The Relationship Between Declensional Attributes and Relative Utterance Speed in the Continental Germanic Languages

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Abstract

This paper analyzes the different attributes of grammar that affect declension and what their physical impact is in relation to relative utterance speed in the continental Germanic languages. Relative utterance speed, in this study, is quantified by the number of syllables that a certain noun-article combination contains. Noun-article combinations in particular were chosen to be the objects of focus in this study because of their ability to be impacted directly by declension, leading to an observable change that can result from declensional modifications in a sentence. Discussion of the history, function, effects of declensional attributes, which are case, gender, number, and article presence, provide background for a study of Swedish and Norwegian comparing the number of syllables in words that have taken up specific combinations of these attributes. Based on prior research and the results of the study, there is not conclusive evidence to suggest a presence or an absence of effect that declensional complexity has on sentence length in the language group. It has been determined, however, that gender-based inflection of animate noun-article combinations does not have an effect on relative utterance speed in Norwegian, and that declensional complexity does not invoke a difference in relative utterance speed in animate noun-article combinations between Swedish and Norwegian.

Introduction

Declension is the inflection of nouns, pronouns, and adjectives in language. Doing this in the context of a sentence frequently results in morphological changes in the words of focus, typically done by the addition of an affix to them. Despite a trivial and somewhat irritating appearance to learners of a declension-heavy language, its use presents the existence of semantic aspects of words that would otherwise have not been realized. Put simply, the use of declension on nouns, pronouns, and adjectives gives them a meaning which is distinct from their non-inflected counterparts. Thus, one can question the effects that the use of declension has on the length of a sentence required to express an idea in language. Because the affixes used act as morphemes themselves, and as a replacement for prepositions or postpositions in certain cases, the relative time of utterance needed to express a particular idea in a declension-heavy language presumably changes in comparison to a less declension-heavy one.

Due to the variation in the amount of declension used between languages within it, the Germanic language family is an appropriate one to focus on for this study, particularly the group of most predominant Germanic languages that currently exist on the continent of Europe. These languages, which include English, German, Dutch, Danish, Norwegian, and Swedish, among others, will be referred to as the continental Germanic languages for the purpose of this study. The title of 'continental Germanic' was assigned to this select group of languages because they

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[1] Definitions of linguistic keywords:
Declension: inflection of a noun, adjective, or pronoun based on class
Inflection: change made to a word to mark distinctions in case, gender, number, tense, person, mood, or voice
Case: inflectional form of a noun, adjective, or pronoun indicating its grammatical relation to other words
Gender: a grammatical subclass that determines agreement and selection of certain grammatical forms
Number: distinction of a word form to denote reference to one or more than one
Article: words or affixes that are used in conjunction with nouns to limit or give definiteness to its application

are among the most widely spoken Germanic languages that currently exist within the European continent. 'Continental Germanic' does not exclude non-contiguous regions of Europe, which allows for the inclusion of the insular Icelandic and Faroese languages in this study. In order to accurately analyze declension and compare it between languages in the continental Germanic group, a plethora of information related to inflection in its languages and the history behind it is needed before a study can be conducted. The topics of focus are organized into four groups: 1) how declension functions in the languages, 2) how declension developed and changed over time, 3) how grammatical gender interacts with declension, and finally, 4) the effect of declension on different parts of speech among languages within the group.

Function of Declension

The continental Germanic languages use declension in a variety of ways. Although their direct function is similar throughout the language family, the uses of declensional rules vary between each language. This leads to variation among the continental Germanic languages as a whole, and thus, each must be examined independently in order to fully grasp the nuances of each language in this regard.

Inflectional cases

A historical characteristic of the Germanic language family is the utilization of four inflectional cases: the nominative, genitive, accusative, and dative cases. Each case is meant to fulfill a specific function in showing how a noun is applied in a sentence. The existence of these four cases can still be seen in certain modern continental Germanic languages, such as Icelandic. Icelandic utilizes all four of the said inflectional cases, causing a more specific change in nouns, adjectives, and pronouns through the addition of a suffix based on their grammatical function

(Müller, 2005). The effect that the use of the four cases has on the noun at hand can allow a better understanding as to how the noun interacts with its target words. This conveys a more context-specific understood meaning of the noun to the language's speakers.

Although languages, such as Icelandic, have maintained the use of these four noun cases, the roles of inflectional cases in each Germanic language have changed over time, with certain languages experiencing the removal distinguishable characteristics of up to all four of said cases. A clear example of this reduction in the number of inflectional cases through a language's modern development is found in Swedish grammar. There is a striking difference between the number of cases used for the three aforementioned parts of speech seen when comparing Old Swedish and Modern Swedish. While Old Swedish functioned through the use of all four inflectional cases, the nouns and adjectives of Modern Swedish have been modified to function without any inflectional case at all. Alternatively, pronouns of Modern Swedish maintain the use of two inflectional cases, namely the nominative and genitive (Norde, 2002). To a similar effect, Danish has also undergone a reduction in the number of functional inflectional cases it has, shifting only to rely on the nominative and genitive cases for nouns and pronouns (Holmes & Lundskær-Nielsen, 2010). The variation in the number of cases only scratches the surface of the individualistic perspective with which each language must be viewed in this sense.

Irregularities in declension

Although there is a general set of guidelines that languages follow in order to convey ideas in a particular way, such as the addition of an *-s* suffix in English to denote a plural number, there are certain declensional anomalies that exist in each language which, again, must be examined and taken into account. A rather minimal example of this exists in English in the denoting of plural number for nouns. The "vast majority" of nouns in the English language

follow a rather formulaic pattern when denoting their plural forms. However, there also exists an "odd whimsical extension of irregular formation" found in the plural forms of certain words (Blevins, 2006, p. 512). The extension of the typical plural formation being referred to is what occurs in nouns that follow the regular pattern, such as *cat*, *book*, or *river*, as opposed to irregular-patterned nouns, such as *man*, *crisis*, or *ox*. The plurals for the normal pattern words are formulated quite simply, with just the addition of an /s/ phoneme to denote it, leading to the plural form of *cats* from *cat*, *books* from *book*, and *rivers* from *river*. However, in order to denote plurality in nouns that do not follow this rule, a more unique change must be made depending on the specific type of noun. Take the word *man* as an example, which has the plural form *men*. The change made to this specific word to denote plurality is the substitution of the vowel *a* for an *e*. Abnormalities like these are seen in a variety of other forms, such as the word *crises* from *crisis*, or *oxen* from *ox*. Even if a speaker of the English language who is not very proficient in the language were to use an incorrect plural form, such as by saying *mooses* as opposed to the correct plural *moose*, the statement would still be intelligible to most other English speakers. Although English has plenty of irregularities used when denoting plural number, they clearly are not extremely necessary to speakers in conversational or informal contexts. The productive grammatical rule in place in English of using an *-s* suffix to denote plural number is sufficient enough to render the irregular forms communicatively arbitrary, as the productive rule is so broadly standard in English that an assumption can be formed that plural number is being denoted when the suffix is used on a noun that does not follow the standard form.

The irregularities of declension in other Germanic languages in comparison to their counterparts, however, are far more impactful and can cause far more confusion than it is

possible with the case of English plurals. Within the continental Germanic languages, one that undoubtedly stands out the most is the case of Icelandic and its compound nouns. Compound nouns have the ability to form the meaning of a complex noun while existing as only one word. However, the case declension that must be taken into account when forming such nouns is not straightforward by any means. The individual nouns making up a larger compound one can each follow their own declensional pattern. This idea can be found in the word *einkabílastæði* (private parking spot), which is made up of the nouns *einka* (private), *bíla* (car), and *stæði* (space). Both the words *einka* and *bíla* exist in this word in the genitive case, while the word *stæði* exists in the nominative case. Alternatively, there exists another common form of nominal compounding where uninflected stems of compounded nouns are utilized, as opposed to their inflected genitive counterparts, as shown in the aforementioned example. One such occurrence is found in the Icelandic word *þjóðhagfræði* (macroeconomics), with *þjóð* (nation), *hag* (interest), and *fræði* (study) all existing in the nominative case (Harðarson, 2016). This shows the declensional variation that Icelandic nouns can have through this feature of nominal compounding, which is typically uncommon among the continental Germanic languages. As such, the irregularities of compound nouns in Icelandic, as well as other nominally-compounding Germanic languages, must be noted when understanding how its declensions as a whole function. Mistakes in this type of declension can cause far more confusion in conveying the meaning of a word, showing that declensional abnormalities as a whole should be kept in mind when comparing distinct languages within this group.

Changes in Declension

Living languages that are used by a population are bound to experience change in some form, ranging from inflectional cases to vocabulary. Changes can be brought on by a variety of factors that can be either internally or externally motivated.

Internally motivated modification

Internally motivated change to a language can be attributed to a few key elements: practicality and social influence. When a language is modified for the sake of practicality, the changes it undergoes are done to improve efficiency in the expression of ideas, or because certain facets of the language become deemed unnecessary by its speakers. This type of internally motivated change is visible when comparing late, or extinct, Germanic languages, from which the modern continental Germanic languages developed. When comparing Gothic and Old Norse languages to their older predecessors, such as Proto-Indo-European, it is evident that the preexisting necessary suffixes functioning as stem classifiers and inflectional endings had become separable from nouns (Norde, 2002). This example of declensional modification is not one that exhibited a reduction in the number of cases present in the languages, but rather a deflexion by means of reducing the necessary applications of declensional affixes. Because the change was widespread across multiple early Germanic languages, it is plausible that said modification was caused by the lack of importance for inflectional noun markings in the them.

Although practicality-based internal motivation can take place when causing inflectional change, social motivation is far more obvious and relevant to modern language, as it is more consciously caused by a language's speakers. Take the case of gendered inflection as an example. In multiple continental Germanic languages, such as English and Swedish, the use of gendered occupational and title-related suffixes has almost entirely disappeared. Distinctions

between words such as *actor* and *actress* have, in many instances, become viewed as "old fashioned or even clearly derogatory" (Ronneberger-Sibold, 2007, p. 205). This trend continues to this day, as modern German-speaking feminists have also criticized the use of said gendered inflection is their own language. Although some groups will deem it socially unacceptable to use gender-oriented titles as shown, others may feel that they are necessary to be clear in the presentation of ideas in their language, which is what their existence in German can most likely be attributed to. Considering the change that the other aforementioned languages underwent in their removal of extraneous gendered suffixes, it is likely that German will experience a similar adjustment in the future due to the cultural similarities shared by many Western populations.

It cannot be understated that although these different types of internal motivation factors are possible in promoting grammatical modification within a language or family of languages, namely the language group of focus in this research, it is difficult to identify any given one of them as the driving factor for any particular grammatical change, unlike the case of externally motivated modification, where specific sources can be identified as a change-eliciting factors due to commonalities shared between an influencing linguistic source and the language it has influenced. Because of the ambiguity that surrounds the discussion of internally motivated change as a whole, external motivating factors should be regarded with significantly more plausibility in causing modification.

Externally motivated modification

Alternatively, it is also possible for languages to be affected by outside influence, such as through interaction with foreign languages, cultures, and groups. This is evident, once again, when inspecting the changes that have taken place between extinct languages belonging to the Germanic family. The Scandinavian languages, which developed from Old Norse, were

"profoundly influenced by Middle Low German" due to the contact between the Germanic and Scandinavian people (Norde, 2002, p. 243). The loss in grammatical case that the Scandinavian languages experienced can be attributed to this contact because of the reduced elements of grammatical case which already existed in Middle Low German. Additionally, the influence that a language can experience as a result of foreign languages is also evident when analyzing modern languages, such as Faroese. In Faroese, for example, the typical plural number marker for the masculine-gendered nominative case is an -*ar* suffix. However, due to the increasing use of Danish in the Faroese region, the Danish plural marker -*s* has become popularized (Petersen, 2008). Despite being part of the same family, continental Germanic languages are able to impact and change one another, which has led to the inflectional changes that characterize their modern forms.

Interaction between Grammatical Gender and Declension

A characteristic of the continental Germanic languages that must be taken into account when reviewing their declensional features is the existence of grammatical gender within them. Declension interacts with grammatical gender and causes greater diversity in how nouns are affected.

Gender and declension as reciprocal determinants

Oftentimes, gender and declension can act as reciprocal determinants for one another in language. This allows either gender to determine what declension a word must have, or for declension to determine what the gender of a word must be (Kürschner & Nübling, 2011). In the Nynorsk dialect of Norwegian, for example, the use of indefinite articles on nouns with a singular number indicate the gender of a word. *Ein* (a) is used for masculine nouns, *ei* (a) is used

for feminine nouns, and *eit* (a) is used for neuter nouns (Enger, 2004). Therefore, given a phrase

such as *ein bil* (a car), one could use the presence of the masculine declension of the indefinite

article, *ein*, to determine that the noun *bil* is masculine without having directly known its gender

beforehand. This is an example of declension determining the gender of a noun, but, as

previously stated, the opposite can take place in language as well. The same is true in reverse,

where the gender of the noun of focus can function as a determinant for declension. In knowing

the gender of the noun *bil* as masculine, the implicitly resulting indefinite article that should be

used is *ein*.

The use of both forms of determination is a visible characteristic of certain other

continental Germanic languages, such as German. Take, for instance, the phrase *meine Ente* (my

duck). As a feminine noun, the possessive pronoun that precedes it is required to take on an *e*

suffix based on its grammatical gender (Martin, 2015). Because feminine possessive pronouns

are the only ones that can take on this suffix, declension functions as a determinant for the

gender of the noun *Ente*. Again, the same type of reciprocal determination can be seen in this

case. Upon seeing the pairing of a possessive pronoun with an *e* suffix and a noun of any type,

the automatic assumption can be made that the noun it is attached to has a feminine grammatical

gender. As demonstrated, there is a high degree of interaction between declension and

grammatical gender in the continental Germanic languages.

Implied gender without effect

Although there is a clear relationship between gender and declension in some continental

Germanic languages, it is worth noting that this interaction does not take place in all of them. In

fact, gender present within certain languages of the group is able to have no effect on a sentence

in terms of declension. This concept is most predominant in modern English. Before the

modernization of Old English, nouns of the English language existed in one of three distinct

genders: masculine, feminine, and neuter. However, after the language developed into the

modern English, there is no longer a distinct grammatical gender assigned to a word, which is

visible in the lack of gendered articles, or different forms of the articles *a* and *the* (Baron, 1971).

Thus, it is not possible for variation to exist in the way that grammatical gender interacts with

inflected articles.

However, the lack of effect that grammatical gender has is not limited to languages like

English that do not use a defined gender system. This same phenomenon also takes place even

in languages that continue to make use of the three aforementioned grammatical genders, such as

in the case of German where plural number nouns in the masculine and neuter gender can both

use the *-e* suffix when denoting its plurality (Kürschner & Nübling, 2011). Therefore, it is

possible for the gender of a particular noun to either be masculine or neuter grammatical gender

without changing any part of the sentence, as shown in Figure 1 seen below.

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Figure 1:

Singular subject → Plural subject

Masculine: Der Hund geht zum Fluss. → Die Hunde gehen zum Fluss.

        (The dog is walking to the river. → The dogs are walking to the river.)

Neuter:　　Das Pferd geht zum Fluss. → Die Pferde gehen zum Fluss.

        (The horse is walking to the river. → The horses are walking to the river.)

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The singular-subject sentences have been shown to clearly indicate that the subject nouns *Hund*

and *Pferd* are of different grammatical gender, which is visible through their different articles

placed before both words, with *Hund* and *Pferd* having a masculine and neuter gender,

respectively. As seen, the change between masculine gender and neuter gender for the subject words does not change the inflection they undergo when put in their plural forms. This means that if given a comparison between both of the subject nouns at hand in their plural forms, their genders are not distinguishable, displaying the possible absence of effect the gender can have on declension.

Effects on Parts of Speech

It is evident through the previously made comparisons between the continental Germanic languages that each language in the group has declensional features affecting nouns which are not always shared. The purpose of this section is to illustrate how particular parts of speech, namely nouns, pronouns, and adjectives, are affected by declension, as by nature they are more malleable than other parts of speech due to their ability to be influenced by case, gender, number, and article presence the most directly.

Denoting case

Typically, case is denoted in the continental Germanic languages by affixing a suffix to a noun. In languages that utilize a multiple-case system, or one that uses more than just the nominative case for nouns, the number of suffixes that are actually used to denote each case is less than the total number of cases that exist. In Faroese, for example, the declension that a noun takes on depends not only on case, but also which one of the twelve classes, or groups, the noun falls into. This creates forty-eight different possible declensional situations that can be encountered in nouns with singular number. However, despite there being so many different distinct declensional situations, there are only six different suffixes that can be added to singular nouns to represent these situations. In many of these declension possibilities, the noun may not

take on any suffix at all (Enger, 2013). Icelandic and Danish also follow a similar system to the Faroese one. In Icelandic, a rather small set of inflectional markers is used to denote a much greater number of cases (Müller, 2005). Danish is more of a unique case, in that although it does not contain all four Germanic declensional cases, it still maintains the use of fewer inflectional markings than its number of cases. The Danish genitive case makes use of only one marker to denote it, regardless of the gender of the noun (Holmes & Lundskær-Nielsen, 2010). Interestingly enough, the continental Germanic languages as a whole do not follow a one-to-one system for the declensional cases they carry, which refers to one unique affix is used to denote one type of declension. In addition, the languages that carry a higher amount of declensional cases do not make use of a one-to-one system by case either, they use a variety of suffixes for each case and even share suffixes between cases.

Simplification by removal of gender

Declension is also known to be simplified in languages where grammatical gender has been reduced. The resulting grammatical structure of declension becomes less complex, with the motivating factors for this simplification being any of those discussed previously. Grammatical gender of nouns can cause more complexity, which there is evidence of when comparing Old English and Modern English. Old English followed the three-gendered system, as many other Germanic languages do, as illustrated through the presence of agreement between nouns, adjectives, and pronouns. Contrarily, in Modern English, there is no longer a grammatical gender-based agreement between nouns and adjectives. To visualize this difference, anaphoric pronouns serve as an adequate example, where their role has been reduced in that gender is only reflected for the natural gender of animate nouns (Baron, 1971). The use of anaphoric pronouns and their role regarding natural gender and animacy is demonstrated in Figure 2.

Figure 2:

<u>Animate Subject:</u>

Masculine: A <u>man</u> was walking down the avenue, where a car passed <u>him</u>.

Feminine: A <u>woman</u> was walking down the avenue, where a car passed by <u>her</u>.

Neuter: A <u>child</u> was walking down the avenue, where a car passed by <u>it</u>.

<u>Inanimate Subject:</u>

Neuter: A <u>car</u> was parked on the avenue, where someone walked by <u>it</u>.

An anaphoric pronoun is used to refer back to an understood, specified noun. As illustrated in Figure 3, the gender of the anaphoric pronoun is only relevant when it refers to an animate noun that has a natural gender, where the pronoun used will either agree with the masculine, feminine, or neuter gender with *him*, *her*, and *it*, respectively. The absence of a natural gender for a given noun will result in it assuming a case identical to that of a neuter animate noun.

Simplification by the absence of gender can also be seen when specifically taking nouns into consideration. As previously mentioned, occupational nouns in German typically exist with both a masculine and feminine-gendered form, with the addition of a suffix used to denote the feminine-gendered form. However, many of the continental Germanic languages fail to maintain this same trend and have instead abandoned their use for the most part (Ronneberger-Sibold, 2007). There is a clear difference evident when comparing the complexity, in this respect, of languages with each type of system; the ones that do not make use of gendered occupational suffixes are able to convey the same idea using an occupational word in a shorter number of syllables. While other effects that case, gender, and number have on declension are not always visible, this is a very clear example of the absence of gender reducing the complexity of

declension. The extent to which gender is active in the language is arguably just as important as describing the functionality of its declensional system.

Declension and Syllabic Count

In order to most effectively visualize the difference that inflection makes in the length of sentences, and more generally, differences in relative utterance speed in the continental Germanic languages, I carry out an experiment which compares how declension functions in its usage through the analysis of examples of its use. To complete this, all attributes affecting declension must be taken into account and used in the comparison, which are case, gender, number, and article.

To effectively plan this experiment, I select two continental Germanic languages that are closely related in origin, but not so much so that they have the exact same declensional structure. The Swedish and Norwegian languages are chosen for this reason. While being closely related, Swedish uses fewer grammatical genders than Norwegian, as well as fewer cases. Neither language uses extensive noun compounding, meaning translation and identification of the inflected noun-article combinations are simplified.

To compare the effects of declension in each language, I count the number of syllables that a noun-article combination contains in both languages. There are thirty-two unique sentences created in which the noun of focus uses a combination of the four attributes. For example, a sentence created can have its noun of focus in the nominative case, neuter gender, plural number, and with a definite article attached.

The nouns that are used in the study are all animate ones, with the presence of a vowel or consonant ending being taken into account. In each particular gender, the nouns chosen have the

same number of syllables and the same type of letter, either vowel or consonant, with which they end. These measures are taken in order to maintain consistency in the starting form of each noun and allows any difference in the number of syllables between each language to be attributed to declension.

The Swedish nouns used are *pojke* (boy), a common-gender noun, and *barn* (child), a neuter-gender noun. The Norwegian nouns used are *løve* (lion), a masculine-gender noun, *jente* (girl), a feminine-gender noun, and *barn* (child), a neuter-gender noun. These nouns meet the criteria of having the same number of syllables within each gender, as well as ending with the same type of letter within each gender.

Although Swedish only has two genders, common and neuter, the comparison can still be made with Norwegian despite Norwegian having three: masculine, feminine, and neuter. Because the common gender in Swedish is derived from its former masculine/feminine roots, the common gender declensions would be comparable to both the masculine and feminine. To depict this similarity, both the masculine and feminine genders have been included for Norwegian.

The syllable counting process for Swedish translations are the same for both common and neuter gender, as there is only one phrase to count to serve as a comparison to Norwegian. However, because Norwegian has two genders, masculine and feminine, that must be compared to the Swedish common gender, a single value for the average syllable count had to be found in order to effectively make a comparison. Thus, the overall syllable count column of the data table for Norwegian, labelled $NO_{avg}=NO$, both represents the average syllable count between Norwegian masculine and Norwegian feminine, as well as the direct syllable count from Norwegian neuter. Norwegian neuter phrases are counted for syllables using the same process as

those of Swedish. Once the number of syllables in the noun-article combination is counted for

each phrase, their difference is calculated by subtracting the number of syllables in the Swedish

translation from the number of syllables in the Norwegian translation.

Figure 3 first provides the source sentences as well as translations into both Swedish and

Norwegian, organized by the gender of the noun of focus. Translations were obtained using two

online software in an attempt to achieve as much accuracy as possible through comparing the

resulting translations yielded from both sources. The second table provided shows the data

which resulted from this study. The columns of the second table indicate the sentence translated

through its number corresponding to the first table, case, gender, number, and attached article of

the noun of focus, the number of syllables the translation has in Swedish, followed by those of

Norwegian in masculine, feminine, and average/direct syllable count, and finally the difference

in syllabic count between Norwegian and Swedish, respectively.

Figure 3:

Source Sentence	Swedish Common (SVC)	Norwegian Masculine (NOM)	Norwegian Feminine (NOF)	Swedish Neuter (SVN)	Norwegian Neuter (NON)
1. There is a boy(SVC)/ lion (NOM)/ girl (NOF).	Det finns en pojke.	Det er en løve.	Det er en jente.		
2. The house is a boy's/lion's/girl's.	Huset är en pojkes.	Huset er en løve.	Huset er en jentes.		
3. The deer struck a boy/lion/girl.	Hjorten slog en pojke.	Hjorten slo en løve.	Hjorten slo en jente.		
4. The man showed a boy/lion/girl the book.	Mannen visade en pojke boken.	Mannen viste en løve boken.	Mannen viste en jente boken.		
5. There is a child(SVN, NON).				Det finns ett barn.	Det er et barn.

English					
6. The house is a child's.				Huset är ett barns.	Huset er et barns.
7. The deer struck a child.				Hjorten slog ett barn.	Hjorten slo et barn.
8. The man showed a child the book.				Mannen visade ett barn boken.	Mannen viste et barn boken.
9. There are boys/lions/girls.	Det finns pojkar.	Det er løver.	Det er jenter.		
10. The house is boys'/lions'/girls'.	Huset är pojkars.	Huset er løvers.	Huset er jenters.		
11. The deer struck boys/lions/girls.	Hjorten slog pojkar.	Hjorten slo løver.	Hjorten slo jenter.		
12. The man showed boys/lions/girls the book.	Mannen visade pojkarna boken.	Mannen viste løvene boken.	Mannen viste jentene boken.		
13. There are children.				Det finns barn.	Det er barn.
14. The house is children's.				Huset är barns.	Huset er barnas.
15. The deer struck children.				Hjorten slog barn.	Hjorten slo barn.
16. The man showed children the book.				Mannen visade barnen boken.	Mannen viste barna boken.
17. There is the boy/lion/girl.	Där är pojken.	Det er løven.	Der er jenta.		
18. The house is the boy's/lion's/girl's.	Huset är pojkens.	Huset er løvens.	Huset er jentas.		
19. The deer struck the boy/lion/girl.	Hjorten slog pojken.	Hjorten slo løven.	Hjorten slo jenta.		
20. The man showed the boy/lion/girl the book.	Mannen visade pojken boken.	Mannen viste løven boken.	Mannen viste jenta boken.		
21. There is the child.				Där är barnet.	Det er barnet.

Sentence						
22. The house is the child's.					Huset är barnets.	Huset er barnets.
23. The deer struck the child.					Hjorten slog barnet.	Hjorten slo barnet.
24. The man showed the child the book.					Mannen visade barnet boken.	Mannen viste barnet boken.
25. There are the boys/lions/girls.	Där är pojkarna.	Det er løvene.	Det er jentene.			
26. The house is the boys'/lions'/girls'.	Huset är pojkarnas.	Huset er løvenes.	Huset er jentenes.			
27. The deer struck the boys/lions/girls.	Hjorten slog pojkarna.	Hjorten slo løvene.	Hjorten slo jentene.			
28. The man showed the boys/lions/girls the book.	Mannen visade pojkarna boken.	Mannen viste løvene boken.	Mannen viste jentene boken.			
29. There are the children.					Där är barnen.	Det er barna.
30. The house is the children's.					Huset är barnens.	Huset er barnas.
31. The deer struck the children.					Hjorten slog barnen.	Hjorten slo barna.
32. The man showed the children the book.					Mannen visade barnen boken.	Mannen viste barna boken.

Sentence No.	Case	Gender	Number	Article	SV syl	NOM syl	NOF syl	NO_{avg}= NO syl	(NO-SV)
1.	Nom	C/M/F	sing	indef	3	3	3	3	0
2.	Gen	C/M/F	sing	indef	3	3	3	3	0
3.	Acc	C/M/F	sing	indef	3	3	3	3	0
4.	Dat	C/M/F	sing	indef	3	3	3	3	0
5.	Nom	N	sing	indef	2			2	0
6.	Gen	N	sing	indef	2			2	0

7.	Acc	N	sing	indef	2			2	0
8.	Dat	N	sing	indef	2			2	0
9.	Nom	C/M/F	plu	indef	2	2	2	2	0
10.	Gen	C/M/F	plu	indef	2	2	2	2	0
11.	Acc	C/M/F	plu	indef	2	2	2	2	0
12.	Dat	C/M/F	plu	indef	3	3	3	3	0
13.	Nom	N	plu	indef	1			1	0
14.	Gen	N	plu	indef	1			2	1
15.	Acc	N	plu	indef	1			1	0
16.	Dat	N	plu	indef	2			2	0
17.	Nom	C/M/F	sing	def	2	2	2	2	0
18.	Gen	C/M/F	sing	def	2	2	2	2	0
19.	Acc	C/M/F	sing	def	2	2	2	2	0
20.	Dat	C/M/F	sing	def	2	2	2	2	0
21.	Nom	N	sing	def	2			2	0
22.	Gen	N	sing	def	2			2	0
23.	Acc	N	sing	def	2			2	0
24.	Dat	N	sing	def	2			2	0
25.	Nom	C/M/F	plu	def	3	3	3	3	0
26.	Gen	C/M/F	plu	def	3	3	3	3	0
27.	Acc	C/M/F	plu	def	3	3	3	3	0
28.	Dat	C/M/F	plu	def	3	3	3	3	0
29.	Nom	N	plu	def	2			2	0
30.	Gen	N	plu	def	2			2	0
31.	Acc	N	plu	def	2			2	0
32.	Dat	N	plu	def	2			2	0

*The colors in this diagram are used to denote the different changes that the noun can take on within each category (case, gender, number, and article type).

Abbreviation Key:

Case	Gender	Number	Article Type	Language
Nom - Nominative	C - Common	sing - Singular	indef - Indefinite	SV - Swedish
Gen - Genitive	M - Masculine	plu - Plural	def - Definite	NO - Norwegian
Acc - Accusative	F - Feminine			
Dat - Dative	N - Neuter			

Discussion

As seen by the data, there is only one point throughout the entirety of the experiment that shows a nonzero difference between the syllabic count of the noun-article combination between Swedish and Norwegian. However, there is a point to be made about that sentence, number 14, in particular as well as sentence 10 regarding the validity of their data.

Certain source sentences sound extremely awkward in that the noun and article would never be used in the context of a conversation or writing in English. This is because English entirely lacks a plural indefinite article, causing certain combinations of case, number, and article types to be impossible to express. This combination in particular is the genitive/plural/indefinite one. As a result, only the closest approximation to what this certain combination should be was made, which were those of sentences 10 and 14. The consequences of this are seen in the resulting translations for Swedish and Norwegian.

Having used online translation software as the means of obtaining translations from the source sentences, there is unfortunately room for error in using untranslatable source sentences, which is an issue that is seen particularly with sentences 10 and 14. Although the closest possible approximation was made for what the case/number/article combination should be in the

source sentence, the software is simply unable to translate it correctly due to the fact that there is no way to properly express it in English. In theory, the software used should be able to identify this combination correctly and consequently provide an accurate translation based on these criteria. However, because the source sentences are nevertheless properly inexpressible in English, it is not certain that translation of this type can take place with any strong degree of accuracy.

The consequences of this lack of expressibility are particularly noticeable in translating sentence 14. Although the phrase in sentence 10 seemed to translate consistently between both languages, the same is not true for sentence 14. The Swedish and Norwegian noun-article combinations take on strikingly different, inconsistent declensions, with that of Norwegian instead being the exact same as the one yielded in sentence 30. Therefore, it can be inferred that there is most likely an incorrect translation for Norwegian in sentence 14, meaning that the data it provided should not be regarded as worthy of consideration. Furthermore, because of the evident risk being taken in using logically inexpressible source sentences, data resulting from the translations yielded from sentence 10 should also be disregarded.

As seen by the usable data obtained, at no point is there a difference between the number of syllables that a specific Swedish or Norwegian declension makes. Throughout all usable examples, the number of syllables of the noun-article combination showed no difference when comparing the two languages. Although both languages see changes in syllable count by means of manipulating the four attributes, the changes they experience are consistent between them.

Conclusion

In analyzing the data that resulted from the study as well as prior research, conclusions can be drawn about the relationship that declension has to relative utterance speed within Swedish and Norwegian, as well as inferences regarding possible similar trends that may be present in other languages of the continental Germanic group.

Regarding solely the information derived from the study conducted, it is clear that there is no relationship between declensional complexity for nouns and phrase length within the languages compared. Despite Swedish having a declensional system far less complex than that of Norwegian, the number of syllables produced for any given declensional combination for the noun-article combinations was identical between the two languages in the viable phrases used for comparison. The data suggests that the presence of additional cases and grammatical genders present in Norwegian seem to have no effect on the declensions of nouns by means of causing extraneous addition of syllables.

Additionally, there is more to be said about the relationship between declensional complexity and grammatical gender based on these results. Even within Norwegian, there was no change in syllabic count that occurred based on gendered inflection whatsoever, such as in the case of changing between masculine and feminine gender. A similar inference regarding the language group as a whole can be drawn in considering preliminary research conducted as well. Referring back to Figure 1, the trend in German for the examples shown is consistent with the results of the study in comparing Norwegian, where two noun-article combinations that only differ in their grammatical gender have no difference in their syllabic count in the case of masculine and feminine. This suggests that it is a trait that can is consistently found in the continental Germanic languages. Thus, there is reason to believe that gender-based inflection

does not result in syllabic count differences, and more broadly, in sentence length differences, in the continental Germanic languages. Although there may be truth to this inference based on the results of the study, it however is not possible to accurately apply this to languages other than Swedish or Norwegian.

Inferences made regarding declensional cases as a whole in this language group should be expanded on in the future before being broadly applied to it, where further studies can provide a more conclusive assertion on the matter. Such studies may include research involving the use of inanimate nouns instead of solely animate ones, referencing different parts of speech that are inflected using declension, and even through the inclusion of more languages. There is, however, sufficient evidence to believe that gender-based inflectional complexity for animate noun-article combinations in Norwegian has no effect on syllabic count, and therefore, no effect on phrase length and therefore relative utterance speed. Pertaining to the study conducted in a broader sense, it has also been determined that declensional complexity does not invoke a difference in syllabic count and thus relative utterance speed in animate noun-article combinations between Swedish and Norwegian.

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