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and, most importantly, our authors and reviewers!

INTRODUCTION

Finally, it is here!

After months of work by authors, reviewers, and the editorial team, we have a first edition!

This issue contains excellent work by Radboud students, both bachelor's and master's students, about their research projects in all fields concerning language and linguistics. It contains articles on, among others, phonology & memes, the language of depression, and multimodal experiments with ideophones.

We hope RU:ts will be a fixture on the Radboud campus for years to come! The journal is intended as an enlightening project with the aim to have Radboud students learn about academic publishing, peer review, and also the scientific relevance of their work.

The papers are also available online for free, as they are published under Open Access Creative Commons Licence. The authors receive the rights to their papers, and can (re)publish them anywhere as long as they mention RU:ts in some way! This is especially important to us because we support the "open science" movement.

We want to give special thanks to the teachers who helped us on our way, especially dr. Nelleke Oostdijk, prof. dr. Helen the Hoop. We would also like to thank Sander Nederveen, who is a fellow founder, and all the reviewers and authors who made this project possible!

Best wishes,
Iris Faber & Myrthe Reuver
editors-in-chief

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Independent Pronoun Semantics:

The pragmato-semanto-syntactic processing of pronominal reference[1]

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Abstract: A comparative literature review is carried out on the topic of pronominal reference, looking specifically at pronoun gender agreement. Theoretical (Audring, 2013; Josefsson, 2006) and empirical accounts (Hammer et al., 2005; Dong et al., 2015) are compared. It is argued that these converge on the finding that pronouns, rather than being mere syntactic devices used for agreement, are selected on the basis of their own semantic load (referred to here as independent pronoun semantics); moreover, that independent pronoun semantics plays an important role in establishing pronominal reference. These findings are placed in a broader context, making a case for the psychological reality of Gricean pragmatics. Finally, a connection is made with Everett's model of language-culture interactions, that of cultural constraints on grammar (cf. Everett, 2005).

Keywords: personal pronoun, agreement, grammatical gender, language and culture

1. Introduction

Agreement has traditionally been described as a syntactic phenomenon. In this view, agreement is a syntactic relation between two parts of a sentence, the *controller* and the *target*, where the target matches the controller in one or more syntactic features, such as number or gender (cf. Corbett & Fedden, 2016, p. 499). That is to say, the controller is that which gets matched with, and the target is that which matches. Consider the following example:

(1)	Puell-a	pulchr-a	vir-um	crud-um	ama-t.
	girl-NOM. SG.FEM	pretty-NOM. SG.FEM	man-ACC. SG.MASC	crude-ACC. SG.MASC	love-3SG. PRES

"The pretty girl loves the crude man. "

In this Latin sentence, the adjective *pulchra* matches the noun *puella* in the features number and gender; the adjective *crudum* matches the noun *vir* in number and gender; and the verb *amat* matches *puella* in number[2]. Thus, we say that *puella* and *vir* are controllers, that *pulchra*, *crudum* and *amat* are targets, and that they agree with each other in these features.

Recently, however, the notion of *semantic agreement* has been intro-

1 The subtitle was chosen to emphasize that, according to the conclusions I draw in this paper, the processing of pronominal reference does not happen pragmatically, semantically and syntactically in separate processes, but rather in one single, pragmato-semanto-syntactic process.

2 On the traditional analysis of Latin grammar, amat would also be said to agree with puella in person, because puella is a third person; however, this paper is about how agreement is expressed formally, and the form puella does not include a morphological marker for the third person, therefore I leave this feature out of my analysis here.

duced (cf. Audring, 2013; Josefsson, 2006, who speaks of *semantic gender*), where the idea is that the target matches the controller in one or more *semantic* features. In this paper, I will review this notion of semantic agreement from the point of view of pronominal reference, in an attempt to answer the research question "Is semantic or syntactic information primary when it comes to establishing pronominal reference?" Note that when I say "primary", I do not mean primary in a chronological sense, but rather "of primary importance". On the traditional, syntactic view of agreement mentioned above, syntactic information is of primary importance for establishing pronominal reference. However, as we will see, there are reasons to believe that semantic information is at least as important, if not more.

The structure of this paper is as follows. We will discuss recent literature on the topic. First we will consider theoretical accounts of gender agreement (Corbett & Fedden, 2016; Audring, 2013; Josefsson, 2006), with special attention to pronoun gender, and some potential problems with them. Then, in order to get an insight into the psycholinguistic and neurolinguistic mechanisms by which pronominal reference is established, we will look at some experimental research (Hammer et al., 2005; Dong et al., 2015). Certain common findings can be gleaned from these accounts, both theoretical and experimental. Finally, after discussing these commonalities, they will be placed in a wider context, and we will discuss their implications for theories of language processing, as well as what they say about how pragmatics relates to the syntax-semantics interface.

2. Literature review

2.1 Theoretical accounts

Corbett & Fedden (2016), using the Canonical Typology approach, describe a *Canonical Gender Principle*, which holds that "in a canonical gender system, each noun has a single gender value" (p. 495). They then go on to state that real languages do not all conform to this principle; it is an abstraction, and gender systems in different languages vary in their canonicity.

Furthermore, they introduce the notion of *hybrid* controllers (p. 517ff.), which take different agreements in different domains (in some cases, even in the same domain). Hybrid nouns, it is said, "typically arise when the gender assignment rules of the language are in conflict" (p. 518). This behaviour is constrained by the Agreement Hierarchy, which had been previously described by Corbett (1979, cited as Fig. 5 in Corbett & Fedden, 2016, p. 519). The Agreement Hierarchy describes which targets are more likely to be permitted alternative agreement based on semantic justification. From left to right, the hierarchy is as follows: attributive adjectives > predicative adjectives > relative pronouns > personal pronouns, where the further right one goes in the hierarchy, the more likely it is that such targets are permitted alternative agreement.

The example they give here is that of the German noun *Mädchen* 'girl'. Being a diminutive, this is syntactically neuter, but it allows feminine agreement (at least in the domain of the personal pronoun) because it has a female referent. This implies that the reason "the gender assignment rules of the language are in conflict" is because they are (morpho-)syntactic on the one hand (assigning the value NEUTER), and semantic on the other hand (assigning the value FEMININE).

Audring (2013), discussing apparent gender agreement mismatches in

Dutch (p. 35ff.), rejects the notion of hybrid controllers and proposes "an alternative account that does not make use of the *hybrid* concept" (p. 40). She mentions the supposed semantic rules for gender assignment in Dutch. According to these rules, countable nouns should be masculine, sometimes manifesting as common) and uncountable nouns should be neuter. She then states that these rules do not exist as such. This is to judge from the fact that the Dutch gender assignment patterns for countable and uncountable nouns are in fact inconsistent (for examples, see p. 41). She also argues that some Dutch nouns do not always exhibit hybrid behaviour; moreover, if one takes the use of a masculine pronoun for a common noun as a mismatch, virtually all Dutch nouns exhibit hybrid behaviour in some circumstances. Audring herself does not do this, by the way, as "masculine or common gender fall under the same semantic rule" (footnote p. 41; I agree with this remark).

If the rule that produces what Corbett and Fedden call "hybrid" behaviour, as described by them, is not correct (at least not for Dutch), what, then, is causing the fact that nouns can sometimes take one anaphoric pronoun and sometimes another? Audring argues that hybridity is not a property of the controller, but of the target (in this case, the pronoun). On this view, the pronouns have a semantic load of their own, which may semantically clash with the noun's syntactic gender, when it is felt to be semantically inappropriate, and it is the semantically appropriate pronoun that is used in case of such a clash. Thus, she dispenses with the notion of hybrid nouns entirely (pp. 42–44).

Josefsson (2006), writing about Swedish, distinguishes two systems for assigning gender: a syntactic[3] one and a semantic one. She illustrates this with predicative adjective agreement, which in Swedish sometimes (puzzlingly) appears to mismatch: common nouns can trigger neuter adjectives, as in the following example (after Josefsson, 2006, p. 1347):

(2)	senap	är	gul-t.
	mustard	be.PRES	yellow-NEUT
	"Mustard is yellow."		

In this sentence, the noun *senap*, despite being common, triggers the neuter adjective *gult*, instead of the common *gul*, which one would expect if agreement in Swedish were purely syntactic, as in the Latin example above.

Josefsson describes the Swedish syntactic gender system as having two genders: common and neuter, and the semantic gender system as having four: MALE, FEMALE, THING, and SUBSTANCE; inanimate nouns can be variably assigned the THING or the SUBSTANCE gender based on the context, although one of these assignments is often prototypical whereas the other is marked (pp. 1349–1352).

Although Josefsson mainly discusses predicative adjective agreement, she also mentions pronouns, and in fact this becomes crucial later on in her analysis. Pronoun selection shows that the syntactic and semantic gender systems interact: semantic males take the masculine pronoun *han* 'he'; females take the feminine *hon* 'she'; things and substances can both take either *den* 'it [common]' or *det* 'it [neuter]', depending on the syntactic gender of the noun with which they agree (p. 1352)—except in cases where

3 Josefsson uses the term "grammatical gender", but I use "syntactic gender" for the sake of consistency and clarity; in my vocabulary, "grammar" includes semantics.

there is no possible antecedent noun present and *den* and *det* appear to be used deictically (examples on pp. 1352–1353). In these cases, according to Josefsson, the choice of pronoun is determined directly by the semantic gender feature of the pronoun itself: *den* is used for things and *det* for substances, which includes events and clauses (pp. 1353–1355).

On this basis, she goes on to argue that the apparent gender mismatches (or cases of "disagreement") are actually cases of agreement because that with which the target adjective gets matched is not, in fact, the gender feature of the target noun, but that of an (unexpressed) "pronominal element merged higher up in the nominal extended projection" (p. 1355). This is much in the same way that, in sentences with so-called "prenominal apposition", it is the prenominally apposed pronoun and not the noun that triggers agreement on the predicative adjective (examples on pp. 1357–1358). This analysis holds that there is a projection called Semantic Phrase (SemP; this is the aforementioned "pronominal element", which may or may not be overtly expressed) on top of the DP.

Comparing Audring (2013) and Josefsson (2006), we see that both authors discuss languages in which one and the same noun, with the same gender value, is referred to with different pronouns in different situations. Whereas the one (Audring) considers this a case of pronouns exhibiting hybrid properties, the other (Josefsson) claims that the apparent violation of agreement is in fact 'true', i.e. syntactic, agreement with an unexpressed part of the deep structure. Although they disagree on this point, we can see that there is a commonality in their findings, perhaps best summarized as follows: *pronouns have a semantic load of their own, rather than being mere syntactic devices used for anaphoric reference, and this semantic load influences the speaker's choice of pronoun depending on the situation*. In what follows, I will refer to this idea as *independent pronoun semantics*. In light of independent pronoun semantics, we can now review our notion of (semantic) agreement. My view is illustrated in Fig. 1:

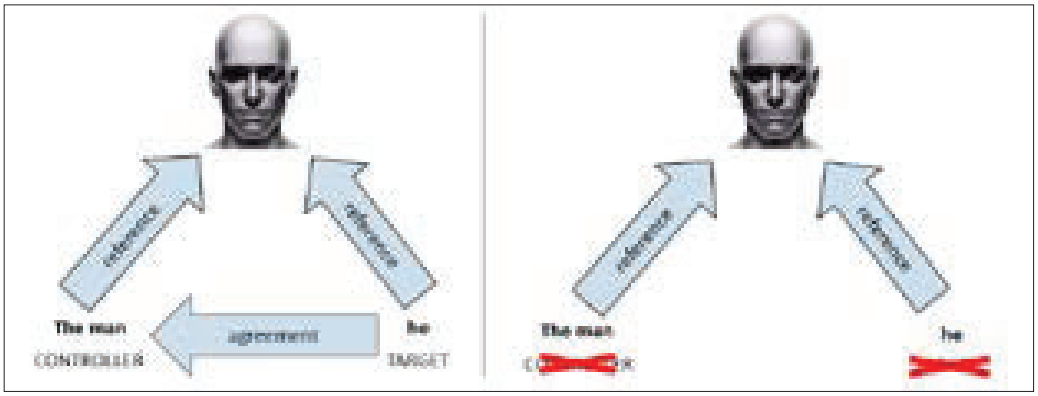

Fig. 1. Syntactic agreement (on the left) vs. 'semantic agreement' (coreference; on the right). The man's head represents the real-world referent, whereas the arrows represent relations between words (syntactic; horizontal) and between words and the real world (semantic; diagonal). The words 'the man' and 'he' should not be taken as the literal English words, but are placeholders for nouns and pronouns in hypothetical languages with full syntactic gender (on the left) and without it (on the right). (Source for man's head: https://depositphotos.com/132561676/stock-photo-generic-human-man-face.html.)

On this view, then, what Josefsson calls semantic agreement is actually simply coreference. Even in languages with syntactic agreement, the pronoun does not merely match its anaphoric referent on syntactic features such as gender, but it also refers by itself, namely to its extralinguistic (real-world) referent. In languages without syntactic agreement, or where syntactic agreement is disappearing, the syntactic relationship between the two is severed, while the semantic relationship is maintained through coreference. Thus, the noun ceases to be a controller, and the pronoun ceases to be a target. For this reason, I suggest we do away with the notion of semantic agreement and use the term agreement only for syntactic agreement.

The fact that personal pronouns have independent gender semantics helps explain why they are on the right in Corbett's Agreement Hierarchy: they are "permitted alternative agreement based on semantic justification" (Corbett & Fedden, 2016, p. 59) more than the elements to their left because, as I have just demonstrated, their semantic gender allows them to refer directly to the referent, rather than via the noun.

2.2 Experimental accounts

So far we have accrued theoretical evidence for the influence of independent pronoun semantics on pronominal reference, but let us now take a more empirical look at what this means for language processing in a psycho- and neurolinguistic sense, by looking at evidence from experiments.

Hammer et al. (2005) investigated event-related potentials (ERPs) in German-speaking subjects presented with German sentences containing anaphoric pronouns that either matched or mismatched their antecedent nouns in gender, where the antecedent noun could refer to either a person or a thing (examples in Table 1 on p. 229). Their results indicate that semantic and syntactic processing interact when listeners (or readers) link a pronoun to its antecedent.

Linking a pronoun to its antecedents proceeds in two stages, according to Garrod & Sanford (1994, cited in Hammer et al. 2005, p. 227): the *bonding* stage, at which the link is initially established, and the *resolution* stage, at which the link is evaluated and ultimately judged to be either successful (the pronoun is congruent with its antecedent) or unsuccessful (the pronoun is incongruent with its antecedent). While this pronoun processing is going on, brain activity may show one of two ERPs: to oversimplify somewhat, an N400 is seen in case of increased semantic processing (indicating difficulty), whereas a P600 is seen in case of increased syntactic processing.

Hammer et al. found both N400 and P600 effects. In their first of two experiments, stimuli consisted of a sentence with one main clause containing the antecedent (such as *Die Jacke ist warm…*) and one subordinate clause containing the pronoun (such as *…weil sie gefüttert ist*). In this experiment, they found a small negativity (not quite an N400) at the pronoun position in case of a mismatch, but only if the antecedent was a thing, contrary to expectations (pp. 229–230); they also found an N400 on the word following the pronoun, again only in the thing condition (pp. 230–232; 235). This indicates that the parser continues to search for an acceptable referent outside the sentence, i.e. either at the discourse level or in the real world, but only in the thing condition (cf. discussion on pp. 232–233; 235–236).

They also found a P600 at pronoun position for both person and things,

but this effect was larger in the person condition, indicating that the preceding negativity 'pulls down' the P600 in the thing condition (p. 230; 235). In light of this finding, they revised their analysis of the P600 effect: it does not reflect purely syntactic processing, but is influenced by the semantic processing that is still going on at the same time (p. 232; cf. also pp. 235–236).

In the second experiment, featuring similar sentences preceded by an additional ('discourse') sentence (such as *Die Frau steht im kalten Schnee*), they looked only at N400 effects (pp. 233–234). This experiment replicated the findings from the first (p. 234), which confirms that semantic and syntactic processing occur together, not separately (cf. p. 236). In other words, the parser uses both semantic and syntactic information at the bonding stage to establish the link between pronoun and noun antecedent. When the noun refers to a person, and thus contains semantic gender information, the pronoun clashes semantically as well as syntactically with the noun, meaning no further analysis is possible. In this case, the parser proceeds to the resolution stage without doing anything, resolving that the pronoun is incongruent. This is expressed in terms of brain activity as a P600.

However, when the noun refers to a thing, and thus does not contain semantic gender information, the possibility remains open that the pronoun refers to something else. Thus the parser is not sure of the link at the bonding stage, expressed by a negative brainwave (indicating difficulty in semantic processing). It then searches outside the sentence, in the discourse, for any other information it could use to establish pronominal reference with something other than the noun inside the sentence. If this information is not found, it resolves that the pronoun is syntactically incongruent at the resolution stage, expressed similarly by a P600, except that the P600 in this case is smaller because it is 'pulled down' by the preceding negativity. But then, crucially, the parser holds out for more information from the following word(s), and only when this information determines once and for all that the pronoun either does or does not have the same referent as the noun does the parser resolve that it is either congruent or incongruent (expressed by an N400 on the word following the pronoun in case of incongruence).

To summarize, although both nouns with inanimate and with animate referents had syntactic gender, it was only the "semantic gender" of the *animate* referents that immediately (at the bonding stage) blocked pronoun integration. This indicates that it is the pronoun's independent semantics that is used to establish pronominal reference, and only if this does not resolve ambiguity do syntactic features come into it.

Another study that suggests semantic information is at least as important for establishing pronominal reference as syntactic information was done by Dong et al. (2016). They did two self-paced reading experiments with Chinese-speaking learners of L2 English. In both experiments, participants were shown sentences with a noun antecedent (such as *Mary goes to the zoo to watch animals every day after work for a good rest*) and an anaphoric pronoun, where the prounoun either matched (*She…*) or mismatched the antecedent in gender (*He considers it the best way to relax and maintain a good mood*; p. 737). In the first experiment, the sentences were preceded by a picture of either a human or a non-human; in the second, the sentences were not preceded by a picture (p. 736).

The authors found that reading times for sentences with a mismatching pronoun were significantly longer—indicating difficulty during processing—only in the condition in the first experiment where the gender of the pictured human matched that of the pronoun (pp. 738–740). In all other circumstances, reading times were the same as for sentences with a matching pronoun (ibid.; pp. 742–743).

They explain this finding as follows (p. 743ff.): in Chinese, 3rd person singular pronouns are not distinguished with regard to gender, except in writing. Thus, when Chinese listeners link a pronoun to its antecedent in Chinese, they do not use gender information (indeed, they cannot, since it is absent). According to Dong et al., Chinese learners of L2 English do the same in English—at least at the bonding stage (see above). At the resolution stage, they use extrasentential information (in this case, the picture) to evaluate the link. This is why the presence of a picture that matches the pronoun, and thus mismatches its antecedent noun, slows down reading times, whereas reading times are unaffected everywhere else (cf. discussion of the mismatch effect on pp. 743–744).

Thus, the studies by Hammer et al. and Dong et al. both indicate that semantic information is important for linking a pronoun to its antecedent; moreover, that extrasentential information (whether from the discourse or from the real world) is used to evaluate this link.

3. Discussion

We have now collected substantial evidence from both theoretical and experimental sources. In section 1 above, we reviewed the definition of agreement, controller and target. In section 2.1, we compared the notion of hybridity as discussed by Corbett and Fedden (2016) and by Audring (2013), respectively; we also discussed Josefsson's (2006) analysis of the Swedish gender system and found that it shares with Audring's analysis of the Dutch gender system that which I refer to as independent pronoun semantics. This idea was then embedded back into Corbett and Fedden's theoretical framework. Finally, in section 2.2, we held these theoretical findings up to empirical scrutiny; we found that independent pronoun semantics directly affects the linking of pronouns to their antecedents and the evaluation of this link, both during comprehension (Hammer et al. 2005) and during productions (Dong et al. 2016).

Building on this evidence, we may now ponder what the *reason* could be that independent pronoun semantics influence the establishment of pronominal reference as seen above. For example, the fact that the parser holds out for extrasentential information in the study by Hammer et al. strongly suggests that pragmatics plays a role here. After all, language is a tool for communication, and in order for communication to be successful it is always necessary to be able to make sense of what the other party is saying. The *Maxim of Relation*, as formulated by Grice (1975, p. 46), states "Be relevant", i.e. (my words) when listening, people expect their conversation partner to say only things that are relevant to the conversation; when speaking, they know that their conversation partner expects them to do the same, so they try to be equally relevant. Thus, when faced with something that seemingly makes no sense (an apparent gender agreement violation), the listener first tries to

make sense of it: "Either this pronoun is incongruent with this noun, but the speaker *meant* to refer to this noun and simply used the wrong pronoun; or the pronoun is in fact congruent, but with another antecedent (found either elsewhere in the discourse or in the real world), not with this one."[4]

This need for 'sense-making' is so inherent to the communicative function of language (and indeed to human cognition more generally) that I would go so far as to suggest pragmatics is part of the mental grammar, i.e. language users have built into their language processing the question *What is proper to say (in this particular situation)? What should be said and what not? What makes sense?*

There is a body of research that supports this suggestion if one makes the necessary connections. On the production side, Antón-Méndez (2010) uses the concept of the *preverbal message* to explain why L2 English speakers whose native language is Spanish make more pronoun gender errors than L2 English speakers with similar native languages, such as Italian. According to her, the information included in the preverbal message is language-specific (pp. 133–135). Spanish has different information requirements than English; in particular, the gender of a third person constituent is often not required in Spanish. Thus, the processing responsible for these errors takes place on the conceptual level, not on the level of syntax. On the comprehension side, this is in accordance with the finding by Dong et al. that Chinese speakers of L2 English process pronoun gender information at the conceptual level. That is, the pronoun is not linked by gender to its antecedent syntactically, but to its real-world referent conceptually; processing difficulty only occurs only if this real-world referent (represented in their experiment by a picture) clashes with the pronoun.

The connection with pragmatics lies in the fact that again, which information is required at the conceptual level depends on what is or is not proper to say in the situation at hand. This differs between languages and is influenced by culture. For example, Pawley (2002) found that inanimate nouns in colloquial Australian English can be animated by referring to them with *he* or *she*. The choice of pronoun depends on semantic properties that, while not fully known, are common to the grammars of the members of this linguistic community, evidenced by the fact that such references are never misunderstood.

An example of culture influencing language comprehension is provided by Hubers et al. (2016), who presented prescriptivist listeners with constructions that are held to be 'improper grammar' by prescriptivist standards, and found that these listeners present such constructions differently from *both* uncontroversially grammatical *and* truly ungrammatical constructions—on a physical, neurolinguistic level, demonstrable through fMRI scans.

Thus, the above findings make a strong case for the psychological reality of Gricean pragmatics. Pragmatics, which is influenced by culture, itself influences language processing—measurably—down to the level of syntax. This appears to support Everett's model of what he calls "cultural constraints on grammar", whereby the grammar of a given language is shaped by the cultural values and attitudes of its speakers as to what is 'proper' to say or not (cf. Everett, 2005, pp. 622–623; 631; 633–634).

4 I do not mean to suggest that this attempt at sense-making takes place consciously; on the contrary, my point is that it is as subconscious as the rest of the language processing system.

4. Conclusion

We can conclude with the following remarks. Although the research question at the beginning of this paper was a single one, the answer turns out to be twofold. Firstly, semantic information indeed appears to be at least as important for establishing pronominal reference as syntactic information, if not more. Returning to the notion of agreement, we see that it is not necessary, even in languages that have it, because independent pronoun semantics ensures that the pronoun-noun link is always maintained simply through coreference. Secondly, this process of establishing pronominal reference is influenced by pragmatics, during both production and comprehension: different languages have different requirements as to what should be expressed, which influences both what speakers choose to say (production) and how listeners make sense of what is said (comprehension).

Unanswered questions still remain. Strikingly, if agreement is not necessary, then why does it exist at all? I suspect the answer may be found in the way the information structure is optimized for easy understanding. Note that Josefsson (2006, pp. 1366–1367) states that pronoun gender facilitates discourse linking. It could be the case that different languages use different forms and combinations of agreement, word order, prosody and perhaps other devices to package information and link discourse together, motivated by the listener's need to make sense of what is said and the speaker's need to make this possible. Further research opportunities lie here.

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Typology of grammatical relations: Explanations in the typology of grammatical relations and alignment systems[1]

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Abstract: The languages of the world are very similar in their function to facilitate basic human needs for self-expression and communication. In order to do this, languages typically assign properties, in the form of predicates, to entities or concepts, expressed in language as arguments of these predicates. Verbal predicates can vary in valency, being able to have up to three core arguments attached to them. In order to distinguish these arguments from each other, languages can apply a wide variety of strategies, which are realized at different linguistic levels, such as morphology and syntax. Syntactically, languages can use rigid word order patterns to encode gramwmatical relations. They can also employ morphological marking of either the verb or the arguments, known as head marking and dependent marking, respectively. Even within these different strategies, languages have a variety of options to specifically realize them. For instance, dependent marking languages that use case markers for their arguments can employ various alignment systems. Additionally, they can use different combinations of alignment systems in different linguistic contexts. One can thus see that languages display a considerable amount of variation in a fairly basic aspect of language, namely the fundamental structure of their basic sentences. This paper will explore different explanations as to why languages show this variation, mostly focusing on grammatical relations and alignment systems. This will be done through close analysis of previous literature on alignment systems. This analysis showed that for all possible alignment types, a clear explanation could be offered.

Key words: typology, grammatical relations, alignment systems, morpho-syntax, case marking

1. Introduction

Regardless of their endless diversity, all of the world's languages are very similar in their basic function. In order to effectively describe actions and concepts in the real world, languages assign predicates, often, but not always, in the form of verbs, to certain arguments, which take the form of nouns. Where these nouns refer to the objects or concepts in the real world that speakers want to say something about, the predicate expresses the action or property that they want to assign to these nouns. The number of arguments attached to a verb can vary. Intransitive, transitive and ditransitive verbs take one, two or three arguments, respectively (Faulhaber, 2011). Additionally, many languages have so-called impersonal verbs, which do not take any arguments whatsoever. This class of verbs usually mainly in-

1 I have written this paper for a course taught by Eva Schultze-Berndt that I followed at the LOT Winter School 2019 at the University of Amsterdam.

cludes weather verbs or verbs relating to atmospheric conditions (Malchukov, Ogawa, & Siewierska, 2011). Among the possible arguments of a verb, a distinction is usually made between subjects and objects, with an additional distinction between direct and indirect objects in case of a ditransitive verb.

Despite their universality in argument structures, languages display considerable diversity in their overt expression of these structures. Languages employ different strategies in order to distinguish certain arguments from each other. Not only do they have the possibility to make these distinctions at different levels of language, such as morphology and syntax, in the forms of inflection and word order, respectively, languages also vary in the exact ways in which these strategies are employed, such as different morphosyntactic alignments (Williams, 1981).

One logical option for languages to mark their arguments is the use of word order. Languages with a fixed word order can reserve sentence positions for different arguments (Sinnemäki, 2010). This works especially well in languages that place one argument before the verb and the other argument after the verb, such as the many SVO languages the world has, as well as those very few languages that have attested OVS word order, despite the fact that these languages are really rare. Languages with other basic word orders can of course still employ word order to mark their arguments, as long as they are rigid in their basic order. In these languages, however, it might become problematic when one of the arguments is not overtly expressed, for instance when topic drop occurs (Liceras & Díaz, 1999).

Another effective strategy for languages to distinguish their arguments is marking. Many languages encode information such as person, number and gender about either the subject, the object or both on verb inflection, so-called head marking. Another form of marking is dependent marking, where arguments are assigned case markers that encode their grammatical function (Nichols, 1986). This latter strategy is quite effective, because these case markers are usually very easy to distinguish.

In order to further analyze these case markers and the grammatical functions they encode, it is useful to define certain semantic macro-roles, which encompass a multitude of semantic roles across languages and across different semantic verb types. Although a variety of terms have originally been proposed, a distinction is now often made between intransitive subjects, indicated by the letter S, transitive subjects, indicated by A, and transitive objects, indicated by O (Dowty, 1991). In (1-2) below, examples of an intransitive and transitive sentence from Latin can be seen. The first, intransitive sentence has only one single argument, the S argument, whereas the second one has both a subject, the A argument, and an object, the O argument.

(1) *canis* *curr-it*
dog.NOM run-3
"The dog runs." (Ayer, 2014)

(2) *canis* *occid-it* *catt-um*
dog.NOM kill.PERF-3 cat-ACC
"The dog killed the cat." (Van Everbroeck, 2003)

Using these macro-roles, one can more easily compare the case marking systems of different languages and see if languages use similar forms for certain arguments with similar functions, resulting in different types of morphosyntactic alignment. This article will attempt to explain why the languages of the world are so diverse in their alignment strategies. The expectations are that an explanation of some kind, ranging from speakers' preferences to notions like frequency and economy, can be offered for all of the different types of alignment found. In the following, an overview will first be presented of the different types of alignment, followed by possible explanations for the occurrence of certain alignment types as well as the preference for some types over others.

2. Alignment types

First of all, languages can use different morphological forms for certain grammatical roles or they can use the same form for multiple different roles, so-called syncretism (Bickel & Nichols, 2009). Secondly, languages can also use different morphological forms for the same macro-role in different situations, so-called split alignment. These splits can be moderated by a variety of linguistic factors, which will be discussed later on.

Logically, when relating syncretism to the S, A and O arguments, there are five different possibilities as to the different or identical forms they can have. First of all, all three arguments can have different forms. Additionally, either one of the three arguments can have a different form than the remaining two, while the other two arguments have the same form. Finally, all three arguments can have the same form. All of these possibilities occur in the languages of the world, although some of them are considerably more frequent than others.

The most common alignment pattern is nominative-accusative alignment. Languages with this type of alignment mark the object of a transitive sentence with a distinct case marker, the accusative case. The subject of an intransitive subject and that of a transitive sentence have the same form. This case form, which is usually but not always unmarked, is called nominative. Many Indo-European languages, including Latin, have nominative-accusative alignment. As one can see in (1-2) above, intransitive and transitive subjects appear in the nominative case in Latin, while transitive objects receive an accusative marker, which has several different allomorphs, including *-am*, *-um* and *-em*, for different declensions and genders. Similarly, in Japanese, as can be seen in (3-4) below, the case marker *-ga* indicates nominative case, while *-o* marks accusative case.

(3) *otoko-ga* *tsui-ta*

man-NOM arrive-PFV

"The man arrived." (Mazuka & Itoh, 1995)

(4) *otoko-ga* *komodo-o* *mi-ta*

man-NOM child-ACC see-PFV

"The man saw the child." (Mazuka & Itoh, 1995)

The second most common type of alignment is ergative-absolutive alignment. In these languages, rather than with transitive subjects, the intransitive subjects pattern together with transitive objects. The ergative case is used for

the subjects of transitive sentences, whereas intransitive subjects and transitive objects are marked with the same, usually unmarked, absolutive case. Basque is an example of such a language, as can be seen in (5-6), which show how transitive subjects are distinguished from zero-marked intransitive subjects and transitive objects through the ergative case marker *-ek*. At first sight, if one looks at these two alignment types neutrally, neither of these types seems to be unambiguously more logical than the other. Still, nominative-accusative languages are much more frequent than ergative-absolutive languages, the former being around three times more frequent than the latter (Nichols, 1993).

(5) *gizon-a* *etorri* *da*
man-NOM arrive-PFV be.3
"The man has arrived." (King, 1994)

(6) *gizon-a-k* *mutil-a* *ikusi* *du*
man-SG-ERG boy-SG see have.3
"The man saw the boy." (King, 1994)

Languages that mark all three macro-roles with a different case are called tripartite languages or ergative-accusative languages. Aside from using an ergative case for transitive subjects and an accusative case for transitive objects, tripartite languages also have a distinct case for intransitive subjects. This case is usually called the intransitive case and always has zero marking. Tripartite languages are fairly uncommon. An example of such a language is Nez Perce. In (7-8), examples showing the intransitive, ergative and accusative cases used in this language are shown.

(7) *hi-páayn-a* *háama*
3.INTR-arrive-ASP man
"The man arrived." (Rude, 1986)

(8) *háama-nm* *pée-'wi-ye* *wewúkiye-ne*
man-ERG 3.TR-shoot-ASP elk-ACC
"The man shot the elk." (Rude, 1986)

Languages with purely direct alignment, where different arguments are in no way explicitly distinguished from each other and listeners have to rely on context and world knowledge in order to effectively interpret sentences, are really rare. The single case in which the core arguments appear in these languages is called the direct case, which is always unmarked. An example of a language that does not distinguish between subjects and objects anymore is Scottish Gaelic, as can be seen in (9-10). There are, of course, many languages, including English and Dutch, for instance, that have either partly or entirely abolished their case systems and do not overtly mark their arguments morphologically, but most of these languages employ other strategies in order to distinguish their arguments, such as the rig-

id SVO word order of English or the use of different markers for subjects and objects on the verb, such as those in Yimas (Van Everbroeck, 2003).

(9) *ruith* *mi*
run.PST 1
"I ran." (Robinson, 2008)

(10) *chunnaic* *mi* *an* *cat*
see.PST 1 the cat
"I saw the cat." (Robinson, 2008)

The final possible alignment type would then be alignment where both arguments of transitive sentences are marked in the same way, whereas the arguments of intransitive sentences are marked differently, so-called transitive alignment. This type of alignment is extremely rare, but it does occur. One of the few languages to have this type of alignment is Rushani, albeit only in the past tense, resulting in a split alignment system. In the present tense, the language displays a typical nominative-accusative system, but the case form that is used to mark transitive objects in the present tense is also used for transitive subjects in the past tense, as can be seen in (11-12), making it a transitive case in this tense.

(11) *az-um* *pa* *Xara* *sut*
1-SG to Xorog go.PST
"I went to Xorog." (Payne, 2002)

(12) *mu* *tā* *wunt*
1.TR 2.TR see.PST
"I saw you." (Payne, 2002)

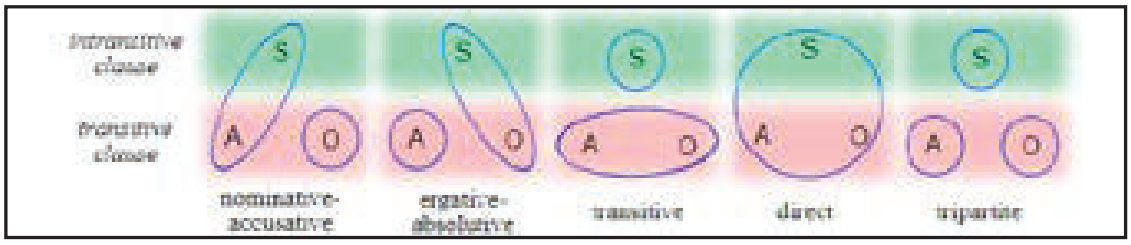

Figure 1. The five possible alignment types

Aside from the five alignment systems mentioned above, which are shown in Figure 1 above, there are also many languages that display a combination of alignments across different situations, so-called split alignment. This split can be conditioned by a multitude of variables. Some languages, for instance, distinguish between multiple intransitive verb types based on different semantic roles for their respective arguments and mark these arguments distinctly. This split is strongly related to volition and the degree to which the subject of the verb is a true agent. In languages with this type of split, verbs that have very volitional and agentive subjects, so-called ac-

tive or unergative verbs, mark their arguments similarly to transitive subjects, whereas verbs that have less agentive subjects, so-called stative or unaccusative verbs, mark these subjects like transitive objects (Duranti, 2004).

Another type of split alignment is a split based on tense or aspect. Some languages, such as Georgian, show a split based on tense. In the present tense, Georgian has nominative-accusative alignment, whereas in the past tense, it has ergative-absolutive alignment (Comrie, 1978). A split like this can also be conditioned by aspect, like in many Indo-Iranian languages, where a nominative-accusative system is found in the imperfective aspect, while an ergative-absolutive system is attested in the perfective aspect (Bubenik, 1989). As can be seen in (11-12), Rushani also has a split alignment system like this, namely a split based around tense similar to the one in Georgian.

Animacy is also often an important factor in the alignment of languages. Generally, in languages with this type of split, less animate subjects are more likely to be receive an ergative marker, while more animate subjects are usually unmarked. Conversely, some languages tend to mark only highly animate objects with an accusative marker. The patterns shown across languages with animacy splits led to the formulation of the animacy hierarchy (Song, 2014). This hierarchy ranks referents according to their degree of animacy, where referents with a lower animacy are placed further down in the hierarchy. At the top of this hierarchy are personal pronouns, with first and second person pronouns being more animate than third person pronouns, followed by proper nouns and then common nouns referring to humans, other animate referents and inanimate referents, in that order. In fact, the place a referent receives in the hierarchy is not just based on animacy, but on an interaction between certain factors, such as animacy, person and referentiality (Croft, 2003). Factors that are also occasionally claimed to be involved in the formation of the hierarchy are number and definiteness.

3. Explanations

As was discussed above, languages are not only able to mark grammatical relations at different linguistic levels, but they also display considerable diversity in the specific strategies they employ at these different levels. An example of this can be seen in case marking, where languages can use the same cases for different arguments and even different cases for the same arguments in different situations. This results in a variety of different combinations of these cases, some of which are a lot more common than others. This raises the question why these specific patterns are more common than the rest. The following will provide explanations for as many of the observed patterns and their frequencies as possible.

A notion that is essential to incorporate when trying to explain these findings is the notion of economy, which means that speakers should not specify unnecessary information in their utterances (Van Gelderen, 2004). This effectively explains why in most languages, intransitive subjects are usually unmarked, as this single argument does not need to be overtly distinguished from any other core arguments. It also explains the fact that nominative-accusative and ergative-absolutive languages are by far the most common types of alignment and tripartite or transitive systems are really rare, as it is only

necessary to distinguish transitive subjects from transitive objects, but it is not necessary to distinguish either of these from intransitive subjects. This means that only one of the two arguments of transitive clauses needs to be explicitly marked in order to distinguish it from the other argument, while the other argument can simply remain unmarked, just like intransitive subjects.

This does not yet explain, however, the preference of either nominative-accusative or ergative-absolutive alignments. As was stated before, nominative-accusative systems are much more frequent than ergative-absolutive systems. This appears to make sense, as nominative-accusative systems use the same case form for two different arguments that pattern similarly syntactically, both functioning as the subjects or topics of sentences and usually, in the case of active verbs at least, also as agents of the verb. This makes one wonder, however, why ergative-absolutive systems exist altogether. The occurrence of ergative-absolutive alignment has been linked to discourse and information structure and the fact that intransitive subjects and transitive objects appear to behave similarly in that they very frequently introduce new referents in the discourse through full noun phrases, whereas transitive subjects appear in the form of full noun phrases considerably less frequently (Du Bois, 1987). Although this theory has been criticized based on the finding that lexical intransitive subjects do not pattern in frequency with either lexical transitive subjects or objects, this dispreference for lexical transitive subjects appears to have been confirmed across languages (Everett, 2009).

Although the explanation of split alignment systems based on semantic roles seems quite straightforward, as it makes sense for the subjects of active verbs to pattern in their semantic role characteristics with transitive subjects and for the subjects of stative verbs to pattern with transitive objects, explanations for the other two split alignment types mentioned above, although less straightforward, can also be proposed. For instance, for split alignments based on tense or aspect, one can clearly see a cross-linguistic pattern. Languages that have such a split always have a nominative-accusative system in the present tense or imperfective aspect and an ergative-absolutive system in the past tense or perfective aspect (Tsunoda, 1981). This pattern can be explained by assuming that the central participant of an action or the participant whose viewpoint is taken has a tendency to be unmarked in languages. In the imperfective aspect, one could arguably say that the subject is the most central participant, whereas the object is more central in the perfective aspect, because the object is more affected by the action of the verb in the latter case than in the former (Malchukov & de Hoop, 2011).

When looking at (11-12) again, Rushani also seems to follow this pattern of marking the subject only in the past tense, which might suggest that this language originally had a fully-fledged split alignment system with ergative-absolutive alignment in the past tense, which has started to decay through the increased marking of objects in the past tense. If one now looks at the fact that young speakers of Rushani are starting to occasionally leave subjects in the present tense unmarked in spoken language, one finds evidence that the odd transitive alignment Rushani is displaying might in fact be an unstable transition stage from split alignment to common nominative-accusative alignment, which is in line with the rarity and apparent illogicalness of this type of alignment (Payne, 2002).

Finally, split alignments revolving around animacy can be explained in terms of frequency and economy. Since highly animate referents are much more likely to be agents and subjects and less animate referents are more likely to be patients and objects, it would make sense economically to leave these arguments unmarked when they appear in a semantic role both speakers and listeners would expect them to be in, whereas arguments that appear in unexpected semantic roles could be marked overtly in order to make this semantic role explicit (Aissen, 2003). This can be clearly seen in languages with this type of split alignment, such as Yankunytjatjara, which only marks objects that appear in the form of proper names and pronouns, which are at the top of the animacy hierarchy, with an accusative case, while using the ergative case for all types of subjects except for first and second person pronouns, which are also highly animate (Goddard, 1985).

4. Discussion

The languages of the world show considerable variation in the strategies they use in order to mark grammatical relations. Within the different case marking systems of the world, all logically possible alignment types occur, as well as variations of different systems that are conditioned by all sorts of linguistic factors. This makes one wonder why there is so much variation in this otherwise very basic feature of language and raises the question why languages would favor certain alignment types over others. Seeking explanations in terms of economy, frequency and other preferences, the occurrence of these different alignment types as well as languages' motivations to choose one over another are analyzed.

As can be seen, most of these cross-linguistic patterns of alignment can be explained quite nicely, even though these explanations might not be so straightforward or obvious at first sight. The two most common alignment types, nominative-accusative and ergative-absolutive alignment, are the most economical, because they only distinguish the arguments of transitive verbs, which are the only arguments that necessarily require this distinction, as opposed to the arguments of intransitive verbs, which do not need to be distinguished from any other arguments in the sentence. Furthermore, most split alignment types can be explained by varying degrees of nuances or shifts by arguments between semantic roles. Examples of this are the shift of viewpoint from agent to patient in alignment systems split by tense or aspect and the different semantic roles of active and stative verbs in alignment systems split by verb type. Finally, economy also seems to play an important role in various cases, such as the general preference of languages for nominative-accusative and ergative-absolutive alignment and the use of zero marking for arguments that appear in expected semantic roles, such as animate nouns appearing as subjects and inanimate nouns appearing as objects.

These findings show that explanations can be provided for the different alignment systems of languages across the world. These explain both the preferences for certain individual alignment types over others, such as the preference for nominative-accusative or ergative-absolutive alignment over other alignment types, and the occurrence of split alignment systems, such as splits conditioned by animacy or verb tense. In order to clarify the occur-

rence of these different alignment types, these explanations call on several distinct notions, namely economy, frequency and cognitive preferences.

Of course, the different notions used here to explain the variation in alignment systems display interaction and it can be difficult to correctly attribute portions of an observation to an individual notion. Especially, either cognitive preferences or frequency can partly form the basis for economy effects, in the sense that the marking of a certain argument might be a more economical choice for speakers if they have certain cognitive preferences relating to this argument in certain contexts or if these arguments are very frequently attested in certain contexts. The notion of cognitive preferences is also somewhat vague and hard to define and one could alternatively define them to encompass both economy and frequency effects, but they can be clearly seen at play as a distinct factor, for instance in alignment systems split by tense or aspect.

As grammatical relations and alignment form an intriguing aspect of the core structure of languages, they have always been an intensively studied topic within linguistics, in the form of both descriptions of the alignment systems of individual languages (Rude, 1986; Robinson, 2008) and typological comparisons of wide arrays of languages (Nichols, 1993; Bickel & Nichols, 2009). Several papers have also sought to offer explanations for the patterning of alignment systems (Bubenik, 1989; Everett, 2009; Malchukov & de Hoop, 2011). This paper hopes to combine the knowledge of these different types of studies on alignment by offering both typological descriptions of alignment systems found in languages across the world and numerous explanations for the occurrence of these different systems. This way, the current paper aspires to contribute to the field of linguistic typology, not only by offering a clear overview of the various types of studies performed so far on this topic, but also by giving a definitive answer to the complex question why different alignment systems are the way they are.

5. Conclusion

Grammatical relations constitute a core feature of the languages of the world and a richly studied topic within linguistic typology. One of the possible strategies languages can turn to in order to codify grammatical relations, case marking, leaves languages with several logical options for morphosyntactic alignment, all of which occur in the languages of the world. The different alignment types and combinations of alignment systems create intricate patterns across languages and one might wonder what motivations languages could have for preferring certain alignment types over others. This paper hoped to contribute to the field of linguistic typology by offering a clear overview of the different types of alignment and possible explanations for their occurrence or prevalence in languages across the world. Through careful consideration of previous studies on a variety of languages, analyses and explanations for every alignment type were offered.

These analyses attempted to provide clear answers to very relevant questions concerning grammatical relations, an important and interesting topic within linguistic typology. Most importantly, it was found that, resorting to the notions of economy, frequency and cognitive preference, explanations could be offered for the different alignment systems or combinations

of systems found across the languages of the world, effectively answering some intriguing questions regarding the basic structure of human language.

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Glossing abbreviations:

1 = first person
2 = second person
3 = third person
ACC = accusative case
ASP = aspect
ERG = ergative case
INTR = intransitive
NOM = nominative case
PERF = perfect tense
PFV = perfective aspect
PST = past tense
SG = singular
TR = transitive

Language is Arbitrary? I Wouldn't Be Saussure: Multimodal Ideophone Guessability

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Abstract: Ideophones (marked, sound symbolic words depicting sensory imagery) are an increasingly described feature of many languages, across families. However, these words have been understudied compared with the other types of words making up the world's languages. Few experiments have been done on ideophones in natural languages, rather the majority of experiments have been done regarding invented name-shape correspondences. Recent attempts have been made to bridge these currents in the research and this paper follows that path. Here I present a case for weak cross-linguistic iconicity (linguistic non-arbitrariness) in situations where monolingual English speakers are asked to guess the meaning of Japanese and Korean ideophones. Videos containing a native speaker of Korean and Japanese (respectively) were shown to native English-speakers who were ignorant of both languages. Four possible meanings were given for each ideophone. Participants guessed the correct meaning of 20 ideophones with the result that the ideophones were guessed above chance, arguing for possible iconic properties of Japanese and Korean ideophones in a multimodal context.

Keywords: multimodal(ity), iconicity, ideophones, Korean, Japanese

1. Introduction

Research into linguistic iconicity takes a researcher from inside the human brain to inside the workings of a culture. Literary luminaries and laudable linguists have taken pains to explain why and how certain sounds are paired with certain meanings.The field of linguistics was founded on the idea that language was arbitrary; that there existed no relationship between the English word 'tree' and the object it refers to, other than that the English language uses that series of sounds, 'tree' to designate a particular plant with bark, leaves, etc. Each word is a sign representing an object or idea and each of these linguistic signs is arbitrary.This, at least, was the view of Ferdinand de Saussure as outlined in his 1916 Course on General Linguistics. However, running counter to this idea was the notion of sound symbolism, that certain sounds may indeed capture an aspect of their meaning, that certain sounds or even whole words in a language may not be as arbitrary as Saussure and others postulated.

Systematic thought regarding sound symbolism (written in European languages) is traceable to thinkers such as Prussian polymath Wilhelm von Humboldt. Humboldt claimed that certain consonants were less than arbitrary. 'St' suggested being fixed, as in the German word stiff (starr) and stand (stehen). The 'w,' by contrast suggested movement/inconstancy in words such as wavering (Wirren) and wind (Wind) (von Humboldt, 1836, as found in Levelt, 2013). These efforts sparked contemplation of the origins of language, as the possibility that there were non-arbitrary starting points. Despite these early efforts and later revisitations, Pim Levelt concluded 'We will probably never know whether savage man was a phonetic symbolizer" (Levelt, 2013).

In the mid 19th century, Western linguistics (particularly working in Western and Central Africa) started to become increasingly interested in ideophones. They were to remain as such, minus forays of Japanese researchers and researchers of Japanese into the radar of Western academia until Ramachandran and Hubbard (2001) conducted their famous kiki-bouba experiment, an update of Wolfgang Köhler's 1929 Maluma-Takete study.

In both experiments, two names were paired with two shapes (see figure 1). This was then repeated with a variety of shapes and names. The pairing of, for instance, a 'round' bouba sound with a round shape (the shape on the left) and the 'jagged' sound of kiki with jagged shape led Köhler and later Ramachandran and Hubbard to argue for non-arbitrariness in language, with Ramachandran and Hubbard identifying the human angular gyrus with cross-modal abilities.

However, natural languages are once again being looked into regarding ideophony. Ideophones are 'marked words that depict sensory imagery' (Dingemanse 2012). A wide array of natural languages contain words defined as ideophones and Japanese, specifically, has received a lot of attention of late for its high number of 'mimetic'[1] words. Whether Japanese is particularly rich in ideophones compared to other Central/East Asian or African languages is up for debate. Japanese has been very well described, a situation not applicable to the many South American, African, Central and South East Asian languages in which descriptions of ideophones are growing, but often still limited (Dingemanse 2017, 2018). This experiment seeks to add to the growing literature on ideophones and their role in human language and languages.

Table 1. Japanese ideophone examples.

Ideophone	Meaning
Ton ton	Knocking on a door
Pan pan	Full, bursting
Tsuru tsuru	Slippery, smooth surface
Bacha bacha	Water splashing
Neba neba	Sticky
Mero mero	Blurred
Tsun-tsun	The state in which something small is sharp-pointed
Mokomoko	Weak and warm
Gito gito	Being oily
Gari gari	Scraping sound

The present study takes its inspiration from Dingemanse et al. (2016). In their study, Dingemanse and colleagues words that had been described previously as iconic. They presented participants with 203 ideophones from five languages. The eight-two native Dutch speaking listeners listened to these ideophones and then were presented with a binary-choice task, in four versions: an original recording, a full diphone resynthesis, a segments-only resynthesis, and a prosody-only resynthesis.

Participants then guessed the meaning of each ideophone (out of two choices). All four versions of the ideophone (with the potential modifications described above) were guessed above chance by the participants. The effect was not so large as those found in experiments using pseudo-words

1 Scholarship on Japanese has often used the word 'mimetic' in the same way I am using 'ideophone' here (see Iwasaki, Sells & Akita 2017, or Dingemanse et al., 2016).

Table 2. Korean ideophone examples

Ideophone	Meaning
T'aengt'aeng	Blown up, like a balloon
K'ungk'ung	Pounding from a big and heavy stuff/obese person walking
Pogŭlbogŭl	Boiling sounds
Ŏngŏng	Crying
T'oshilt'oshil	Chubby
Songsong	Chop into small pieces
Pasakpasak	Crispy, easily breaking
Mikkŭlmikkŭl	Oily/fish's skin
Pŏlbŏl	Shivering/shaking
Tchallangtchallang	Metallic sound/small bell

(such as the boubi/kiki experiment conducted by Ramachandran and Hubbard). They found that both the segmental and suprasegmental prosodic information drove the modest effect they found. Thus, iconicity was co-mingled with arbitrariness in the ideophones as a whole.

I sought to find out if this modest effect would be altered by situating the ideophones in a multimodal context (in this case, a video recording of the respective speakers). The reasoning was that a video more closely reproduces the multimodal context in which an ideophone is normally perceived (that is, a interlocutor is simultaneously a listener as well as a viewer of spoken language, with the speaker's body also assisting in meaning-production). Thus, this design more closely mirrored naturalistic ideophones, as found in situ, as speakers would find them (instead of audio recordings without a human face). As Dingemanse (2018) puts it 'Ideophones emerged as multimodal performances, inviting the listener to imagine what it is like to perceive the scene depicted'. I chose to present the participants with four options, since a forced-choice provides an artificially high likelihood that guessing will lead to a correct answer (50% chance for forced-choice, compared to 25% when faced with four options).

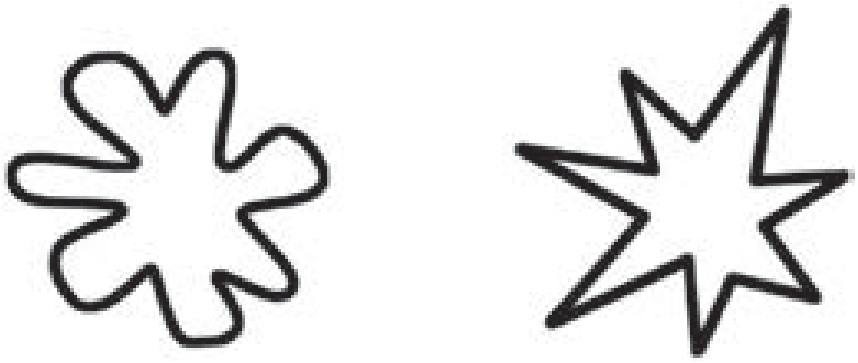
2. Methodology

The stimuli consisted 20 videos featuring native speakers of Japanese and Korean respectively (10 videoes per language).[2] These videos were recorded in Nijmegen, the Netherlands by the author using a camcorder, capturing the speaker's profile from the shoulders up. Ideophones were selected randomly from the openly available materials from Dingemanse et al. (2016).[3] Participants were recruited in the (U.S.) American city of Portland, Oregon. After a description of the task, participants viewed 20 videos, evenly split into 10 displaying Japanese ideophones and 10 displaying Korean ideophones, respectively. Participants volunteered and were not paid.[4]

2 The speakers recorded for the stimuli were native Korean-speaker Jeongin Yoon and native Japanese speaker Haruna Chinzei, both students at Radboud Universiteit Nijmegen. Their willingness to aid this project are very much appreciated and this paper would not have been possible without them.

3 See figures 1. and 2.

4 Some volunteers were compensated for their efforts, but there was no standard form of compensation.



Participants sat in front of a computer screen with the experimenter. Instructions were explained orally, stating the participants would watch 20 videos, containing 10 words from Japanese and 10 words from Korean (participants were not told which words were from which language). Participants were not told that the words were alleged to be sound-symbolic. Participants were asked to guess the correct translation from the four options that would be presented on a web document on the computer screen (the experimenter switched manually between the intended video and the computer screen displaying the word and the accompanying options). In each trial, participants heard a stimulus word and were taken back to the web document to select the English meaning they felt best matched the word in the video. Four choices were given (the three incorrect choices were created such that the four choices contained the correct response, its opposite, a semantically unrelated meaning and that semantically unrelated meaning's opposite). All participants saw/heard the ideophones in the same order; no randomisation techniques were employed.

Examples (correct answers in **bold**)

(1) Mokomoko (Japanese)

Strong and cold

Plump

Thin

Weak and warm

(2) Korean

T'oshilt'oshil

Tall

Thin

Chubby

Short

2.1 Results

Table. 3 Title?

Participant	Correct (Out of 20)
1	7
2	6
3	11
4	6
5	8
6	5
7	5
8	7
9	9
10	8
11	4
12	7
13	7
14	7
15	9

A one-tailed t-test was conducted comparing the mean score to 25% (assumed chance of a correct response for an test with questions comprising of four options). the mean proportion of correct responses for the test comprising both Japanese and Korean ideophones was found to be 35%, instead of the 25% chance-level. That is, the mean proportion of correct responses for the test comprising both Japanese and Korean ideophones was found to be slightly above average ($M = 7.07$, $SD = 1.79$). The low p-value ($p < .001$) suggests this result is highly significant.

Some videos included slight errors of editing which could not be remedied once the dataset was in use. Some videos contained English numbers preceding the Japanese or Korean ideophone.

During testing one participant did not appear to have heard the stimulus correctly and was asked 'was that clear?' The word 'clear' was one of the options from which to choose and this instance was a possible instance of priming.

3. General Discussion

Dingemanse et al. (2016) employed a two-alternative forced-choice task in which ideophones, of various vocal qualities, were played to participants with two choices of correct meaning. This present study chose to depart from a two-alternative forced-choice in order to potentially lessen the likelihood that participants would guess correctly above chance. 7.06/20 is not above 50 percent correct attribution of ideophones to their meaning.

However, assuming 100% guessability or even 50% guessability on a task

requiring participants to choose amongst four potential meanings is not entirely reasonable. Assuming a weaker 'iconicity' as found in Dingemanse et al. 2016, it is not surprising that a weaker effect was found. Despite the video input providing more information by nature of being multimodal, giving four options amongst which to choose should vastly increase the difficulty of the task. As Dingemanse et al. assumed '50% correct, that is, chance performance in a two-alternative forced-choice task.' The present experiment may assume fewer correct responses, by roughly half. If that assumption is valid, the rate of correct responses should be 25% (1/4 or 5/20). Given that, in effect, 7/20 correct was the average per participant and that this is higher than chance ($p < .001$), one can assume some level of iconicity. This is if one accepts the notion that 15 participants forms a relevant sample size. Likely it does not. However, taken together with Dingemanse et al., there is a strong case to be made for weak iconicity. However, there remains a weak case to be made for strong icwonicity. Ramachandran and Hubbard's results have hardly been replicated. Their initial study, very elegant, yet vaguely described) found a roughly 95% rate of attribution for round shapes with 'round' sounds (such as the /u/ vowel).

Such research is highly suggestive of a weak form of iconicity for ideophones. More work should be conducted on a wider array of languages throughout the world to determine if the guessability holds true across a large sample of ideophone-rich languages. Further tests to be done include testing guessability of ideophones in speakers of other ideophone-rich languages. If individuals speaking ideophone-rich languages are better able to discern the meaning of of ideophones in other, otherwise unrelated languages, this would suggest that either ideophones as a word class are close enough in structure to be guessable across languages, that ideophony, like the use of tones in languages, may train a certain underlying skill allowing for a heightened awareness of the sound symbolic nature of ideophones in general, regardless of context. However, these last points are speculation.

4. Conclusion

In sum, ideophones are an intriguing experimental handle for sound symbolism in human language. They have long since been thought to be non-arbitrarily sound symbolic (by certain language traditions). Interestingly, there is evidence of non-arbitrary sound-shape mappings from the experimental psychological and behavioural neuroscience literature. However, only recently have there been attempts to bridge the gap between these two scientific traditions (observational field linguistics/linguistic anthropology on the one hand and psychology/behavioural neuroscience on the other). This paper has been attempt to continue down that trail so little blazed. I have here suggested weak sound symbolism for Japanese and Korean ideophones as perceived by native English speakers, paralleling findings by Dingemanse et al. who found weak sound symbolism for Ewe, Siwu, Korean, Japanese, and Semai ideophone.

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Competing Interests

The author has no competing interests to declare.

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Appendix

Options presented to participants following the corresponding video:

Japanese Ideophones (correct answers in **boldface**)

(1) Ton ton
- a. Squishing something slimy
- b. **Knocking on a door**
- c. Snapping something (like a twig)
- d. Shattering something (such as glass)

(2) Pan pan
- **a. Full, bursting**
- b. Tall
- c. Empty, barren
- d. Short

(3) Tsuru tsuru
- a. Rough, sandpaper surface
- b. Hot substance
- **c. Slippery, smooth surface**
- d. Cold substance

(4) Bacha bacha
- a. Fire crackling
- b. Horse hooves on stone
- **c. Water splashing**
- d. Knocking on a door

(5) Neba neba
- **a. Sticky**
- b. Dry
- c. Slippery
- d. Spongey

(6) Mero mero
- a. Clear
- b. Stinky
- **c. Blurred**
- d. Fragrant

(8) Mokomoko
- a. Strong and cold
- b. Plump
- c. Thin
- **d. Weak and warm**

(7) Tsun-tsun
- a. The state in which something large is dull
- **b. The state in which something small is sharp-pointed**
- c. Very red
- d. Very green

(9) Gito gito
- **a. Being oily**
- b. Being on fire
- c. Being sticky
- d. Being frosty

(10) Gari gari
- **a. Scraping sound**
- b. Tiptoeing
- c. Wiping (as with a cloth)
- d. Pounding

Korean Ideophones (correct answers in **boldface**)

(1) T'aengt'aeng
- a. Flapping, like a flag
- **b. Blown up, like a balloon**
- c. Deflated
- d. Bright (with respect to light)

(2) K'ungk'ung
- a. Click of one's tongue
- b. The light tap of feet
- c. Giggling
- **d. Pounding from a big and heavy stuff/obese person walking**

(3) Pogŭlbogŭl
- a. Dripping
- b. Heartbeat
- **c. Boiling sounds**
- d. Whistling

(4) Ŏngŏng
- **a. Crying**
- b. Whispering
- c. Laughing
- d. Shouting

(5) T'oshilt'oshil
- a. Tall
- b. Thin
- **c. Chubby**
- d. Short

(6) Songsong
- a. Grind into powder
- b. Squish
- **c. Chop into small pieces**
- d. Congeal

(7) Pasakpasak
- a. Goopy
- **b. Crispy, easily breaking**
- c. Sturdy, unbreakable
- d. Dusty

(8) Mikkŭlmikkŭl
- **a. Oily/fish's skin**
- b. Lava
- c. Dirt/earthy
- d. Fur/furry

(9) Pŏlbŏl
- **a. Shivering/shaking**
- b. Tightening muscles
- c. Flying
- d. Hopping/skipping

(10) Tchallangtchallang
- **a. Metallic sound/small bell**
- b. Jumping sound
- c. Crunching/chewing sound
- d. Pounding wood/wooden drum

Perception verbs across languages: A review from a typological, linguistic anthropological, and cognitive linguistic perspective

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Abstract: This paper reviews perception verbs to describe the sense modalities sight, hearing, touch, taste, and smell from three research traditions, namely, a Linguistic Typological, Linguistic Anthropological, and Cognitive Linguistic perspective. The aim of this review is to provide an assimilation of those three perspectives, predominantly based on cross-cultural conversational data. The Linguistic Typological perspective describes the hierarchy of perception verbs, supporting Viberg's vision dominance hypothesis (1983). The Linguistic Anthropological perspective describes cultural influences on lexical distribution, suggesting that language influence perception and therefore languages differ in how sensory experiences are linguistically divided. The Cognitive Linguistic perspective describes the interaction between language and thought, providing evidence of the Cognitive Science view to the detriment of Linguistic Determinism. Finally, this paper describes three accounts on the extended meaning of perception verbs into cognitive concepts.

Keywords: Language of perception, Vision dominance hypothesis; Lexical distribution; Cultural relativism; Language and cognition

1. Introduction

Humans perceive the world around them through their senses. The five traditionally described and researched senses are sight, hearing, touch, taste, and smell. The sensing organs, each affiliated with a sense, send stimuli to the cortex for processing. Language enables humans to share the sensory information that has been processed. According to Majid and Levinson (2011) language holds a paradox. They claimed that, on the one hand, language is primarily linked to seeing and hearing, since language is expressed and perceived through those senses, resulting in inferior abilities to express touch, taste, and smell. On the other hand, language, in the sense of "a particular tongue" (p. 7), enables humans to express their perceptual experiences including touch, taste, and smell through seeing and hearing. In other words, sharing experiences of touch, taste, and smell, besides seeing and hearing, ought to be expressed through language, thus by the perception verbs describing seeing and hearing.

Extensive research has been done into the language of perception. Within this research field, this review focused solely on the five traditionally researched perception verbs to describe the sense modalities sight, hearing, touch, taste, and smell, and will exclude the vestibular sense and proprioception, as well as human echolocation used by blind people to navigate and sometimes identify things in their surroundings. Moreover, this research will not aim at investigating morphological constructions

within the perceptual field. Furthermore, this review did not include multi-sense verbs, meaning verbs to express the perception of multiple senses.

However, this review did examine the five traditionally researched perception verbs to describe the sense modalities sight, hearing, touch, taste, and smell, from three research traditions, as proposed by Evans and Wilkins (2000). These research traditions are a Linguistic Typological perspective (section 1.), a Linguistic Anthropological perspective (section 2.), and a Cognitive Linguistic perspective (section 3.). The aim of this review is to assimilate those perspectives to contribute to research on the relationship between human's perception of the world, how perception and language influences one another, and cognition. Additionally, this review predominantly focused on conversational data, because as Levinson (2006) already indicated, "language evolved for . . . communication in interaction" (Levinson, 2006, p.42). It was suggested by San Roque et al. (2015) that all languages are used in communicative interaction, while it might be the case that some languages do not contain literacy.

2. Linguistic Typology

2.1 Hierarchy of perception verbs

The first research tradition *Linguistic Typology* focused on the way the sensorium, the sum of one's perception, is divided in language. Viberg (1983) contributed substantially to this research field by examining how the five traditional sense modalities (sight, hearing, touch, taste, and smell) are lexically divided. He then divided those five sense modalities into three components, activity-based, experience-based, and source-based, whereof the latter he referred to as *copulative* (e.g. 'A *looks* funny', Viberg, 1983, p. 124), in which there is no perceiver present. Dividing the five traditional senses into these three components resulted in a maximum possibility of fifteen different sense terms per language. Table 1. shows Viberg's table for English, in which he explicated that English has three basic sense terms for the modalities sight and hearing, compared to only one sense term per modality of touch, taste, and smell (Viberg, 1983).

Table 1. Viberg Table of English (Viberg 1983: 128)

	activity	experience	copulative
sight	look at	see	look
hearing	listen to	hear	sound
touch	feel		
taste	taste		
smell	smell		

Viberg (1983) examined 50 languages, based on a translated core set per language, and compared those languages to their semantical organization of perceptual verbs. Based on these comparisons, he concluded the existence of a hierarchy of sense modalities, namely from top to bottom, sight, hearing, touch, taste, smell. He argued that sight is the most salient modality, firstly because all languages have a perception verb referring to the sense modality sight, except

Kobon[1], and secondly, the high emergence of sensory experiences referring to sight, contributes to this hierarchy. The hierarchy of sense modalities resulted in two universal conclusions, namely, that in all language across different cultures the modality sight is dominant over the other four modalities, and secondly that all sense words are ranked similarly across all languages. Viberg (1983) claimed that this ranking exists in a unidirectional way, meaning that the modality sight can be extended to the modality hearing, and the modality hearing can be extended to the modality touch etcetera, however not vice versa.

Evans and Wilkins (2000) found support for Viberg's universalist account by researching 69 Australian languages, which they claimed were under-represented in Viberg's research. Their evidence showed close similarity to Viberg's findings (1983) concerning the lexicalization of perception verbs. However, the sense modality proprioception which is used notable in many Australian languages was disregarded in the research of Viberg (1983), whereby Evans and Wilkins (2000) decided correspondingly to leave this sense modality out of their research, because comparison of data proved impossible.

Correspondingly, San Roque et al. (2015) analyzed the two universalist claims that derived from the research by Viberg (1983) by investigating the frequency of words within the perception field. They analyzed 13 languages of everyday conversations in which people shared experiences of seeing, hearing, feeling, tasting, and smelling. They found evidence supporting Viberg's vision dominance hypothesis (1983) in 12 out of 13 languages, except Tzeltal[2]. However, they did not find evidence that the ranking of the senses is universal cross-linguistically. They suggested that cultural differences lie at the basis of this variation. Despite the variation in ranking, their data showed that the sense modality hearing is ranked second in all researched languages except Semai[3]. In Semai the sense modality smell appeared second, after sight.

San Roque et al. (2015) proposed three accounts for their supporting evidence on Viberg's vision dominance hypothesis (1983). Firstly, all humans experience a prepossession for the sight modality on the grounds of biological predominance of visual sensory information. Secondly, expressing perceptual experiences of seeing is not constrained by anything other than the experience that is shared. Finally, the sight modality comprises more than the shared experience solely, it contributes to joint attention between interlocutors.

Winter, Perlman, and Majid (2018) continued the research on Viberg's vision dominance hypothesis (1983) by focusing on the usage of perceptual language in a quantitative study. They found a correlation between the frequency use of perceptual language of sensory modalities and the lexical differentiation of that sensory lexicon. This type-token frequency correlation implicated that sense modalities that are more often used in language induced a more lexically discriminated lexicon. This could be considered as the fourth account, besides the aforementioned three accounts proposed by San Roque et al. (2015), supporting Viberg's vision dominance hypothesis (1983).

1 Kobon is a language spoken in Papua New Guinea.

2 Tzeltal is a language spoken in southeastern Mexico.

3 Semai is a language spoken in western Malaysia.

2.2 Lexical distribution of perception verbs

There are three known sources that can be held accountable for the lexical distribution of perception verbs. The first source was described by Levinson (2006) which he referred to as "the interaction engine" (Levinson, 2006, p. 44). He described this source as humans' mental capability to combine the communicative intentions with the natively fitted core ability to interact with other humans. These intentions are meant to influence the behavior between interlocutors with a common goal using joint attention within a common ground.

The second source responsible for dividing the sensorium in language is biology, by allowing human to perceive sensory experiences through the senses (Majid and Levinson, 2011) and additionally distributed the sense modalities within the sensory cortex. Levinson and Majid (2014) marked the dominance of the sight modality in the cortex.

The third source that played a significant role in the distribution of perception verbs in the lexicon is culture. It is the culture people live in that yields the environment in which experiences of seeing, hearing, feeling, tasting, and smelling occur, that one wants to share (Majid and Levinson, 2011). They explicated that the distribution of the perceptual lexicon provided insight in the cultural structure of the sensorium.

3. Linguistic Anthropology

3.1 Environmental influence on lexicon

The second research tradition, *Linguistic Anthropology*, focused on the aforementioned third source of lexical distribution of perception verbs, given the cultural variations in the use of sensory modalities and their relative magnitude. In a broader sense, it focused on how language shapes communication and enables cultural common representations.

Boas (1911) is seen by many as the founder of Northern American anthropology. He examined different Eskimo languages (*Inuit languages*, see nomenclature) and their lexicalization of words for sea ice and snow. Boas (1911) found that Eskimo languages contained a much more varied lexicalization of words for sea ice and snow than English. Firstly, he linked this difference to the main interest of people using those languages, in other words, the interest of Eskimo's in snow resulted in a more diverse lexicon regarding snow phenomena. By contrast, English words for snow all consist of the stem 'snow' combined with other word(s) or a complementary stem, whereas the Eskimo lexicon consist of lexically distinctive words, (e.g. *aput* (Eskimo language) – '*snow on the ground*' (English), *qimuqsuq* (Eskimo language) – '*snowdrift*' (English)). Secondly, he argued that the need to express a specific phenomenon by a single distinctive word derived from the environment people who use that language live in. In other words, if a phenomenon stands alone in the lives of people, a single term may arise. He argued that in English different phenomena concerning *water* are lexically distinctive in words like, e.g. *liquid*, *lake* and *dew*, and that it is "perfectly conceivable that this variety of ideas, each of which is expressed by a single independent term in English, might be expressed in other languages by derivations from the same term" (Boas, 1911, p. 25).

Pullum (1989) criticized Boas' (1911) claim concerning derived words for snow in English oppose to lexically distinctive words in Eskimo languages,

which he referred to as the *Great Eskimo Vocabulary Hoax*. He stated that "things could have been otherwise" (Pullum, 1989, p. 276) by which he seemed to be aiming at the randomness of one language using derived words versus another language using lexically distinctive words to express a phenomenon. Furthermore, he questioned Boas' (1911) findings that the interest of the Eskimo's was at the base of their broad lexicon regarding words for snow. Pullum (1989) reduced it to the fact that people who encounter specific phenomena more often, use a more specific lexicon to address those phenomena. He compared the Eskimo lexicon for snow with pressmen lexicon for different types of fonts.

In contrast, Krupnik and Müller-Wille (2010) adopted Boas' (1911) research and expanded this by examining "20-some" (Krupnik et al., 2010, p. 391) Artic cultures concerning their lexicon of words for sea ice and snow. This research was allied to the Siku project[4]. Krupnik et al. (2010) found empirical support for Boas' claim (1911) that Eskimo languages indeed consist of a more detailed lexicon to refer to phenomenon of snow, compared to English. Krupnik et al. (2010) found the same results for phenomena of sea ice and additionally, that these differences in lexicon occured not only within Eskimo languages but also within other languages in the polar regions. The empirical evidence suggested that Boas (1911) had found more than four Eskimo words for snow than he noted down. Krupnik et al. (2010) suggested that Boas (1911) tried to prevent the inclusion of derivatives referring to snow which may underlie his choice for those four words. They concluded not only that Boas' (1911) research is empirically supported and therefore valuable, but also that the *Great Eskimo Vocabulary Hoax* is a misconception of Boas' (1911) research. They stated that the hoax arises from the fact that the four original documented terms for snow in Eskimo language by Boas (1911) were continually increased in number by inaccurate reuse until eventually two-hundred different terms for snow.

Similarly to Boas (1911), but from the opposite starting point, Whorf (1956) contributed to the research on lexicalization. He claimed that the undeniable presence of certain phenomena abated the need to designate those phenomena as such, simply because they are always present. He described the instance of people with a visual impairment which caused them to only see blue. For those people the word blue would not express a meaning which people without that disability refer to as the color blue, so their lexicon would lack any color words. Furthermore, and similar to Boas (1911), Whorf (1956) found a causal relation between the environmental temperature and the lexical division of words relating to snow and ice. However, this causality is vice versa. In a warm environment the need to be able to communicate distinctively between phenomena of snow and ice is less than in colder environments where a distinction has communicative value.

Regier, Carstensen, and Kemp (2016) grounded their research on Boas' (1911) claim and Whorf's (1956) inversed application of Boas' (1911) claim, in which they endeavored to expand the debate beyond Eskimo languages. In particular Regier et al. (2016) elaborated on the study by Whorf's (1956) research, since research into languages in warmer climates offered the opportunity to investigate more languages, because there are fewer languages present around the polar regions. Regier at al. (2016) examined the relationship between environment and "communicative need" (Regier at al.,

4 Siku is an abbreviation for 'Sea Ice Knowledge and Use', as well as an Inuit word referring to ice.

2016, p. 2), based on the general hypothesis that "language is shaped by the functional need for efficient communication" (Regier at al., 2016, p. 2). They described a causal sequence which stated that the environment formed the "communicative need" (Regier at al., 2016, p. 2), based on the main interest of people and within a culture that required certain communicative content. This requirement in turn formed semantic categories. From a universalist point of view, this claim would not hold. They would claim that words for sea ice and snow are differentiated in the lexicons across all languages. However, from a cultural relativist point of view the lexical differentiation of words for sea ice and snow diverged across languages. Regier et al. (2016) found evidence partly supporting both the universalist and cultural relativist claims. Their research showed on the one hand, that languages contained lexically distinctive words for sea ice and snow irrespectively of the temperature of the location the language is used in. On the other hand, discrimination within the lexicon was reduced in warmer regions. They attributed their first finding to the influence of languages from other cultures on cultures in warm regions, as a result of colonization. As far as the latter finding is concerned, they proposed that the limited communicative need to express phenomena of sea ice and snow would reduce lexical discrimination.

3.2 Cultural influence on lexicon

Majid (2015) indicated, in line with Regier et al. (2016) that different cultures might require different lexical content. She stated that languages across the world differ greatly in how they divide sensory experiences through language, based on the influence of ecological and environmental factors on the sensory lexicon. In contrast with Regier et al. (2016) who focused more on the environmental influence on the sensory lexicon, Majid (2015) focused more on the influence of the experiences of the language user in relation to the sensory lexicon. She explicated that experiences can distort the sensory lexicon at an individual level.

On a more global language level, Majid et al. (2018) examined the sensory lexicon cross-culturally. They found, in line with Majid (2015), that languages indeed differed in how they linguistically divide sensory experiences. These differences were caused by cultural emphasis, e.g., in cultures in which music plays an important role in everyday life, the sensory lexicon for sound words proved to be more diverse, compared to cultures in which music is not strongly embedded.

Likewise, Floyd, San Roque, and Majid (2018) explored the Cha'palaa[5] language and their lexicon referring to experiences of smelling. They suggested that the extensive way in which smell is integrated in that culture, e.g. in traditional tales and rituals, shaped their olfactory lexicon, which is in line with the findings of Winter et al. (2018), who found a positive correlation between frequency use and lexical differentiation. Floyd et al. (2018) stressed out the ongoing debate on whether language use causes language change, or vice versa, that language use is the result of language change. In the case of the Cha'palaa language, the question arose if the cultural dominance of smell induced the amount of olfactory words? Or, whether the amount of olfactory words provoked the frequency use?

5 Cha'palaa is a language spoken in Ecuador.

In the study by Majid and Levinson (2011), they claimed that the way the sensorium is divided within a particular language can influence the way a sensory input is perceived and how people respond to those stimuli. In the case of the Cha'palaa language this would mean that the Chachi community, whose language is Cha'palaa, experience smell differently than communities whose frequency use of smell terms is much lower. This suggested that language influence the way people perceive the world cross-culturally and it might even influence the way people form mental representations.

4. Cognitive Linguistics

4.1 Linguistic Relativity

Mental representations, in the context of this paper only linguistic mental representations, are a mental imagery of experiences people have, examined from the third research tradition *Cognitive Linguistics*. Those experiences can be seen as cognitive input, which can be processed as thoughts. A thought can in turn serve as a starting point for output in the form of language. Thinking itself can also be considered in terms of language, since people are able to hear their thoughts, so called implicit speech. This meticulous cooperation between language and thought lies at the base of Linguistic Relativity, which is often referred to as the Sapir-Whorf hypothesis, although Sapir (1884-1939) and Whorf (1956) have never co-written any article together. Linguistic Relativity incorporated three main assumptions. Firstly, the assumption that languages around the world comprise different semantics. Secondly, that those semantics can influence the manner in which the world is perceived by its language user, in other words that language can determine thinking. The final assumption holds the idea that language users of one language indeed think differently than language users of another language.

Wolff and Holmes (2011) surveyed seven versions of the Sapir-Whorf hypothesis, among which the so-called *Linguistic Determinism*. This concept of Linguistic Relativity holds the idea that language users of different languages think differently, assuming a strong relationship between language and cognition. However, Wolff et al. (2011) provided evidence supporting the Cognitive Science view, which holds a stronger relationship between thought and the world, to the detriment of Linguistic Relativity. Their cross-linguistical evidence showed a greater variety in lexicon than could fit the differences in thought, which disproved the claim that language determine thought. However, it is through the perceived difference between language and thought that language and thought influence each other.

4.2 Extension of sense verbs into the cognitive domain

In taking a cognitive approach to the interaction between language and thought, Evans and Wilkens (2000) explicated on a second universal hypothesis besides Viberg's vision dominance hypothesis (1983), namely Sweetser's (1990) hypothesis about the universal connection between sight and intellection. She claimed that the precedence of the modality sight in human experiences, which she claimed also holds, but to a lesser extent, for the modality hearing, caused this extension of perception into cognition. This is in line with the remark of Levinson and Majid (2014) were they mentioned the influence of the relatively

large amount of cortex being involved in processing visual input to the dominance of the modality sight. Sweetser (1990) described the extended meaning of the modality sight, e.g., perceptual experience seeing would be extended to the cognitive interpretation *know*, to be linked to higher cognitive functions.

However, Evans and Wilkens (2000) examined 69 Australian languages in which they found that the modality hearing is more intensively connected to higher cognitive functions in comparison to sight, suggesting a cultural variation. They provided, among other things, the example of languages in which knowledge transfer is mainly verbal, e.g., in songs and narratives, rather than textual, which can explain the perceptual experience hearing as extension for the cognitive interpretation *know*.

This cultural relativist claim of Evans and Wilkens (2000) is partially endorsed by San Roque et al. (2018), who investigated 13 languages of which they recorded everyday conversations. They found evidence that the meaning of the modality sight was extended to cognitive concepts in all researched languages. Furthermore, they found that the extended meaning of the perceptual experience hearing is almost all linked to meanings related to communication and speech, e.g. hearing as extension to *understand* and *tell*. Yet, hearing was only used in three out of the 13 languages as extension for the cognitive interpretation *know*.

As a result, San Roque et al. (2018) suggested a third account in the field of the extension of perception into cognition as well as in the lexical differentiation of words. They suggested, alongside universalism and cultural relativism, the "interactionally-driven universals" (San Roque et al., 2018, p. 399), originated from humans need for social interaction. Herewith, they are in line with the assumption of the interaction engine" (Levinson, 2006, p. 44) as an account for lexical distribution of perception verbs.

5. Conclusion

This review aimed to explore and assimilate the five traditionally described sense modalities, sight, hearing, touch, taste, and smell from three research traditions, as proposed by Evans and Wilkins (2000).

The *Linguistic Typology* section showed widely supporting evidence of Viberg's vision dominance hypothesis (1983) against the background of the hierarchy of perception verbs. Furthermore, this section tapped into the known sources that can be held accountable for the lexical distribution of perception verbs.

The *Linguistic Anthropology* section described the influence of the environment on lexical distribution, starting from Boas' (1911) research on Eskimo languages leading to the research by Regier et al. (2016) on the need for efficient communication. The cultural precedence found in the aforementioned studies raises the question whether this is universal around other cultures and if this result in similarities in their languages.

The *Cognitive Linguistic* section depicted on the interaction between language and thought, disclaiming the so-called *Linguistic Determinism* in favor of the cognitive science view. One issue which might need further investigation is to what extent the cultural similarities are based on a kind of generic cognition. The second part looked into the extension of perception verbs into cognitive concepts, designating a third account which can be held accountable for the extension of perception based on human communication in interaction.

Nomenclature
The term "Eskimos" was used to unquestionably refer to previously conducted research using this term as such. It is by no means the intention to be offensive to the Inuit by using this term.

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Review: Detecting depression in language

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Abstract: Depression is a mental illness which causes a depressed mood for most of the day and/or diminishes interests and pleasures. Culture and language play a role in developing and experiencing depression as language makes it possible for someone to make sense of their experiences, while a depressed person has a disconnect between these emotional experiences and language. In this paper, it is found that depression alters a depressed person's language on different levels: on the level of phonology, vocabulary, and grammatical structure. On the level of phonology, a depressed person takes longer to utter sentences, takes more pauses and repeats more words. Depressed people also tend to use more 'I' in their writing and more absolute words like 'always'. Their sentence structure is atypical too as they write longer and more descriptive texts with shorter sentences, use more inversion and ellipses, repeat words more often and use more figurative language. However, most of the studies have focused on written text only, so there is a need to extend this research to naturalistic communication. And as most studies are conducted in English speaking countries, there is also a need for future research to look at the language use of depressed people in other languages as the signs may be different than in English before any findings can be implemented in therapeutic settings to detect possible depression earlier on and to treat it better.

Keywords: Depression, Language use, Lexicon, Phonology, Style

1. Introduction

Depression can be described by citing the fifth edition of the Diagnostic and Statistical Manual of Mental Disorders' (DSM-5) diagnostic criteria (American Psychiatric Association, 2013): someone has to experience a depressed mood for most of the day and/or diminished interest or pleasure accompanied with four other symptoms to receive this diagnosis.

Depression can, however, be described differently by different people. In the first place, laymen sometimes see depression as something different as one would expect it to be based on the official criteria stated by the DSM-5 (Robertson, Venter & Botha, 2005). They underlined White's notion that experiences of depression by 'ordinary' people is far from uniform (1982, in: Robertson et al., 2005). In the second place, there exist cultural differences in the way depression is perceived. Shao, Doucet, and Caruso (2014), for example, established that emotions in general have both universal and culture-specific aspects. They found that emotion perception is the more universal domain, whereas emotion understanding and regulation are culture-specific.

So, it was indicated that not everyone talks the same about depression. Even though this is interesting on its own, the aim of the current paper is to look at how people with depression talk themselves. Based on the *structural equation model* of Şimşek (2013) – which states that personal reflection and self-rumination relate to language use and to developing depression – it is plausible that people with depression use language differently. He based his

theory on Bucci's Multiple Code Theory which states that the possibility to connect language and psychological experiences makes it possible for someone to make sense of these experiences (1984). In this model, the ability to describe these states with words (referential activity) is linked to depression, as depressed people have a disconnect between the emotional experiences and language. In Şimşek's model it is assumed that there is a gap between what is/can be expressed and the actual feeling, and that the size of this gap differs between people. By letting 459 people fill in numerous questionnaires, he tested his model and found that a big gap between experience and language will lead to a lower level of self-concept, which in turn leads to more self-reflection and self-rumination. The latter, which is a form of unhealthy recurrent thinking, can lead to depression, while self-reflection, a healthy aspect of self-consciousness, lowers the chance on depression. When a person has a high need for absolute truth - as is the case in many depressed people – self-reflection also has a negative effect on depression and makes it worse.

Şimşek (2013), thus, stated that language and depression have influence on one another. In this paper, I will focus on how depression can influence a depressed person's language use. I tried to include research from multiple languages, but all but one of the studies were conducted in English. This means that this review mostly focuses on English language features. Firstly, I will explore how depression can influence someone's phonology – especially focusing on prosody as this is mostly stereotypically seen as affected by depression. Secondly, I will discuss the influence on depressed people's lexicon. Lastly, I will talk about the style of their language. I will end this paper with some suggestions for future research and for practical usage in therapy practices.

2. Method

2.1 Search strategy

In November 2018, 23 papers that were published between 2000 and 2018 were identified on the topic of 'language of depression' using the search engines RUQuest and Google Scholar. The limit was set on 2000 to exclude the more outdated research, yet still include the relevant first studies that were conducted using the Linguistic Inquiry Word Count (LIWC; Pennebaker, Francis & Booth, 2001). To search for these papers, the terms 'language of depression', 'language + depression', 'grammar + depression', 'depressive speech', and 'phonology + depression' were used. Furthermore, papers that were referred to in the papers that were selected were used. Two papers on phonology were added that were outside of the publication date limits, because these were pioneering this kind of research and could not be kept out.

2.2 Data selection

From the papers that were found, studies about how other people talk about depression were omitted out as this paper focuses on the language use of depressed people themselves. Another four papers were excluded as there were only theoretical possibilities stated in these instead of empirical research. One more paper was not used as it was a master's thesis instead of a peer-reviewed paper. In the end, a total of 15 empirical and review papers were included in this study.

2.3 Procedure

The papers were ordered by the linguistic level they focused on (phonology, lexicon, style). Some of the papers fitted only in one of the levels, while others were used in multiple levels as they talked, for instance, about the lexicon and style. These papers were summarised individually, after which the results and specific methods were compared within the linguistic level it was ordered in. Within each of the three linguistic levels, an overview of the most important findings was made, after which an overall conclusion about 'the language of depression' was drawn.

3. Results

3.1 Phonology

Kristeva (1989) already said that the speech of depressed people is repetitive and monotonous. They utter interrupted sentences and when "that frugal musicality becomes exhausted in its turn […] the melancholy person appears to stop cognizing as well as uttering" (33). More recent studies showed that indeed 20% of depressed patients showed signs of catatonia, which is a state of psycho-motor immobility. These people tend to stop talking, start to stutter, or start repeating what has just been said by someone else (Marvel & Paradiso, 2004).

In this paragraph, I will focus on the phonology of depressed speech only, instead of also focusing on people that completely stop talking. Already in 1921, Kraepelin noted that depressed people tend to speak in a low voice, that they talk slowly and hesitatingly, sometimes becoming mute in the middle of a sentence, monotonously, and sometimes stuttering. Empirical research followed when Kuny and Stassen (1993) observed 30 depressed patients during their recovery from depression. In their study, they assessed the patients' language six times during two weeks and compared these findings with the language of 192 healthy people. They found that a speaker's loudness and the variation in loudness over time, and the speaker's voice timbre correlated highly with depression.

Results of Alpert, Pouget, and Silva (2001) were partially similar. Based on the free speech of a group of 22 elderly participants with major depressive disorder and 19 healthy controls, they observed that depressed patients showed less prosody than healthy subjects and that abnormal pauses in their utterances decreased when these patients were treated for their depression via medication. They, thus, concluded that temporal changes in speech, such as pausing, reflect the depressed state whereas prosodic features (e.g. stress patterns) seem to reflect a depressed trait: agitated, which is characterised by heightened psychomotor activity, or retarded, which is characterised by slow thinking and behaviour, depression.

The previously mentioned papers were all about depressed speech in relatively small samples of clinical patients. However, Low et al. (2011) investigated the acoustic correlates of depression in a sample of 68 depressed and 71 non-depressed adolescents in naturalistic interaction with their parents. By measuring the number of additional harmonics due to air flow in the vocal tract, as well the prosodic, cepstral, spectral, and glottal features, they found that the air flow in the vocal tract predicted depression quite well: accuracy ranging between 81%-87% for males and 72%-79% for fe-

males. By combining glottal features with prosodic and spectral features, the accuracy was slightly less accurate, but still it predicted the depression well: 67%-69% in males, 70%-75% in females. They explain this difference in speech by saying that speech production systems show physical manifestations of psychological difficulties. In other words: depression may have a significant effect on the vocal cord function, making it more difficult to produce sound by interaction with structures in the vocal tract.

3.2 Lexicon

One of the first papers written about the 'language of depression' in written texts is Stirman and Pennebaker's 'Word use in the poetry of suicidal and non-suicidal poets' (2001). Based on the notion that the frequency of word use in written text can be used as an indicator of psychological state, they tried to identify predictors of depression in these poets' poems as measured by these poets having committed suicide. Furthermore, they tried to link their findings to the two most prominent models about suicide: Durkheim's social integration/disengagement model (1951, in: Stirman & Pennebaker, 2001) and the hopelessness model of suicide. The first model states that a suicidal person has failed to integrate in society and becomes detached from social life. In other words, these people detach from the source of their pain and this way withdraw from social life and become more self-oriented. The hopelessness suggests that suicide takes place during extended periods of sadness and desperation in which an individual also has the tendency to think in absolutes leading to the conclusion that suicide is the only option. In case if the Durkheim's model is right, the authors expected that the suicidal poets would use more self-references and less references to others in their work, whereas if the second model is right, they would use more negative emotion words, such as anger, sadness, fewer positive emotion words, such as happiness, gratitude, and more references to death. For these purposes, the authors analysed 156 poems from well-known poets who committed suicide from their early, middle and late work without looking at the subject of the poems beforehand. They compared these poems with 135 poems from non-suicidal poets who were matched in nationality, era, education and sex with one of the suicidal poets. They found that suicidal poets did use more first-person singular pronouns, but did not use less references to others or communication words like 'talk'. Furthermore, the non-suicidal and suicidal poets did not differ in their use of positive or negative emotion words, even though suicidal poets mentioned death more often. Moreover, they did not find any phase effects, i.e. suicidal poets did not use more self-references or references of death in their later work than in the beginning. Because of these results, it seemed like neither of the models fit quite right, as the suicidal poets were not less positive or more negative, and they did not show any more social withdraw during their careers either.

Another artistic form of language use is the writing of song lyrics. To study depressive language clues in this form, Lightman, McCarthy, Dufty and McNamara (2007) analysed the lyrics of 8 suicidal and 8 non-suicidal songwriters matched on genre of music, date of birth, degree of fame, nationality, status of addiction and mental health and education. They used 35 songs from each artist and analysed the self- and other-references, emotion words, references to time, communication words and death-themed words. Another thing they

measured was the concreteness of the language used based on the word concreteness index in the Coh-Metrix from Graesser et al. (2004; in Lightman et al., 2007), as they predicted that suicidal singers would be less concrete due to the detachment from society as the Durkheim's model stated. They found that the suicidal artists were less concrete and that they sang more about the future, or at least they used more future-tense verbs. This was not predicted, because it is believed that suicidal people tend to be preoccupied with the interminability of the present without thinking about the future. The expectation that suicidal artists use more self-references and less other-references was not fulfilled as there was only a non-significant trend present. Moreover, contrary to the hypothesis, they found that the non-suicidal singers used more death-themed words than the suicidal ones. They explain this discrepancy by using the writing as something therapeutic: the non-suicidal artists were matched to the suicidal ones on the basis of their mental health and as writing down traumatic events or negative emotions can be cathartic; the non-suicidal artists could have been depressed too, but dealing with this by writing. Another reason why the results of this study might be different from that of Stirman and Pennebaker (2004) is because the process of writing poetry and writing song lyrics is different: many poets work independently, while songwriters have band members for example. Secondly, irony is often prevalent in music (e.g. positive lyrics on melancholic melodies) but computational tools like the LIWC cannot recognise irony, because it only focuses on text.

One could say that poetry as well as the closely related genre of music lyrics and depression are closely linked already, since suicide rates among poets are higher than among authors of other literary forms or the general public (Jamison, 1993). Thus, they are not a very representative medium for testing the depressed language features. That is one of the reasons why Rude, Gortner and Pennebaker (2004) looked at the language use of depressed and depressed-vulnerable college students. Another problem this study sorted was measuring depression by suicide. These are two different concepts, as depressed people do not have to commit suicide and suicidal people do not have to be depressed. Rude et al. (2004), thus, let 31 currently-depressed, 26 formerly-depressed, and 67 never-depressed participants write an essay about their deepest thoughts and feelings about starting college. They based their hypothesis that depressed and formerly-depressed students would use more first-person pronouns on Pyszcynski and Greenberg's theory that depressed individuals tend to think a great deal about themselves (1987, in: Rude et al., 2004) and also included the formerly-depressed participants because Beck's idea that depressive schema's or habits may be latent (1967, in: Rude et al., 2004). And indeed, they found that depressed students did use more negative emotion words and first-person singular words, on the other hand the formerly-depressed students did not differ from those that never suffered from depression. They explained this may be because of self-awareness of these formerly-depressed students, so they analysed the essays again by splitting them in three parts, assuming the old habits of depressed language would 'slip in' later on. Consistent with this idea, they found that the formerly-depressed students' use of 'I' increased across their essay, and that this increase was greater than that of never-depressed students.

In 2010, Rodriguez, Holleran and Mehl (2010) let laymen assess subclini-

cal depression in others by reading personal diaries or blogs. By reading the self-descriptions from depressed people, the laymen had to say if the person who had written the text had depression on a 7-point Likert scale, after which the texts were also analysed automatically by the LIWC (Pennebaker, Francis & Booth, 2001) to see if therwe actually are thematic or linguistic differences between depressed and not-depressed writing. They found that in both genres the laymen achieved high and comparable levels of accuracy, meaning that depression is recognised in written text by these laymen. The cues they used to distinguish text from depressed people from non-depressed people were highly correlated with the cues the writers themselves (sub)consciously used. This means that laymen spot depression in text not only by explicit notions of sadness, but also implicit notions of verb tenses. Moreover, they found differences in how the depression was worded in each genre. In the diaries, people tended to use more words related to sadness, cognitive mechanisms indicated by words such as 'know', and metaphysical references like using the word 'religion'. In blogs, people tended to use more swear words or references to sleep as an indicator of depression. Rodriquez et al. (2010) then conclude that laymen seem to be implicitly aware of these context-specific differences by which they can spot depression in texts.

As mentioned earlier, depression cannot only lead to a high self-absorption, but also to thinking in absolutes (see Şimşek (2013) and the hopelessness model of suicide). Al-Mosaiwi and Johnstone (2018) focused on the use of these absolutist words instead of the references to the self in internet forums. They predicted that there would be a higher percentage of absolutist words in anxiety, depression, and suicidal ideation forum groups than in general forums and that the percentage in suicidal ideation forums would also be higher than in both anxiety and depression forums. They collected 30,000 words from 63 forums. They then made two lists of words to look for in the texts even though they only reported the outcomes for the second list: a list of extreme words like 'very' and of absolute words like 'always'. They found that indeed the percentage of absolutist words in anxiety, depression, and suicidal ideation forums was significantly greater than in the general forums and that the percentage of absolutist words in suicidal ideation forums was greater than in the anxiety or depression forum. Because the researchers were afraid they could have been measuring psychological distress instead of the use of absolutists, they did a second study in which they compared four forums of mental health conditions: two of which are known to not use absolutist words – namely post-traumatic stress disorder and schizophrenia – and two which are – bipolar disorder and eating disorder. They found that even though all groups contained many negative emotion terms, only the bipolar disorder group and eating disorder group contained absolutist thinking, indicating that they indeed measured absolute thinking instead of psychological stress.

3.3 Style

The previous paragraph focused on the lexicon, but there are also indicators that a depressed person's writing style differs from non-depressed people. Eichstaedt et al. (2018), for example, looked if Facebook language could predict depression in medical records. They found that the word use of depressed

people was the same as what could be found in the articles described in the last paragraph: these people were talking about emotions like sadness, loneliness, and hostility, were prone to rumination, and had increased self-references. They also found something non-lexical related: post length and frequency. These two variables were as predictive of depression as demographic characteristics which already had a fair accuracy. They concluded that word count across posts was 1,424 words higher for users who developed depression. So, posting more and longer texts on Facebook could be an indication of depression.

This is not only the case on Facebook. Smirnova et al. (2018) found that people with mild depression wrote longer and more descriptive styled texts than healthy individuals when asked to write an essay about their life. Moreover, they used more informal and figurative language, more inversions and lexical repetitions, omitted words more often, and even though their essays were longer overall, their individual sentences where shorter. When comparing participants with normal sadness to the healthy participants and depressed participants, it was shown that their language use was in between the two groups. For example, they omitted more words than the healthy group, but less than the depressed group. However, it is important to note that this last study was conducted in Russian while the other ones were done in English.

4. Conclusion

First and foremost, it can be concluded that there actually exists some sort of 'language of depression'. Previous studies have at least found that there are language features that are typical of the language of depressed people, yet differ from the language use of non-depressed people. These differences are seen in phonology, vocabulary, and style. As far as phonology is concerned, one could notice that people with depression take longer to utter sentences, take more pauses during speech, and that they repeat words more often than healthy people. Moreover, the stress pattern in a depressed person's speech seems atypical from normal speech. Unfortunately, it is not clear yet how depression affects the speech production system exactly.

In their vocabulary, depressed persons also differ from their peers. This holds to some degree for writing in the artistic sense like poetry – even though here suicidality was more of a dividing factor – but definitely for writing essays or forum entries. Depressed people tend to use more 'I' in their writing, as well as absolute words like 'always'. This indicates that a depressed person is more self-absorbed and thinks a lot about how they are feeling and what they are, but also that they tend to think in absolutists. Important to note is that even though a person is recovering or already recovered officially, these habits of self-references and using absolutist words can still hold. This indicates that the mindset of a formerly depressed person still differs from that of a healthy person even though the evidence of this can be masked by a greater self-awareness in this group.

Lastly, the grammatical structure of sentences in the language of depressed people seems different than that of non-depressed people. When looking at natural language of depressed people, one still finds atypical grammatical structures. Depressed people tend to post more and longer texts on Facebook for example and also write longer and more descriptive texts when writing essays.

Moreover, their sentences are shorter, their language more figurative, their word order is inversed, and they repeat words more often or omit them altogether.

5. Discussion

When concluding that there must be something like 'the language of depression', it is worth noting that most of the studies cited in this paper are conducted in English speaking countries or online where English was the language that was used. The only exception is the article from Smirnova et al. (2018), which is Russian of origin. Moreover, all of these studies were done with the Western definition of depression in mind. Therefore, these findings may not be universal, because cultures differ from each other in how they see depression and how they treat it. It is even the case that someone's culture moderates the effect of emotions on developing depression as Chan et al. (2016) found. This is why it is important to continue doing research on linguistic differences of depressed and non-depressed people who speak other languages than English or who live in different cultures.

Another important shortcoming in the research is that it is mostly conducted on (artistic) written texts. If we want to use these linguistic variables that are different in depressed language versus non-depressed language, we ought to do studies of language use in naturalistic communication. In the paragraph about phonology it is already shown that this is possible, for instance, by measuring air flow and prosody to show differences between depressed and non-depressed language.

Moreover, future research ought to clearly distinguish suicide and depression. Two studies in this review used suicide commitment as a measure for depression, but having depression does not mean wanting to commit suicide, and vice versa. Furthermore, the hopelessness model of suicide might not be the same as a hopelessness model of depression, as Alloy, Abramson, Metalsky, and Hartlage (1988) indicated.

Still, when more is known about the language use of depressed people, one could start to think on how to implement it in the setting of therapy. By teaching professional counsellors to look for specific signs in language use, diagnosing depression could become easier; especially in people who cannot concentrate enough to fill in the depression questionnaires.

All in all, the research papers mentioned in this paper indicate that depressed people differ in their language from healthy people; specifically, on the following linguistic levels: phonology, vocabulary, and grammatical style. However, more research is needed on this topic. Are the differences in depressed and non-depressed languages dependent on the specific language and/or culture? Are these differences dependent on the format in which the language is used? Only when there is more clarity in these subjects, we could start to implement the findings in a therapeutic setting or use them as signs for early intervention.

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Facebook memes and the semiotics of typography: The case of *lemgthbook*

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Abstract: Since January 2017, an ever-growing agglomeration of Facebook groups has spawned (362 groups to date) whose defining characteristic was that all of their content was somehow thematically related to the concept of length. These groups, collectively titled *lemgthbook*, enforce a puzzling semiotic practice: the usage of the letter <n> is banned from their content and <n> is systematically replaced by <m>. This study adopts an ethnographic approach in order to provide a preliminary account for this practice through a qualitative analysis of *lemgthbook*-style user-generated content. The study's main goal is to investigate possible theoretical implications for the semiotics of typography within the framework of social semiotics. The content posted in *lemgthbook* groups, treated here as internet memes, is found to innovatively exploit the modal affordances of typography as a mode by creating meaningful typographic contrasts not on the level of typeface but through the substitution of alphabetic characters. This is found to be a result of the limitations imposed by the semiotic technology of Facebook, which does not readily allow for the inclusion of different-font text. It is also found that this peculiar semiotic practice has begun spreading outside *lemgthbook*. The findings further our understanding of the mode of typography expanding on its original conception by Van Leeuwen (2006). This is mainly achieved by considering the crucial role of social media technology in semiosis as recently brought to light by Poulsen & Kvåle (2018), whereby the availability (or lack thereof) of options for meaning-making on a social medium (e.g., can users produce text in different fonts?) results in different meaning-making patterns. Based on this semiotic analysis, the study also explores the humourous function of *lemgthbook* content. The discussion proposes a view of such content as a case of shitposting, a type of abstruse humour that proliferates on the internet.

Keywords: social semiotics; memes; internet linguistics; humour; online culture

1. Introduction

In January 2017, a Facebook group called *lemgthy earth: a lomg earth discussiom group* was created. The group appeared to be aimed at parodying "flat Earth" conspiracy theory discourse and its defining characteristic was banning the use of the letter <n> from all its content. The letter <n>, never explicitly mentioned but only described as "half-m, before o" in the group's description,[1] was thereby systematically replaced by the letter <m>. Since then, 362 Facebook groups have spawned enforcing the same puzzling practice. The groups were originally thematically linked due to their reference to the concept of length although more recently created groups have seen a thematic expansion by focusing on different themes while retaining the key semiotic practice of "<m> replaces <n>" (e.g., *heckimg amgrybois amd*

1 See https://www.facebook.com/groups/lemgth/about or/and the Appendix for a screenshot of the group's description.

where to fimd them focuses on entities that have an angry appearance). Together they constitute a collection of Facebook groups dubbed *lemgthbook*, all listed in a purposely made website of the same name ("lemgthbook," n.d.). The goal of this paper is to provide a semiotic account for the practice of replacing <n> with <m> in the internet meme-type content posted primarily in *lemgthbook* groups, but also elsewhere. The investigation of such a creative digital text phenomenon provides the opportunity to explore possible theoretical implications for the semiotics of typography in new media.

Despite a growing interest in the study of internet memes and social media witnessed in recent years (e.g., Lou, 2017; Taecharungroj & Nueangjamnong, 2015; Varis & Blommaert, 2015), there has been little concern with investigating the theoretical implications of novel multimodal text phenomena created across platforms. Additionally, the study of multimodal meaning-making practices on the web has not yet attracted much attention from the theoretical perspective of social semiotics, a distinctive approach to the study of meaning-making based on systemic functional linguistics (cf. Poulsen & Kvåle, 2018). Therefore, this paper attempts to employ a social semiotics approach for analysing the *lemgthbook* phenomenon in relation to the study of typography as a mode (i.e., a resource for meaning-making) as introduced by Van Leeuwen (2005b; 2006).

The paper seeks to answer the following questions. Can the replacement of <n> with <m> in *lemgthbook* (and beyond) serve to further our understanding of the meaning-making potential of typography as a mode in a social semiotics approach? How does the creation of *lemgthbook* memes relate to the modal affordances of typography on Facebook? In what terms can these memes be understood as humourous online culture artefacts based on their semiotic analysis?

An inductive qualitative analysis of *lemgthbook* memes through ethnographic immersion in the groups reveals that in their creation the semiotic potential of typography is exploited in a way that it is both contingent upon the options for meaning-making provided by the Facebook interface and novel. These memes can be viewed as abstruse humourous creations characterisable as shitposting (i.e., purposely irrelevant/bad-quality content) (Holm, 2017).

In the following sections, after a brief literature review that outlines the theoretical framework of the study (Section 2), I introduce the method adopted (Section 3) before providing an analysis of two representative examples of such memes (Section 4). In section 5, the findings of the analysis are summarised, and the humourous function of *lemgthbook*-type memes is discussed.

2. Theoretical Framework

Social semiotics constitutes a distinctive approach to the study of meaning-making based on systemic functional linguistics (SFL) (Van Leeuwen, 2005a). In it, meaning-making is viewed as an inherently multimodal enterprise; that is, meaning-making occurs along different *modes*. Within the framework of social semiotics, modes are understood as "socially shaped and culturally given resource[s] for making meaning" (Kress, 2009, p. 54). For example, written/spoken language, images, layout, and music are all understood in social semiotic terms as different modes through which meaning can be generated in different ways according to the modes' affordances (Kress & Van Leeuwen, 2006).

After his seminal work with Kress on visual meaning, *Reading images* (Kress & Van Leeuwen, 2006), Van Leeuwen (2005b; 2006) went on to argue that typography should also be treated as a mode in this analytical framework. Demonstrating that typography can be analysed as displaying the ideational, interpersonal, and textual metafunctions[2] established in SFL, he proposed developing a detailed grammar of typography as a mode (Van Leeuwen, 2006). This paper works toward that goal by examining typographic meaning in social media memes. In this endeavour, Van Leeuwen's (2005b, p. 138) view of typography as a mode in which "visual communication and writing form an inseparable unit" is of crucial importance.

A key notion relevant to this idea of reconciling the visual and the verbal is that of *intersemiotic complementarity*, as introduced by Royce (1998) for page-based multimodal texts. Intersemiotic complementarity is defined as a relationship between modes, whereby they "semantically complement each other to produce a single textual phenomenon," the semiotic output of which is "greater than the sum of the individual […] contributions" of each mode (Royce, 1998, pp. 26-27). This phenomenon occurs along (at least one of) the three levels of meaning-making labelled metafunctions (Royce, 1998). Despite it being introduced as an analytical tool for page-based text, the concept of intersemiotic complementarity can prove useful for the analysing digital texts within the framework of social semiotics. However, this presupposes an adaptation of the concept that will consider the factor of social media technology.

Following recent trends toward the study of software and technology in relation to semiosis (see Geenen, Norris, & Makboon, 2015 for a brief overview), social semioticians have taken an interest in social media as "semiotic technology" (Poulsen & Kvåle, 2018). Because social media technology provides a "semiotic surface" that shapes the potential for meaning-making afforded to multimodal texts created on it, it is necessary to consider this technology's features in relation to how they influence digitally mediated meaning-making on these platforms (Poulsen & Kvåle, 2018). Given these considerations, this paper approaches (digital) typography as employed in the *lemgthbook* memes in relation to how Facebook's software shapes its semiotic potential by allowing for certain meaning-making choices and at the same time restricting the availability of other options (e.g., including different-font text in posts).

Finally, it is necessary to address what is meant by "internet memes." Lou (2017, p. 107) insightfully describes internet memes as user-generated "digital art[e]facts" created, altered, and shared online, which typically come in a "template-like" format despite the fact that their form varies vastly, from "hashtags" to video challenges. Varis and Blommaert (2015, p. 31) define memes rather laconically as "signs that have gone viral on the Internet"—a definition justified by their focus on virality. In a different study, focused on internet humour, memes are simply seen as a "medium that is often used to channel humour on the Internet" (Taecharungroj & Nueangjamnong, 2015). While these definitions constitute valid approaches to memes from different perspectives, in this study memes are defined in social semiotic terms as a *genre*; i.e., a text structure that displays recognisable patterns

2 In SFL, the term metafunctions refers to the three dimensions of meaning-making exhibited by a sign system: representing something occurring in the world (ideational metafunction); referring to the relations between participants in the interaction (interpersonal metafunction); constituting an internally coherent unit (text) that interacts with its context (textual metafunction) (Van Leeuwen, 2005a).

of form and content as well as common functions (Van Leeuwen, 2005a). Memes constitute multimodal texts that exhibit a "template-like" form, as noted by Lou (2017), and whose content varies vastly given that their content dimension is overshadowed by their function as "forms of conviviality" (Varis & Blommaert, 2015), which renders them cases of "communication without content" akin to small talk (Varis & Blommaert, 2015).

3. Methodology

The present study comprises an inductive qualitative approach to empirical data collected via ethnographic immersion in the groups where they were created. Two Facebook posts are analysed due to space limitations. This analysis gives rise to theoretical considerations that aim to contribute to the analytical framework of social semiotics and to our understanding of *lemgthbook*-inspired online humour.

3.1 Data Collection

An ethnographic approach was adopted for data collection. The data were collected from Facebook groups (sometimes "closed" groups) of which the researcher was an active member. Group administrators granted their permission for the data collection and the posts were anonymised.

The choice of an ethnographic approach was necessitated given the nature of *lemgthbook* content. *Lemgthbook* comprises a collection of mainly closed Facebook groups, therefore data collection would not have been possible if the researcher was not a member. Further ethnographic immersion in the groups was also required to gain insight into the nature of *lemtghbook* posts since *lemgthbook* members constitute an in-group that shares a common understanding of the context-bound value of the semiotic practices they enforce. Familiarisation with the type of humour generated therein was also required, so that user-level understanding of it could inform the analysis.

3.2 Data Analysis

The data were analysed drawing from the framework of social semiotics. This analytical decision was contingent upon the theoretical underpinnings of this study for the production of valid results. This framework was also favoured due to its wide applicability (Van Leeuwen, 2005a), which in turn necessitates gaining a deeper understanding of the object of enquiry besides relevant theoretical concepts. The ethnographic approach adopted also aimed at meeting this necessity.

As for the analytical procedure followed, an inductive approach was adopted. First, the instantiation of "<m> replaces <n>" was traced in the posts analysed. This was followed by ever-expanding considerations of how the practice functioned along different levels of meaning-making, how it related to other modal elements in the post (pictures, verbal text), and how this amounted to the post's final semiotic output. This led from an illustration of how the phenomenon occurs individually to more general observations on how it functions.

Figure 1. *Very lomg boi.* (Retrieved from: https://www.facebook.com/groups/lomgbois/permalink/1209284405901498/.)

4. Analysis

In this section, two Facebook posts enforcing the "<m> replaces <n>" practice are analysed. One post comes from a closed *lemgthbook* group, while the other is found in a group outside *lemgthbook,* thereby illustrating the spread of this semiotic practice beyond its original space, which also warrants its approach as meme-like content. The analysis is necessarily contained to the semiotic aspects of these memes that are relevant to the paper's goal only.

Figure 1 shows a post from the *lemgthbook* group *Famtastic Lomgbois amd Where to Fimd Them.* The post consists of a naturalistic pictorial representation of a dog with a very long muzzle, "the visual" in Royce's terms (1998), accompanied by a three-word English language text, "the verbal." Typography could be analysed here as a third pole in the multimodal structuring of the post, viewed as a mode that encompasses both the verbal (i.e., written language) and the visual (Van Leeuwen, 2005b). While this view is certainly valid and despite Royce's (1998, p. 41) treatment of typographic features as mere verbal meaning (i.e., written language) conventions, for the purposes of this analysis I propose viewing the mode of typography as part of the visual given that (a) the case of "<m> replaces <n>" disrupts the grammar of the verbal (i.e., English orthography) thereby also disrupting its linearity and rendering it a non-linear composition which is a testament of its pronounced multimodal nature (see Royce, 1998); (b) the use of <m> functions iconically (rather than symbolically) for the representation of the concept of length pointing to the construction of visual meaning. Van Leeuwen himself (2005b; 2006) frames the study of the mode of typography as an exploration of visual meaning-making.

The replacement of <n> with <m> constitutes a novel meaning-making

choice within the affordances of the mode of typography. Examples cited by Van Leeuwen (2006) showcase the semiotic resources of typography focusing on typeface (see pp. 147-150). In this case, the replacement of <n> with <m> is a case of expansion from "condensed" to "wide" (see Table 1 in Van Leeuwen, 2006, p. 151). However, this meaningful contrast is not articulated on the level of typeface but through two different alphabetic letter characters of same size, font, and overall style. The particular nature of this practice is owed to the semiotic potential provided here by the social medium of Facebook. Facebook's technology does not allow for the easy inclusion of different fonts and font sizes in posts but only allows one-font text and emojis in the verbal text region of posts. While there are ways to incorporate different typefaces in a Facebook post (e.g., through alt-codes), these options are not readily provided by the Facebook interface in a user-friendly fashion but are up to users of more advanced digital skills to implement through their own initiative. Facebook software does not afford users the potential to use a lengthier version of any letter—which would have been possible in, say, Microsoft Word or in handwriting—and this is why the meaning potential of the condensed/wide contrast between the available letters <n> and <m> is tapped into. What this illustrates is that the semiotic technology of the social medium is of major relevance for the analysis of multimodal texts created on it, as Poulsen and Kvåle (2018) argue.

Despite the fact that typeface contrasts are not employed, the case of typographic meaning-making under discussion still exhibits the three SFL metafunctions, which allows us to formally define typography as a mode (Kress, 2009). The extension of <n> ("half-m", according to the original *lemgth-book* group's description) to <m> signifies the ideational meaning of increased length. On an interpersonal level, this use of the letter <m> draws upon the readers' cultural knowledge of both <m> and <n>'s forms as letter symbols of the English alphabet along with these forms' relative relations (the former is longer than the latter). In terms of textual meaning, this <m> figures with increased salience; however, this is not owed to the exploitation of visual meaning-making modes (e.g., layout) as one would expect (Van Leeuwen, 2006). Instead, the increased salience of <m> is a result of its violation of the grammar of written English, from which this case of alphabetic character substitution cannot be separated. The unexpected presence of <m> in a place where <n> is expected by an English-literate reader for the production of the canonical spelling of an English word (<long>) grants this instance of <m> a textual status due to its glaring incongruity. The unfitness of <m> in this position is markedly accentuated because official English spelling constitutes a heavily institutionally defined mode that allows minimal flexibility, especially since non-compliance with its regularities generates heavy indexical meanings given the prevalence of prescriptivist metalinguistic discourse in society.

Finally, notable ideational intersemiotic complementarity relations can be observed in the post, as both the verbal and the visual accentuate the attributes of the main participant (dog, "boi"); namely, the participant's length. In the verbal part, this is accomplished through a declarative statement containing an adjective with an intensifier ("Very lo[n]g"). In the visual, this occurs through a *symbolic suggestive* process whereby the participant, the dog, simply "poses" as the *carrier* of the attribute of length, which is accentuated as a "mood" within the visual representation (Kress & Van Leeuwen, 2006, pp.

Figure 2. *So lomg*. (Retrieved from: https://www.facebook.com/groups/451689008565313.)

105-106). The <m> sign contributes to shaping this general "mood" centered around length by calling attention to its own long form through its incongruent usage in writing (see above), thereby "blurring" background details of the picture leading to the foregrounding of the attribute of length (Kress & Van Leeuwen, 2006, p. 106). The intersemiotic complementarity relation thus established is one of *repetition* (Royce, 1998). As will be discussed in Section 5, this relation might be seen as being linked to the humourous effect of the meme.

Figure 2 displays an instance of replacement of <n> with <m> in a post made outside *lengthbook*, in the *Animals in Predicaments Posting* group. The post also contains a watermark that reads "@dogecore" suggesting that it might have originated in a group/account of that name—which, again, is not part of *lemgthbook*. This post contains verbal text overlaid on a picture with four frames in the style of a comic, as well as additional verbal text ("Transcendent") in the verbal part of the post. Due to space limitations and given this paper's goal, I will only address the former verbal text.

Apart from illustrating the viral spread of the *lemgth* meme's key semiotic practice outside of *lemgthbook*, the analytical importance of the *so lomg* post lies in the fact that the function of <m> here does not result directly in the multimodal production of the literal meaning of length but bears this meaning at its core and elaborates it on different levels. The form <m>, through its "distinctive feature" (Van Leeuwen, 2005, p. 140) of increased length in contrast with <n>, as discussed, suggests the meaning of *long*. In the visual part of the post, this feature of <m> is metaphorically related to the depiction of increasing distance suggested across the four frames as the dog gradually disappears into the sky. Additionally, through ideational intersemiotic complementarity with the verbal mode that contains the word *long*, the potential of <m>

becomes involved in an intersemiotic complementarity relation of *synonymy*.

In the end, given that the word *long* here does not function literally in the idiom *so long*, it becomes evident that the iconic form of <m> has served as a source harvested from the *lemgthbook* meme format (use of <m>; theme: length; function: humour, conviviality) from which different levels of meaning were structured. Consequently, meaning-making based on the "<m> replaces <n>" form is seen here gradually stirring away from the literal meaning of length.

5. Discussion & Conclusion

The examples discussed in Section 4 suggest that replacing <n> with <m> constitutes a semiotic practice innovatively based on the affordances of typography as a mode used within the technologically-imposed limitations of Facebook as a social medium. This practice, although originating in *lemgthbook*, has spread outside the niche groups that fathered it, thereby promoting more broadly a novel case of typographic meaning-making in internet memes. In some cases, "<m> replaces <n>" can also be found generating more than the literal meaning of length as a result of its use in the context of posts that are not explicitly concerned with length.

The findings answer the analytical questions posed suggesting that: (a) "<m> replaces <n>" is an artefact of the technological limitations of Facebook's semiotic technology; (b) this practice represents a novel way to produce typographic meaning through alphabetic character substitution instead of on the level of typeface.

As regards humourous function, the practice of "<m> replaces <n>" originated in a group whose description (see Appendix) largely relied on a kind of humour dubbed *deadpan* (Holm, 2017). Holm (2017, p. 4) defines deadpan as a form of "abstruse" humour which "refuses to confirm its comic nature by providing its audience with a lower level of information than is usually required for the straightforward confirmation of interpretation." Indeed, in the case of *lemgthy earth* the burden is upon the audience to decide whether the content presented to them in the description is comic or not (Holm, 2017). The systematic replacement of <n> with <m> enforced and actively commented upon only serves to amplify the absurdity of the text while providing no reassurance that this is in fact a joke.

Holm (2017) finds that deadpan thrives on the internet due to the vast potential to share content outside its original context which might have provided contextual cues for the confirmation of the content's comic nature. Evidently, when *lemgthbook* memes are encountered within *lemgthbook*, the very groups in which they are found function as a cue for the memes' comic reading. However, when these memes' key semiotic practice spreads outside of this space (Figure 2), they "revel in the comic potential of blank absurdity" in a way that resembles memes like "Doge"—which renders them forms of online deadpan (Holm, 2017, p. 7).

If *lemgthbook*-type memes cannot be characterised as deadpan when posted within *lemgthbook* groups, how are they to be categorised? Following the categorisation adopted by Taecharungroj and Nueangjamnong (2015) for the classification of internet humour into distinct *styles* and *types*, *lemgthbook* posts could reasonably be labelled *exaggeration-based* (in terms of humour

type) *affiliative* (in terms of humour style) jokes, which aligns with our semiotic analysis. In terms of humour type, a dimension which considers primarily the content and form of the meme, the intersemiotic complementarity relation of repetition (Figure 1) indeed results in an effect of exaggeration. As for humour style, which pertains to the interpersonal function and content of a joke, *lemgthbook* content fits the description of affiliative humour; i.e., jokes made to "amuse others and facilitate relationships" by referring to "the situation of someone else in a positive way" (Taecharungroj & Nueangjamnong, 2015, p. 294). This also aligns with our understanding of *lemgthbook* posts as memes and of memes as forms of conviviality following Varis and Blommaert (2015). The creation and sharing of these memes enhances the cohesion of *lemgthbook* members as a group of social actors by calling their focus to a specific kind of artefact with specific characteristics (Varis & Blommaert, 2015).

The above classification, albeit justifiable, might be seen as not doing justice to the peculiar nature of the semiotic practice enforced as a key characteristic of these groups. While the validity of describing such jokes as exaggeration-focused is undeniable, describing them as affiliative jokes is a characterisation that might be considered not fine-grained enough. For one, the affiliative function of *lemgthbook* posts is presupposed when one approaches them as memes (Varis & Blommaert, 2015). Further, despite it being technically true that *lemgthbook* posts refer to "the situation of someone else in a positive way" (Taecharungroj & Nueangjamnong, 2015, p. 294), it is doubtful whether this is their main focus since, unlike canonical memes, they do not present a relatable situation, especially since the "someone else" element could be anything, from a tall human being, to a dog with a long muzzle (Figure 1), to an inanimate object of outstanding length. What calls most attention in a *lemgthbook* post is adherence to the "no <n>'s allowed" rule and thereby the semiotic practice under discussion. This is also illustrated in the creation of groups (humourously) devoted to "policing" the usage of <n> such as *beep beep forbiddem glyph restorative justice team* and *BEEP BEEP GLYPH POLICE PUT YOUR HAMDS UP*.[3]

Following these considerations, the group-oriented functioning of *lemgthbook* memes, their irrelevance to the specific characteristics[4] of the situation they are presenting, and—perhaps most importantly—their strong adherence to a peculiar semiotic practice makes *lemgthbook* memes approximate deadpan. More specifically, this type of humour fits into the genre of shitposting, which is defined as the posting of "intentionally poor quality or irrelevant content" (Holm, 2017, p. 9). While "poor quality" is an inherently vague observation in the absence of further specification, the intentional misspelling of English words by substituting <n> with <m> could be an indicator of low quality by virtue of illustrating a lack of adherence to heavily institutionalised norms.

Ultimately, *lemgthbook* memes with their novel semiotic practices present a challenge for the analyst that seeks to categorise them and an exciting opportunity for further research. From this preliminary effort to examine their main semiotic practice, it could be argued that they constitute

3 15 such "policing" groups exist at the moment and another 8 specifically call attention to the use of the "forbiddem glyph" ("lemgthbook,", n.d.).

4 The characteristic of length itself appears to be taken on a secodnary role with the more recent emergence of groups irrelevant to length and the use of "<m> replaces <n>" outside lemgthbook with a non-literal focus.

cases of conventionalised shitposting, whose comic nature is often revealed by the context of *lemgthbook*. It is hoped that future large-scale analytical efforts might expand on this preliminary analysis by also providing quantitative insight, which might substantiate the generalisations made here.

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Appendix

Figure 1 presents a screenshot of the description of lemgthy earth:a lomg earth discussiom group on its Facebook page.

Figure I. *lemgthy earth: a lomg earth discussion group* Facebook group description. (Retrieved from: https://www.facebook.com/groups/lemgth/about/.)

Context of research

MA course, *Introduction to Multimodal Analysis*

Eu nunca falei nada pra ninguém não, né!

A variationist corpus study of negative concord in Brazilian Portuguese

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Abstract: Portuguese is a negative concord (NC) language, specifically a non-strict NC language (i.e. a language that requires NC only in certain constructions). However, colloquial Brazilian Portuguese (BP) alternatively allows the "negative quantification" construction (as described by Agostini & Schwenter, 2015; in this paper, the term "lack of NC" is used). The present study compares three corpora of written and spoken BP in an attempt to uncover the reasons behind variation between NC and lack of NC. The findings by Agostini & Schwenter are largely replicated. Although lack of NC is generally a colloquial phenomenon, there are multiple factors at work, both language-internal (the various NC items have their own syntactic properties) and language-external (properties of the speakers, formality, type of conversation). It is found that the two written language corpora, despite being relatively informal, differ significantly from the spoken language corpus, as well as from each other.

Keywords: Brazilian Portuguese, negative concord, negative indefinite, variationist sociolinguistics, corpus linguistics

1. Introduction

1.1 Theoretical background

In Brazilian Portuguese, a sentence with a postverbal negative indefinite (hereafter: NI) can be constructed in one of two ways. The first, common to all varieties of Portuguese, makes use of negative concord, that is to say, a negative licensor *não* 'not' or *nunca* 'never' is inserted preverbally and an NI, which may also be *nunca*, but also *ninguém* 'no one, nobody', *nenhum(a)* 'no, none [an adjective in Portuguese]' or *nada* 'nothing' is inserted postverbally, giving a single negative meaning to the sentence as a whole, as in the following examples

(1)	O João	nunca	veja	ninguém	na	rua
	John	never	see.3SG.PRES	nobody	on.the	street
	"John never sees anybody on the street"					

(2)	A Maria	não	beijou	nenhum	homem	ontem
	Mary	not	kiss.3SG.PF	no	man	yesterday
	"Mary hasn't kissed any man yesterday"					

(3)	Nós	nunca	vandalizaremos	nada
	1PL	never	vandalize.1PL.FUT	nothing

"We will never vandalize anything"

This is the default construction for all the above expressions. However, *nunca* as a postverbal NI behaves differently from the other three, as the following construction is possible but marked

(4)	O Flamengo	não	caiu	nunca	na	Segunda
	Flamengo	not	fall.3SG.PF	never	in.the	Second

"Flamengo (a football team) haven't ever been relegated to the second level' "

The unmarked construction in this case would be *O Flamengo nunca caiu na Segunda* 'Flamengo have never been relegated to the second level', i.e. a construction without negative concord (hereafter: NC). The reason this is so is beyond the subject of this paper, but one can imagine it is the same or similar to the reason why *not ever* is marked in English compared to *never*.

However, another construction is possible, where the preverbal negative licensor (and thus the NC) disappears. This construction, although still somewhat marked, is common in colloquial (but not formal) Brazilian Portuguese (hereafter: BP). Consider the following examples:

(1a)	O João	veja	ninguém	na	rua
	John	see.3SG.PRES	nobody	on.the	street

"John doesn't see anybody on the street"

(2a)	A Maria	beijou	nenhum	homem	ontem
	Mary	kiss.3SG.PF	no	man	yesterday

"Mary didn't kiss any man yesterday"

(3a)	Nós	vandalizaremos	nada
	1PL	vandalize.1PL.FUT	nothing

"We won't vandalize anything"

(The meaning of 1a and 3a has changed with respect to 1 and 3, but this is irrelevant here because it is due to the semantics of *nunca*. 1a and 3a would be equivalent in meaning to 1 and 3 if 1 and 3 had *não* in the place of nunca.)

Agostini & Schwenter (2015) investigated the variability between constructions with and without NC in BP (what they call "variable NC"), by means of an online survey into the acceptability of lack of NC (pp. 5–7). Although they state that the corpus data they had access to was not suitable for researching variable NC in BP (p. 5), I thought it worthwhile to investigate whether the cor-

pora I found (see below) could be used to replicate their findings and answer the question "Which factors determine the presence or absence of NC in BP?".

1.2 Hypotheses

Agostini & Schwenter draw several conclusions about the factors influencing the acceptability and frequency of lack of NC in BP. Strikingly, they found that acceptability ratings for the various NIs differ in a way that is consistent with their frequency: *nada*, the most common NI, is also judged to be most acceptable, whereas *nunca*, the least common one, is judged to be least acceptable. The acceptability ratings of *ninguém* and *nenhum(a)*, which lie in between, are the reverse of their frequencies, but the difference is so small that this could easily be an artifact of the samples used (frequency data came from the *Corpus do Português*; cf. pp. 5–9, in particular the frequency graph on p. 7 and the acceptability graphs on pp. 8 and 9). They also found a correlation between acceptability ratings and the token-to-type ratio of the verbs with which the four different NIs occur: *nada* occurs with the highest token-to-type ratio of verbs, *nunca* with the lowest, and the other two are in the middle (pp. 15–16). However, because the overall frequencies and the token-to-type ratios are so similar, it is difficult to say which one of them is more relevant for the acceptability of the four NIs.

Furthermore, they found that the respondents on their survey did not give significantly different acceptability judgments depending on their age, leading them to suppose that variable NC in BP is a case of stable variation, rather than a sign that BP is in the process of moving from NC toward lack of NC diachronically (pp. 12–13); nor did the respondents give significantly different acceptability judgments depending on their gender or education level (p. 13).

Native speakers commented that the construction without NC was more "emphatic" than the construction with NC (p. 13). This is in accordance with my own, anecdotal, observations from conversations in colloquial BP. Finally, their respondents were divided into three geographical areas (see Fig. 1): Rio Grande do Sul (the southernmost state of Brazil), São Paulo (in the southeast, more northernly but still relatively close to Rio Grande do Sul), and the Nordeste (northeast) region; the respondents from Rio Grande do Sul rated lack of NC as less acceptable overall (p. 14).

Fig. 1. *Regiões e estados do Brasil* [Regions and states of Brazil]. Note that São Paulo state is in the Sudeste region (red) and Rio Grande do Sul in the Sul region (purple). (Source: Polon, n.d.)

These regions have different demographics. For example, inhabitants of Rio Grande do Sul are called *gaúchos* and many of them own cattle ranches; they are stereotyped as being in majority white, rich and politically conservative. On the other hand, the Nordeste region is known for its large number of inhabitants of African descent and is stereotyped as being poor and left-wing (cf. stereotype maps of Brazil at https://www.reddit.com/r/brasil/comments/9xvs76/12_jeitos_de_dividir_o_brasil/). Thus, it stands to reason that these demographic differences contribute to the differing acceptability rates for lack of NC.

Based on both Agostini & Schwenter's findings and my own anecdotal observations, then, we can hypothesize a number of outcomes that will be tested in the present study, as follows:

Hypothesis 1: We expect to replicate Agostini & Schwenter's findings for the frequency of the various NIs in postverbal position. It will be interesting to see here if we can find a significant difference between *ninguém* and *nenhum(a)*.

Hypothesis 2: Because lack of NC is highly colloquial, we expect to find it in higher frequencies the more informal our corpus is (see below for more data on the corpora used). In more formal language, we should expect more NC, whereas especially in spoken language, we should expect a large amount of variation, where lack of NC is used in particular for the purposes of emphasis.

Hypothesis 3: We expect any regional variation found in our corpora to, broadly speaking, match that found by Agostini & Schwenter.

At this point, then, it will be useful to divide our research question into two sub-questions, namely "Which NIs occur most often in non-NC constructions?" and "In which corpora do non-NC constructions most often occur?", in order to distinguish between the language-internal (frequency, syntax) and language-external (demographic) factors under investigation.

2. Method

The AC/DC project (*Acesso a Corpos/Disponibilização de Corpos* "Access to Corpora/Making Corpora Available", https://www.linguateca.pt/ACDC/) is a collection of 35 corpora of Portuguese, both spoken and written, in various genres, in both European and Brazilian Portuguese, as well as other varieties (such as Mozambican), totalling over 1.5 billion units, annotated using the PALAVRAS parsing system (Bick, 2000). PALAVRAS allows for a variety of tagging methods, including part-of-speech (PoS) tagging and syntactic function tagging. These corpora can be queried using the IMS Open Corpus Workbench (CWB; Evert, 2016).

For the present study, three corpora of a varied nature (see table 1) were searched for instances of the four postverbal NIs *nunca*, *ninguém*, *nenhum(a)* and *nada* using the CWB query syntax (see appendix). The output for each of the three corpora was then searched again for the preverbal negative licensors (hereafter: NLs) *não* and *nunca*. This yielded two sets of data for each corpus: one of NC sentences and one of non-NC sentences. In addition, I added another query for each corpus to include a preposition between the verb and the NI, since the NI may occur in combination with a preposition such as *p(a)ra nada* 'for nothing', *com ninguém* 'with nobody, without anybody' or *em nenhum(a)* 'in any [in negative polarity sentences in English]'. The output from these ad-

ditional queries was once again divided into sets of NC and non-NC sentences. Unintelligible, uninterpretable or doubtful results were manually excluded.

One weakness of this method is that it ignores punctuation and prosody, which means some results that looked like cases of verb + NI at first sight actually consisted of two sentences[1]. These were also manually excluded. Results were tabulated for each corpus and for each postverbal NI (see below) and analyzed for statistical significance.

Table 1. Corpora used, with their sizes.

Corpus name	**Type of data**	**Size (units)**
Corpus Brasileiro (genre subcworpus: en)	texts from film and television scripts	254,352
Corpus Brasileiro (genre subcorpus: ed)	texts from magazines	494,263
C-Oral-Brasil	informal, spontaneous conversations (Minas Gerais)	431,081
Total		**1,179,696**

Lack of NC being a colloquial phenomenon, the best data to study it is found in spoken language. Nonetheless, I justify the choice of corpora here on the grounds that film and television scripts consist mostly of dialogue and thus, while not themselves spoken language, are a kind of representation of spoken language, often intended to sound colloquial; furthermore, that the language used in magazines, while written, tends to be somewhat more popular and informal than other written language. We can thus use the different corpora as a proxy for the formality of the language, where the spontaneous conversations are the least formal and the texts from magazines are the most formal.

Geographically, Minas Gerais is in the same region as São Paulo (see fig. 1), and we therefore expect the findings for this region to be similar to Agostini & Schwenter's findings for São Paulo. Unfortunately, the data from C-Oral-Brazil does not include information about the speakers, meaning that other demographic variables (race, gender, age, education level) cannot be investigated.

I did not look at the variation between the three different kinds of negation NEG1, NEG2 and NEG3 (as described by Agostini & Schwenter 2015, p. 14), only at NC versus strictly postverbal negation. This means I ignored sentences of the form *não* V *não* and *nunca* V *não*. I made this choice because these constructions represent a different kind of negation[2], whereas the present study is

1 Example: Mas o meu amigo me falou nunca falou que tem que desligar o pen drive não (C-Oral-Brasil), which the CWB counts as a case of V+NI, is actually Mas o meu amigo me falou – nunca falou que tem que desligar o pen drive não 'But my friend told me w– he definitely never said you had to disconnect the flash drive'.

2 The second, postverbal não in sentences like Eu não gosto disso não 'I don't like this (no/at all)' is not an NC item, but rather a separate negator added to strengthen the negation. This can be seen from the fact that it can only come at the end of the sentence, whereas postverbal NIs in an NC construction can only occur as part of the VP (*Eu não gosto não disso is ungrammatical, cf. NC Eu não gostei nunca disso which is grammatical); as well as from the fact that there is an equivalent affirmative construction with sim, litt. 'yes', as in Eu gosto disso sim 'I do like this (definitely)'.

focused only on NC. However, I did occasionally find cases where post-verbal *não* is preceded by an NI (V *nada não* etc.), which, although they are cases of NEG2 or NEG3, I did include in the analysis because they still represent variation between NC and lack of NC. In other words, both NEG2 and NEG3 can occur either with or without a postverbal NI; only the cases where they occur with a postverbal NI are relevant to the present study. I have counted these separately.

I also chose not to look at other NC items such as *nem* 'not even, nor, neither' and *sem* 'without', because their semantics preclude them from being used as preverbal NLs in non-NC constructions, thus they only occur in this way in NC constructions. They can also occur postverbally, but this was not found in the current study. A small number of sentences with preverbal *nunca mais* 'never again, never … anymore' were found, as well as one sentence with highly formal *jamais* 'never'; I decided to include them because *nunca mais* and *jamais* behave the same way as *nunca*.

3. Results

Results are tabulated below. The numbers for the queries with and without prepositions were added together. Any manually excluded cases have already been subtracted; they are not shown in the tables.

Table 2. Corpus Brasileiro (text from various genres), subcorpus en (film and television scripts): NC vs. lack of NC.

Negative concord	125 (97.66%)
Lack of negative concord	3 (2.34%)
Total	**128**

Table 3. Corpus Brasileiro (text from various genres), subcorpus ed (magazines): NC vs. lack of NC.

Negative concord	141 (97.92%)
Lack of negative concord	3 (2.08%)
Total	**144**

Table 4. C-Oral-Brasil (informal, spontaneous conversations, Minas Gerais):NC vs. lack of NC.

Negative concord	155 (79.49%)
Lack of negative concord	40 (20.51%)
Total	**195**

Table 5. Corpus Brasileiro (text from various genres), subcorpus en (film and television scripts): NC vs. lack of NC for each NI

postverbal NI only	**with NC**	**without NC**	**Total**
nada	103	3	106
ninguém	0	0	0
nenhum(a)	16	0	16
nunca	5	0	5
postverbal NI only: total	**124**	**3**	**127**
postverbal NI + additional não			
nada não	1	0	1
ninguém não	0	0	0
nenhum(a) NP não	0	0	0
nunca não	0	0	0
postverbal NI + additional não: total	1	0	1
Total	**125**	**3**	**128**

Table 6. Corpus Brasileiro (text from various genres), subcorpus ed (magazines): NC vs. lack of NC for each NI.

postverbal NI only	**with NC**	**without NC**	**Total**
nada	86	2	88
ninguém	0	0	0
nenhum(a)	50	1	51
nunca	5	0	5
postverbal NI only: total	**141**	**3**	**144**
postverbal NI + additional não			
nada não	0	0	0
ninguém não	0	0	0
nenhum(a) NP não	0	0	0
nunca não	0	0	0
postverbal NI + additional não: total	**0**	**0**	**0**
Total	**141**	**3**	**144**

Table 7. C-Oral-Brasil (informal, spontaneous conversations, Minas Gerais): NC vs. lack of NC for each NI.

postverbal NI only	**with NC**	**without NC**	**Total**
nada	102	24	126
ninguém	17	2	19
nenhum(a)	13	2	15
nunca	1	0	1
postverbal NI only: total	**133**	**28**	**161**
postverbal NI + additional não			
nada não	18	10	28
ninguém não	3	2	5
nenhum(a) NP não	1	0	1
nunca não	0	0	0
postverbal NI + additional não: total	**22**	**12**	**34**
Total	**155**	**40**	**195**

Chi-square tests of independence were performed on these results. A significant association was found between corpus and proportion of NC vs. lack of NC, $\chi^2(2) = 42.87$, $p < .001$. To make sure the association was only between C-Oral-Brasil on the one hand and the other two corpora on the other hand, another chi-square test of independence was performed only on the two Corpus Brasileiro subcorpora. No significant association was found here, $\chi^2(1) = .02$, $p = .884$. This confirms that the two Corpus Brasileiro subcorpora do not differ significantly in their distribution of NC vs. lack of NC compared to each other, but they do compared to C-Oral-Brasil.

Moving on to the individual NIs, a significant association was found between corpus and the frequency of the individual NIs, $\chi^2(12) = 119.86$, $p < .001$. Because this can be interpreted several ways, the test was performed again on the two Corpus Brasileiro subcorpora only, then on the single postverbal NIs only, and then on the postverbal NIs + não only. A significant association was found in the first case, $\chi^2(3) = 20.08$, $p < .001$, as well as the second, $\chi^2(6) = 72.07$, $p < .001$, but not in the third, $\chi^2(2) = .21$, $p = .899$. This indicates that the corpora differ significantly in their proportions of the single postverbal NIs, but not in their proportions of the NIs + não, although this latter finding is hard to interpret considering NI + não does not occur at all in the magazines subcorpus, and only once in the film and TV scripts subcorpus.

In addition, a significant association was found between the individual NI and the proportion of NC vs. lack of NC, $\chi^2(6) = 30.02$, $p < .001$; but when controlled for corpus, this association did not differ significantly between corpora.

Finally, a binomial test was performed to see if the postverbal frequen-

cies of ninguém and nenhum(a) differed significantly. This indicated that the proportion of nenhum(a) .81 was significantly higher than the expected .50 on the whole, $p < .001$; however, this difference disappeared when looking only at C-Oral Brasil, where the proportion was only .56, $p = .608$.

4. Discussion and conclusion

4.1 Discussion

The most immediately striking finding is that nenhum(a) as a postverbal NI appears so much more often than ninguém: 82 times (17.56% of the total amount), whereas ninguém only occurs 19 times (4.07%). At first sight, this seems to be a much greater difference than that reported by Agostini & Schwenter; however, the difference disappears in the spoken language corpus, meaning their findings are in fact replicated. Curiously, postverbal ninguém does not occur at all in the two Corpus Brasileiro subcorpora. This seems to indicate that ninguém as a postverbal NI is markedly informal. Moreover, the magazines subcorpus has a relatively higher incidence of nenhum(a) and a lower incidence of não postverbally than the film and TV scripts subcorpus. Why these frequencies differ remains an open question that cannot be adequately answered without a qualitative analysis.

Another remark regarding frequency is that the combination of NI + não is much more frequent in spoken language; it barely occurs at all in the written language corpora. This should be seen in light of NEG3 (see above) being characteristic of informal language. The language in film and TV scripts does not differ from that in magazines here, which is perhaps surprising if we think of scripts as imitations of spoken language. Not all the lines from the film and TV script subcorpus contained dialogue, though; some consisted of stage directions.

Looking at the syntactic behaviour of the individual postverbal NIs, we see that they differ with respect to their occurrence in NC versus non-NC constructions. In particular, nada is the only postverbal NI that occurs somewhat commonly in non-NC constructions. This is in accordance with Agostini & Schwenter's findings (cf. their discussion of this phenomenon on pp. 18–19 and p. 20).

We can now answer the two research questions as follows. As for the occurrence of postverbal NIs in non-NC constructions, my findings replicate those of Agostini & Schwenter in that nada is preferred for this construction and nunca is dispreferred, while ninguém and nenhum(a) are in the middle. This observation holds across all corpora, with the curious side note that ninguém does not occur postverbally at all in the written language corpora. Thus, hypothesis 1 has been confirmed.

As for non-NC constructions themselves, they occur considerably more in spoken language compared to written language, in line with expectations; however, their occurrence in film and TV scripts do not differ significantly from that of magazines. Thus, hypothesis 2 has been partly confirmed and partly rejected, but this says more about the relatively formal language used in Brazilian films and TV series compared to spontaneous conversations.

wFinally, I hypothesized that the data from Minas Gerais would match Agostini & Schwenter's data for São Paulo. Unfortunately, their data consists of acceptability judgments, whereas I only have access to frequencies. This may be

considered a methodological weakness of the present study. Even if we allow acceptability to function as something of a proxy for frequency, the data are difficult to compare because the other two corpora do not contain geographical information. That said, we can state that lack of NC is relatively frequent in Minas Gerais. However, this is weak and no definitive conclusion can be drawn. Thus, hypothesis 3 is tentatively supported, but more research is needed.

4.2 Conclusion

In summary, we can conclude that the factors determining the presence or absence of NC are a combination of language-external (formality, genre, perhaps geographical) and language-internal ones (specific postverbal NIs occur more often in non-NC constructions than others, which may have semantic as well as syntactic reasons). These factors show complex interactions regarding individual NIs, cf. the variable occurrence of nenhum(a) in magazines compared to film and TV scripts and that of ninguém in spoken compared to written language. This matter calls for thorough, especially qualitative, research that looks at the pragmatics, semantics and syntax of the variation in the context of the situation, communicative genre, and the properties of the individual speakers.

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