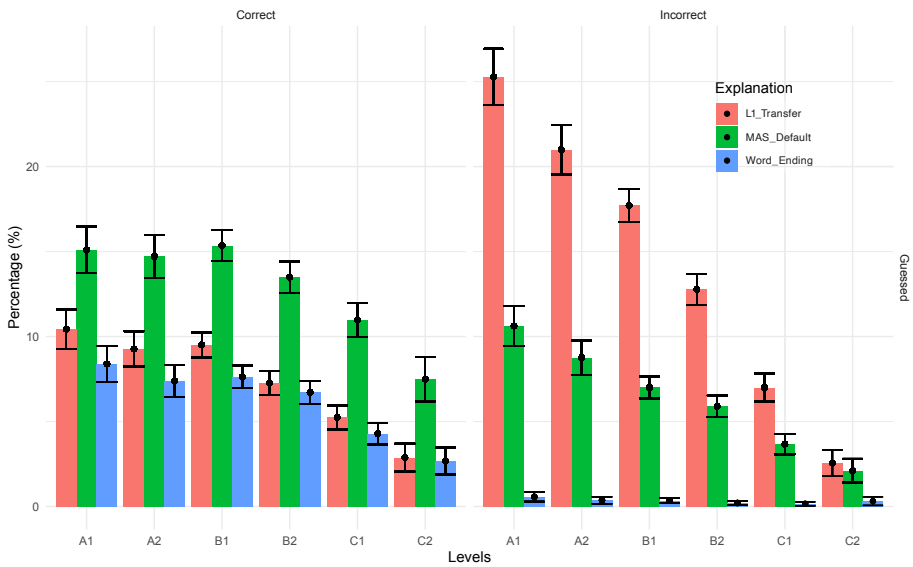


Figure 2: Impact percentage of explanations as a function of correct or wrong answers (by proficiency levels).

Figure 2 opposes data for correct answers to incorrect ones, highlighting two important phenomena regarding the explanatory power of all three predictors, as reflected by the total of all three columns for each proficiency level:

- 1. the combined explanatory power of the three predictors is greater for incorrect answers than for correct ones;
- 2. as L2 proficiency increases, the combined explanatory power of all three predictors decreases for both the correct and the incorrect answers.

It is noteworthy that the contrasting trends in Figures 1 and 2 reflect proportionality effects due to changing base rates of correct and incorrect responses across proficiency levels. When responses are pooled (Figure 1), L1 transfer appears to increase, because correct responses become more frequent and often rely on L1 cues. However, when responses are separated by correctness (Figure 2), the proportion of L1-based explanations decreases within both correct and incorrect responses, especially as incorrect responses become rarer at higher levels. This divergence reflects a Simpson’s paradox effect.

7.2. Bayesian multilevel categorical regression analysis

The complete data set of 22,273 answers from 955 participants yields a total of 11,025 guessed answers from 895 participants. This last number reflects the fact that 60 of our participants claimed to already know the gender of all 24 test items. The Bayesian multilevel categorical analysis reaches good convergence, and the model’s chains show sufficient convergence ($\hat{r} = 1$).

Model fits were computed based on the leave-one-out information criterion (looic) using the loo package (Vehtari et al. 2017). The model showed significant improvement by adding Proficiency levels as a predictor, respectively: looic = 14324.0 (SE = 61.2) and looic = 14244.9 (SE = 63.2). All Pareto k estimates were good ($k < 0.7$). An inspection of the posterior probability from the second model showed that the effect of Explanation (i.e. the impact of our three factors on gender assignment) was captured very well. Further investigations were conducted with this model, with the outcome presented in Table 5.

Table 5: Posterior estimates from Bayesian Logistic Regression examining effects of L1 transfer and word ending on gender assignment accuracy

Effect	Estimate	Est.Error	Q2.5	Q97.5	Odds Ratio
L1transfer_Intercept	-2.361	0.893	-4.156	-0.631	0.094
Wordending_Intercept	-7.362	1.77	-11.281	-4.412	0.001
L1transfer_Niveau	0.118	0.02	0.079	0.156	1.125
Wordending_Niveau	0.273	0.037	0.202	0.347	1.314

Note: MAS_default is the reference group.

Table 5 shows that, at the A1 proficiency level, both L1 transfer and word endings were very unlikely explanations compared to masculine by default as the intercept. This result is partly influenced by the frequency distribution of the different explanation types across the items included in the experimental design. The most relevant effects concern L1 transfer and word endings, whose impact increases steadily with the participants’ proficiency. The results suggest that with each additional proficiency level, the odds of the explanations are 1.125 times higher for L1 transfer and are 1.314 times higher for word endings compared to the assignment of masculine by default.

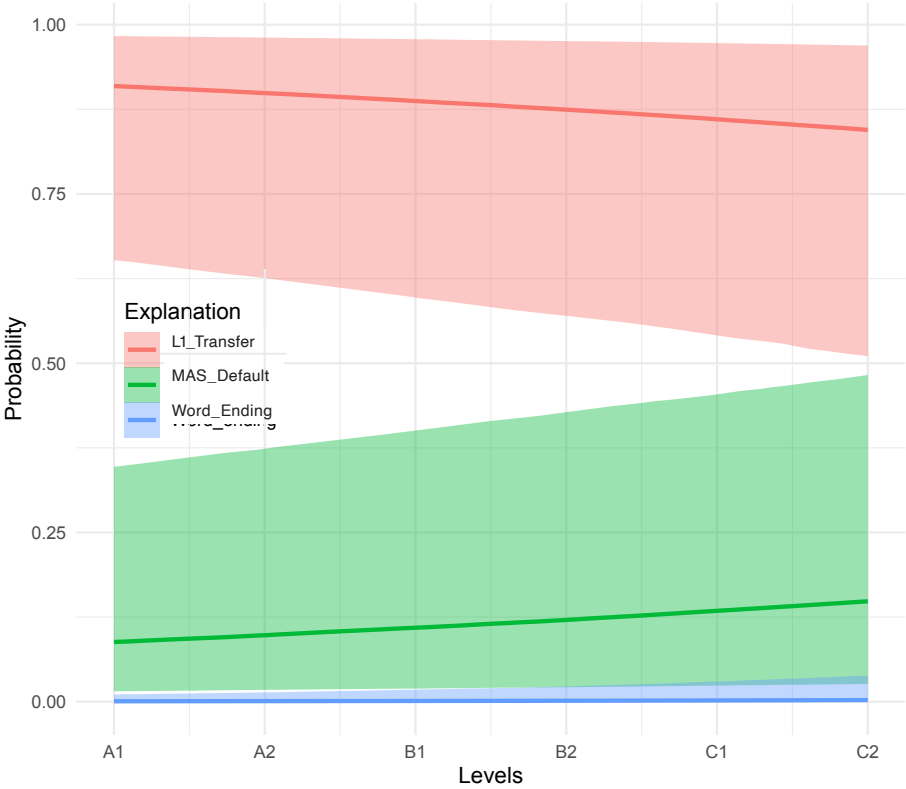


Figure 3: Distribution of responses by proficiency level according to explanations.

As further support for Table 5, Figure 3 shows masculine by default as the most prominent explanation among beginners, i.e. for our A1 participants. Its probability decreases as participants make progress in French. As proficiency levels increase, participants become more likely to rely on L1 transfer and/or on word cues to decide which gender to assign to a word whose gender they do not know.

8. Discussion

Analyses performed on the responses highlight several interesting phenomena regarding how grammatical gender is assigned to words in L2 French by L1 speakers of Polish, for words whose gender is not already known. Firstly, when comparing the impact of L1 transfer with that of masculine by default, we see a tendency at all proficiency levels to rely on L1 transfer for gender assignment, and, even more importantly, this tendency gains importance compared to masculine by default as L2 proficiency increases. As seen in Figure 2, for incorrect gender responses (i.e. cases where not knowing the gender is a certainty), reliance on both the L1 and on the default masculine decreases over time, although the latter does so at a considerably faster rate. While the default masculine initially carries more than twice the influence of the L1, this difference gradually narrows, ultimately resulting in statistically comparable effects at the C2 level.

Secondly, when comparing the impact of L2 word endings with that of masculine by default, L2 word endings become more influential than masculine by default starting at level B2. Across the entire proficiency range, the impact of masculine by default decreases steadily with increased proficiency. What is particularly interesting is that for participants at lower levels of proficiency (A1 to B1), masculine by default has more impact than L2 word endings and that, at the highest levels of L2 proficiency, that ratio is still approximately four to one. This runs contrary to expectations raised by Seigneuric and colleagues (2007), who showed the impact of L2 word endings to be “powerful”.

The fact that the masculine gender constitutes the easiest association at lower proficiency aligns with the well-attested preference for the masculine as the default gender, which is evident even prior to substantial exposure to the language, and observed in both L1 and L2 acquisition. As proficiency increases, language-based strategies – such as L1 transfer and, more importantly, strategies grounded in L2-specific rules – become more prominent, progressively reducing reliance on the default masculine.

Finally, our three factors do not fully account for grammatical gender assignment by learners of French. Ideally, the combined impact of all three factors would total 100% in every case, thus explaining the totality of the assignment process. Figure 2 showed that not to be the case, since the combined impact varies between 42% (for incorrect assignment by A1 learners) down to about 5% (for incorrect assignment by C2 learners). This suggests that other factors intervene in learners’ decision to assign gender to a French word. Such factors could be, for example, stereotypical gender-related associations (e.g. assigning feminine to *couture* and masculine to *truelle* or *soudure*), physical attributes (e.g. assigning masculine to *chandelle* and feminine to *savonnette*), or word clues other than endings. It can also occur by chance. One interesting observation is related to the comparison of correct guesses versus incorrect ones (see Figure 2). The fact that the combined explanatory power of the three predictors is greater for incorrect answers than for correct ones suggests that in some cases the participants may have been wrongly claiming their ignorance of

a word's gender, while in fact they already had some partial knowledge of it. As vocabulary items are learnt incrementally, it remains a possibility that at some point the learner already has a vague sense of a word's gender, even if the level of certainty is too low for that learner to claim that they know it.

Our study opens several avenues for further investigation. One promising direction would be to apply a similar research design to other language pairings. Comparable data across a broader set of languages would allow for deeper exploration of how the three variables examined interact with the transparency of the L1 and L2 gender systems, as well as with the real or perceived distance between the languages. Expanding the range of language pairs could also address a key limitation of this study – namely, the vocabulary differences between French and Polish, which led to an imbalance in the number of items across the gender categories. While such imbalances may be unavoidable with certain language combinations, a larger body of studies involving various pairings would likely produce a more balanced dataset and yield more robust conclusions. Additionally, future studies could explore words with atypical endings – those that deviate from strong gender-marking patterns – as these “exceptions” offer insights into the flexibility and limits of learners' generalizations.

It is also worth noting that the relatively weak role of L2 word endings observed in our study may stem from the use of spoken language. In French, gender cues are often more evident in written form, where orthographic suffix distinctions that are not pronounced aloud (e.g. *-elle* vs. *-el*) remain visually available and can signal grammatical gender. Many endings deemed ambiguous in our study would be clearer in writing. Therefore, future research should examine how word endings affect gender assignment in both spoken and written modalities. Another factor to consider in future research is the possible influence of participants' additional languages (beyond French, English, and Polish). Although assumed to be negligible in our study, this influence cannot be entirely ruled out. Including L3s in future designs could offer further insight.

Methodologically speaking, our response format represents a compromise that allows us to assess both gender assignment and confidence while limiting response complexity that would arise from also probing the source and strength of participants' prior knowledge. One limitation of this format is that some participants may avoid selecting “yes” due to low confidence, whereas others with a more self-confident response style may select “yes” despite weak underlying knowledge; such tendencies are likely shaped by individual factors. Certainty about grammatical gender is itself a complex phenomenon, as illustrated by the fact that many highly educated adult native speakers report confidence in the gender of relatively common nouns (e.g. *avion*, *pétale*, *amour*) while being incorrect. Future research may aim to better differentiate degrees of certainty and examine their relationship to performance. Another criticism that may be made of this study is that, although the task is evocative of real-life binary decisions about gender, it taps into offline judgment rather than real-time language use in a communicative context. Future studies could aim to examine gender assignment in a broader context or in actual communication.

Finally, the three variables studied may influence gender assignment in qualitatively different ways, particularly in terms of learners' conscious application of rules. For example, the use of masculine as a default gender – documented in L1 acquisition well before metacognitive awareness emerges (see Ogneva 2023, for L1 Spanish) – is likely unconscious. In contrast, reliance on L1 gender or L2 word endings may involve greater awareness. Learners might consciously apply memorized associations between endings and gender as a mnemonic strategy, with varying success. Improved study designs could help investigate the degree to which such rule-based strategies affect learners' gender assignment for unfamiliar words.

9. Conclusion

The aim of this study was to explore how speakers of L1 Polish assign grammatical gender to French words whose gender is unknown to them. Our analyses of responses which are assumed to be guesses reveal several phenomena regarding grammatical gender assignment in L2 French. Firstly, L1 transfer becomes increasingly significant compared to the masculine-by-default strategy as L2 proficiency improves. Secondly, L2 word endings gain influence over masculine-by-default starting at level B2, while masculine-by-default is impactful at lower proficiency levels. Interestingly, our findings contrast with previous studies that emphasized the power of L2 word endings (even though, as discussed above, differences in auditory versus written presentation of lexical items may have played a role). Additionally, our three factors do not fully explain gender assignment decisions. While some decisions may be truly random, it is also possible that some other – yet unidentified – qualities of the tested nouns may be at play.

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