Featural dynamics in morphosyntactic change

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Chapter in an OUP volume: Syntactic Features and the Limits of Syntactic Change

Abstract:

This chapter examines Icelandic Dative Substitution (DS) and argues that two of its diachronic side effects, referred to as Person-Specific Retention and an Elsewhere Condition Death Rattle, are explained by the way in which formal features constrain the trajectory of morphosyntactic change. The study is based on naturally occurring data and a recent language acquisition experiment and the analysis draws on weighted grammatical rules as well as Yang's Tolerance Principle (2016).

It is argued that DS does not necessarily involve a change in the syntax, but should rather be viewed as a change in the interpretation of syntactic information at the interface with morphology, resulting in variability on the surface. The results are analyzed in the context of recent theories on specialization in linguistic change and the dynamics of variation in individuals.

Key terms: Historical change, variation, features, grammatical conditioning, Dative Substitution, Icelandic

Contents

1 Introduction

It is commonly observed that morphosyntactic change can involve overgeneralization of productive patterns in language acquisition (e.g., Lightfoot 1999). The resulting development is consequently treated as a systematic simplification through the erosion of marked or infrequent variants. In this paper, we investigate how a superficially simple leveling process can have complex diachronic side effects, which are conditioned by grammatical factors.

The side effects we present are the consequence of variation in subject case, one of the most researched topics of morphosyntactic change in Insular Scandinavian (e.g., Jónsson and Eythórsson 2005; Ingason 2010a; Thráinsson 2013; Jónsson 2013; Þráinsson et al. 2015). We specifically examine a well-known phenomenon of this type in Icelandic: Dative Substitution (DS), a widespread but stigmatized process. The DS change is first attested at the end of the 19th century but still seems far from replacing the older case-marking system completely. DS affects verbs with experiencer subjects, with dative thematic case (2) replacing the accusative case that was formerly used with certain verbs like *langa* 'want, long for' (1):

(1) Mig   langar í jarðarber
    me.ACC longs in strawberries

    'I want strawberries.'

(2) Mér   langar í jarðarber
    me.DAT longs in strawberries

    'I want strawberries'

As will be discussed in more detail in chapter 2, extensive syntactic surveys have been conducted to document the change. The results indicate that intra-speaker variation is common. Recent reserach (e.g., Nowenstein 2017) shows results where most participants accept and produce both accusatives and datives with the same verb, as in (3):

(3) Mig   langar í jarðarber   en þeim   langar í bláber
    me.ACC longs in strawberries but they.DAT long   in blueberries

    'I want strawberries but they want blueberries'

Moreover, the distribution of the different cases within individual speakers does not seem to be unstructured, but rather conditioned by grammatical factors. This brings us to the first side effect at the center of this chapter, the Person-Specific Retention (PSR, see also section 3.1): The historical accusative is more likely to be retained with first and second person singular subjects than with third person subjects. This has been attested in naturally occurring adult data (Nowenstein 2014) and large-scale surveys (Svavarsdóttir 2013; Thráinsson et al. 2015), as well as in language acquisition experiments and heritage North-American Icelandic (Nowenstein 2017). The experimental acquisition data show that the Person-Specific retention also applies to the second side effect of DS we discuss, a much rarer but attested phenomenon: the Elsewhere Condition Death Rattle (ECDR, see also section 3.2). For at least some speakers, the disappearing accusative is variably extended to verbs which historically take a dative subject. Thematic case therefore replaces lexical case.

We argue that these phenomena can be accounted for formally within a model of language acquisition assuming weighted grammatical rules (Yang 2002) and the Tolerance Principle (Yang 2016), where the probabilistic nature of the acquired rules explains the observed intra-speaker variation. Furthermore, we maintain that the variation is constrained by the way in which children target specific features in language acquisition. We argue that DS is an example of how the feature inventory of natural languages conditions language change and can force a specialization based on differential aspects of phi-features (cf. Harley and Ritter 2002; Wiltschko 2008). We incorporate these constraints of person and number features into our model in the form of probabilistic rules which explain the PSR and ECDR phenomena. The resulting interplay between formal features, the dynamics of variation within indivuduals and the mechanics of specialization contributes to recent theories of the nature of language variation and change, providing data in which different types of conditioning result in complex specialization patterns within intra-speaker variation.

Examining the way in which formal features play a role at this level of variation additionally provides an understudied context for the application of theoretical work to a diverse set of data. The present work contributes to recent theories of the feature hierarchies of person and number

(Hall and Cowper 2017; Harbour 2016), where the data seem to align with approaches based on the [±participant] distinction. Dative Substitution is also an example of how grammatical features shape PF phenomena, since we assume, following Wood et al. (Forthcoming), that Dative Substitution is the result of the same syntactic structure being realized in different ways at PF. This analysis is motivated by the fact that Dative Substitution does not correlate with a systematic meaning difference (Jónsson and Eythórsson 2005; Sigurðsson 2012) and it also fits well with the view that morphological case in general is a realizational PF-process that interprets syntactic structure but does not, for example, constrain DP-licensing (Marantz 2000). Our approach draws on the theoretical foundations of Distributed Morphology (Halle and Marantz 1993) and this chapter illustrates the way in which a realizational theory of morphology, in our view, shapes the appropriate understanding of the Borer-Chomksy conjecture. For us, this particular type of variation in case marking falls outside the scope of the Borer-Chomsky conjecture, without impeding an analysis in which the organization of the feature inventory of natural languages is significant.

We elaborate on the formal analysis of DS and its interaction with grammatical features in section 2.2., but we begin the chapter by providing a short overview of previous results in Dative Substitution research in 2.1. The data on Person-Specific Retention and the Elsewhere Condition Death Rattle are presented in section 3, in which we also present our model of the interaction between probabilistic rules and featural constraints. In section 4, we discuss the implications for theories of variation and change, addressing the Borer-Chomsky conjecture (Baker 2008), the different types of conditioning in intra-speaker variation (Tamminga et al. 2016), and the role of specialization in linguistic change (Fruehwald and Wallenberg 2013).

2   Dative Substitution

Before exploring the side effects of DS, we turn to some basic facts (2.1) as well as the formal representation that we assume (2.2).

2.1 Empirical overview

The first known reports of Dative Substitution are found within prescriptivist literature from the beginning of the 20th century (Jónsson 1900), where it is already stigmatized. Although variation in the subject case of experiencers can be found in Old Icelandic (Viðarsson 2009) and throughout the history of Icelandic, the variation is generally considered to have spread at the end of the 19th century (e.g., Jónsson and Eythórsson 2005; Barðdal 2011). Similar phenomena have been observed in other Germanic languages (e.g., Smith 1994) for German and Old English and Jónsson and Eythórsson (2005) as well as Eythórsson and Thráinsson (2017) for Faroese) and although different accounts on the nature and actuation of the change can be found in literature (Smith 1994; Jónsson and Eythórsson 2005; Barðdal 2011; Þráinsson et al. 2015; Yang 2016; Nowenstein 2017 i.a.), the dominant approach is grounded in overgeneralizations and incomplete learning in language acquisition.

This is compatible with descriptive data from language acquisition (Sigurðardóttir 2002), where children first acquire nominative subjects and overgeneralize them before acquiring dative subjects for experiencer verbs and overgeneralizing them. Accusative experiencer subjects are (partially) acquired last. Such a developmental trajectory is also compatible with studies on case marking in the acquisition of other languages, where children are found to acquire structural case first and overgeneralize it before learning more specific rules (e.g., Schütze 1997) for English, German, Dutch, Russian and French children as well as Clahsen and Vainikka (1994) for German and Finnish children). The acquisition order supports an analysis in which dative becomes productive as subject case for experiencer subjects, aligning in a hierarchy of forms (Woolford 2006) in which nominative is the default structural case for subjects, dative is the default inherent case for experiencers and accusative appears as the most marked, lexical case for experiencer subjects. This hierarchy is also present in the distribution of oblique experiencer predicates in Icelandic (estimates in Eythórsson (2002) and Yang (2016)), where dative predicates (type frequency) appear in much higher numbers than originally accusative taking predicates, in addition to having an overall higher token frequency.

Bearing those facts in mind and setting aside the actuation problem (but see Barðdal 2011;

Yang 2016), the emergence of Dative Substitution, and the nature of this variation, might seem fairly straightforward. The first efforts to document this change in real time mainly consisted in evaluating the rate of DS with different verbs and within different age groups of speakers, establishing basic facts and correlations with social factors. Three major surveys were carried out in 1982, 2003 (published in English in 2005) and 2006–2007 (published in 2013), the comparative findings can be found in figure 1:

[figure 1 here]

Figure 1. Dative subject case with the third person singular feminine pronoun - four different DS verbs in three different surveys: Svavarsdóttir (1982) – 200 participants aged 11-12, Jónsson and Eythórsson (2005) – 900 participants aged 11-12 and the Variation in Syntax project (Thráinsson et al. 2015) – 800 participants aged 14-70.

As can be seen, the rate of DS varies between verbs, with higher frequency verbs like *langa* ('want, long for') and *vanta* ('need') appearing more often with a dative subject. Frequency is not the only factor at play here, since nominative is also selected (much less frequently) with *dreyma ('dream')* and *minna ('recall').* This might be due to different semantic conditions as well as a polysemy effect for *minna*, which traditionally takes a nominative subject with the meaning 'remind'. The figure also shows that in the first two studies, conducted in 1982 and 2003 with 11-12 years old participants, DS is on the rise. Jónsson and Eythórsson (2005) report a significant rise of 5.9%, but the data from 2006-2007, with a much broader age group, indicates that the distribution is probably affected by age-grading (Sankoff and Blondeau 2007) and/or an adolescent peak (Tagliamonte and D'Arcy 2009). This does not come as much of a surprise considering the negative sociolinguistic value of DS and the conditioning factors it entails.

Another aspect of the distribution of DS which became apparent in the abovementioned surveys, crucial to this chapter, is widespread intra-speaker variation as shown in (3). Although the surveys were not designed to target it specifically, reports as early as Svavarsdóttir's 1982 study still mention it. Svavarsdóttir's (2013) analysis of the results from the more recent nationwide project 'Variation in Syntax' (Þráinsson et al. 2015) also indicates widespread

intra-speaker variation within the surveys. This intra-speaker variation can even be found at the clausal level, with accusative subjects licensing dative case on agreeing modifiers in what has been called mixed case marking (Jónsson 2013). An online survey conducted in 2012 (Nowenstein 2014) showed this quite clearly. Participants were asked to choose between cases for a first person singular subject and then to choose a case for the modifier *sjálfur* ('self') that traditionally shows agreement with the subject (4):

(4) Mig/mér   + verb + sjálfan/sjálfa or sjálfum/sjálfri
     me.ACC/DAT + verb + self.ACC.M/F or self.DAT.M/F

The results show a much higher rate of DS for the 'self' modifier than the first person pronoun, as can be seen in Figure 2:

[figure 2]

Figure 2. Results for *langa*, forced choice task. N = 280.

All speakers who chose a dative subject also chose to have the modifying element in dative. As the speakers chose accusative massively for the subject, this means that more than half of the participants show variation between the case of the subject and the case of the modifier. What happens when language learners encounter this intra-speaker variation in their input, with mixed messages on the case marking of certain verbs? As is shown in section 3, the variation caused by a simple case of leveling can entail more complex side effects, and children seem to acquire a variational paradigm conditioned by grammatical factors. Before turning to these phenomena in section 3, DS is examined within a more formal context.

2.2   Variable PF realization of grammatical features

We will now turn to the formal difference that gives rise to the variable realization of accusative and dative subjects that was described in the previous section. The focus will be on determining the formal locus of the variability because the derivational point at which the two variants diverge has consequences for how the relevant properties of the grammar relate to theories of linguistic variation and change. Assuming that morphological case realizes grammatical case

features, it is important for our purpose whether the feature distinction between accusative and dative in Dative Substitution is made in the narrow syntax or at the PF branch of the derivation. According to the Borer-Chomsky conjecture (Borer 1984; Chomsky 1995), a properly syntactic parametric difference should be expected to reflect a feature distinction at the level of the syntax and then we would expect it to correlate with systematic cross-linguistic empirical phenomena; the conjecture's description in (5) is from Baker (2008).

(5) The Borer-Chomsky Conjecture

All parameters of variation are attributable to differences in the features of particular items (e.g., the functional heads) in the lexicon.

Note that the notion of a parametric difference in our use of the term can be understood as any minimal and binary syntactic difference between languages made available by Universal Grammar. For further discussion of the nuances of the term, which we will not address here, see e.g., Baker (cited above) and his references. The crucial connection to the present work is that realizational distinctions made at PF are outside the scope of the Borer-Chomsky conjecture. Even if such distinctions operate on features of functional heads, the split between derivational paths is post-syntactic and involves language-specific phonological details. It should be emphasized that this is our proposal for how the Borer-Chomsky conjecture should be interpreted in a framework like Distributed Morphology in which there is no unified lexicon and where morphology interprets and realizes syntax at PF. Our interpretation of the Borer-Chomsky conjecture makes a useful theoretical cut between abstract syntactic variation and more shallow surface variation and these have indeed been argued to be empirically different, for example with respect to the social evaluation of variation:

Abstract linguistic structure has little or no social impact on members of the community. The interface of language and society is narrow, and primarily on the surface: the words and sounds of the language. (Labov and Harris 1986:21)

Following a range of current proposals in the literature, some of which are summarized by Wood et al. (2016:76–81) (see also Wood et al. 2019), we attribute Dative Substitution to different

ways in which the same syntactic structure can be realized at PF. Thus, in our analysis, examples (1) and (2) are two realizations of the same syntactic structure. Following Wood (2015), we assume that the accusative experiencer of a verb like *langa* 'want' is introduced by an Appl(icative) head and that the Appl head is the source of the case marking on the experiencer. In the system of Sigurðsson (2012), the default behaviour of an Appl head is to assign dative case to its specifier (Appl* in Sigurðsson's analysis) but the Appl head can be contextually enriched at PF with a feature that results in accusative case marking (Appl($*^+$) in Sigurðsson's analysis). It should be noted that analyzing Icelandic dative experiencers in terms of Appl heads is a commonly adopted approach in recent work (Wood 2015), even for experiencers that are arguments of nouns (Ingason 2016).

In terms of attributing the accusative/dative distinction to the phonology, this is similar to the system of McFadden (2004, 2006) in the sense that his analysis determines the values of case features at PF. For McFadden, dative case realizes the feature bundle [+OBLIQUE, +INFERIOR] whereas accusative is non-oblique, i.e., its formal representation is [+INFERIOR]. By default, then, the specifier of Appl is a dative. In the case of accusative assignment on the other hand, a PF impoverishment rule, shown in (6), variably deletes the oblique feature associated with Appl in the context of certain verbs like *langa* 'want' and this results in accusative morphology. A failure to apply this rule yields DS.

(6) [+CASE, +OBLIQUE, +INFERIOR] $\rightarrow$ [+CASE, +INFERIOR] / __ {*langa, ...*}

Dative Substitution does not seem to correlate with deep syntactic or semantic differences that are associated with accusative vs. dative case with verbs like *langa*. Given that case is sometimes believed to play an important role in the syntactic licensing of noun phrases, case is at least potentially a deep syntactic phenomenon for some purposes and therefore the apparently superficial nature of Dative Substitution can raise questions about its relation to the Borer-Chomsky conjecture. Dative Substitution raises the question whether it is possible to have case variation in the absence of real syntactic differences. This problem is alleviated if we assume that the distinction between the two cases is made post-syntactically in realizational phonology. Then, it does not matter whether case plays a role in the abstract licensing of noun

phrases or not because if it does, Dative Substitution is the result of a decision that is made later in the derivation.

Assuming that Dative Substitution as a PF phenomenon does not make grammatical features irrelevant in its analysis. On the contrary, although the PF processes that realize case can be superficial and language-specific, they are defined over features that are output from the syntax and thus the feature inventory of natural languages, allowing its organization to constrain the ways in which case can be realized, and how case realization can change over time. The following section focuses on the interplay of formal features and language variation and change in the context of Icelandic Dative Substitution.

3   Formal features and the side effects of linguistic change

In this section, we present data on two types of side effects entailed by the leveling described in 2.1, assuming that the resulting variation is rooted in post-syntactic realization as described in 2.2. Our data show that the distribution of the intra-speaker variation is not random but mapped to grammatical features: the case distribution depends on the person and number of the subject. The interplay of this conditioning and a variational model of language acquisition (Yang 2002, 2016) predicts the phenomena we describe in the following section.

3.1   Person-Specific Retention

As mentioned in section 2, the distribution of the widespread intra-speaker variation is not completely random. Indeed, a person and number effect has been clear for quite some time (first mentioned in Svavarsdóttir 1982). We call this phenomenon the Person-Specific Retention, since it consists in the historical accusative being more likely to be retained with 1st and 2nd person singular pronouns than with the 3rd person, as schematized in (7). The first and second person plural cannot be tested due to accusative-dative syncretism in the inflectional paradigms of the pronouns.

(7)   Rate of DS in different pronouns

1./2.PERS.SG < 3.PERS.SG < 3.PERS.PL

Although the PSR has also been shown to appear in Heritage (North-American) Icelandic (Nowenstein 2017), it has only been thoroughly documented in Icelandic. This has been done in data from adults and children, in experimental settings (Nowenstein 2015), large-scale surveys (Svavarsdóttir 2013 and Thráinsson 2013) and corpora of naturally occurring speech (Nowenstein 2014).[1] All these data will not be reviewed here, but representative examples provided. Figure 3 shows the examples found in a corpus composed of data from blogs, forums and social media (Nowenstein 2014). These are examples in which the same person uses *langa*, the most common DS verb, with two different subjects: The first person singular and the third person plural. The emerging pattern shows that the norm is clearly intra-speaker variation, using accusative with the first person singular and dative with the third person plural. This is more common than consistency, marked in red for accusative and orange for dative. No examples were found of the reverse intra-speaker variation pattern, where the first person singular is in the dative but any gender of the third person plural is in the accusative.

[figure 3]

Figure 3. Results for the 1sg–3pl paradigm in the *langa* corpus (2014). *Mig/mér* are the first person singular subjects and þá/*þau/*þær/þ*eim* (gender syncretism in the dative) are the third person plural subjects.

Based on the negative sociolinguistic connotation of DS, it might be tempting to explain the PSR away as a normative phenomenon, where self-correction is most successful with more frequent subject types. The fact that the PSR appears within the same social context (and even within the same clause) might not be enough to rule out this interpretation, but child language data seem to confirm that the PSR is indeed acquired as the appropriate case marking paradigm for DS verbs. The results from a forced-choice experiment 80 first graders participated in can be found in figure 4 (Nowenstein 2017). To focus on the effect of the PSR, the results which are presented here are those from subjects without any syncretism in their

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[1]As a reviewer points out, person effects also appear on pronoun choice in English (e.g. Quinn (2005) and Parrott (2007)). Although the English and Icelandic patterns might be different in nature, both involve change in a case system accompanied by variation between conservative and innovative case choices which is conditioned by person features.

inflectional paradigm. These are the personal pronouns *ég* (1sg), *þú* (2sg), *hún* (3sg.f) and *þeir* (3pl.m). Recall that Icelandic children first acquire structural subject case, nominative, and overgeneralize it before learning more specific rules for thematic and lexical case. These are the pink overgeneralizations we see in the figure. They do not seem to pattern according to the Person-Specific Retention, but the DAT-ACC alternations do, indicating that they represent the acquisition of intra-speaker variation patterns. This can be assumed because the rate of nominative overgeneralizations is consistent throughout the different pronouns: 10–13% of the pronouns chosen – regardless of person and number – were nominative. But when looking at the oblique cases, the distribution between pronouns is much less stable. The highest rate of accusative appeared with the first person singular (41.3%), then the second person singular (30%), this is followed by the third person singular (16.4%) and is lowest when the pronoun is in the third person plural (only 5%). The result that probably has the most importance is the difference between the overgeneralization of nominative and the substitution of dative, which does not seem to be a classic example of overgeneralization. What children acquire as the subject case marking of verbs like *langa* is actually a pattern of variation between accusative and dative. The use of a nominative subject with the verb will probably mostly disappear with age but the oblique alternations seem to be part of the target adult grammar, as we have seen.

[figure 4]

Figure 4. Results for pronouns with no syncretism, *langa*. $N = 80$.

In this context of overspecified input, where information about the case marking of specific verbs is contradictory rather than sparse, children acquire an intrinsically variable system and make use of the proportional distribution of case found in their primary linguistic data. We believe that the resulting PSR is not a coincidence, but representative of the way in which children target certain features when looking for a context of specialization. Before elaborating on this, we move on to a much quirkier side effect which is also observed in child language data.

3.2 Elsewhere Condition Death Rattle

In addition to Person-Specific Retention, another exceptional pattern is also attested in the Icelandic data. This involves the apparent overirregularization of the dying accusative subject pattern to contexts that historically only involve dative subjects. We refer to this effect as an Elsewhere Condition Death Rattle (ECDR) because we analyze it as a loss of a minority context within an Elsewhere Condition hierarchy. In a nutshell, a child who does not acquire a context for accusative experiencer subjects, but nevertheless receives at least some input that includes accusative experiencers, will interpret the accusative tokens as evidence for a low probability rule that realizes experiencer subjects in general as accusatives.

Before developing our formal analysis in Section 3.3, let us review the data that are most important for understanding the ECDR effect. As a reminder, in the usual case, variability between accusative and dative subjects in Icelandic involves a historical change from type (1) to type (2), repeated as (8) and (9), respectively.

(8)   Mig   langar í jarðarber
       me.ACC longs in strawberries

     'I want strawberries.'

(9)   Mér   langar í jarðarber
       me.DAT longs in strawberries

     'I want strawberries'

In such examples, an experiencer verb like *langa* 'want' that historically takes an accusative subject has adopted an innovative pattern with a dative subject and use of the dative is rapidly gaining ground in this kind of an environment in the speech community. Naturally occurring examples of the type shown in (10) are therefore puzzling at first sight. In those, historical dative subject verbs like *sýnast* 'appear', *finnast* 'find', *leiðast* 'be bored', and *líka* 'like' all appear with an accusative subject. Note that all these examples, and in fact reported examples of the ECDR in general, involve the 1st person singular. The examples are from blogs, studied by Ingason (2010b).

(10) a. Mig   sýnist   það líka.
       me.ACC appears it   also

       'To me, it also appears to be like that.'

    b. En mig   finnst tóbakið   ógeðslega gott.
       but me.ACC find   the.tobacco horribly   good

       'But I think the tobacco is very good.'

    c. Gaavuuuuuð, mig   leiðist   óendanlega mikið.
       Gooood   me.ACC is bored infinitely   much

       'God, I am infinitely bored!'

    d. Mig   líkar litirnir.
       me.ACC likes the.colors

       'I like the colors.'

We must emphasize that this extension of the accusative to a dative subject context is produced at a very low rate. For all of those verbs, the dative accounts for an overwhelming majority of tokens. However, the accusative pattern is too widespread to be ruled out as irrelevant, especially because it seems to be possible to find a number of examples with more or less every commonly used dative experiencer subject verb in Icelandic.

The existence of this low probability accusative pattern is further confirmed by the findings of experimental language acquisition studies. In the same study which was mentioned in the previous subsection, the accusative was extended to dative subjects with *finnast*, with the PSR also present. This can be seen is figure 5:

[figure 5]

Figure 5. Results for *finnast*. $N = 80$.

From the point of view of a language acquisition model that does not allow for probabilistic usage of competing variants, the ECDR effect is quite mysterious. The accusative subject pattern is indeed a dying minority pattern in the speech community and therefore it is noteworthy to see it extend to new territories. One might be tempted to attribute this kind of overirregularization to some kind of a sociolinguistic hypercorrection (Labov 1972), perhaps associated with prescriptive efforts to keep the accusative alive. However, the fact that our evidence come from very casual

speech found in blogs as well as from young children in a language acquisition experiment, makes us doubt that a hypercorrection analysis would be the right analytical path. Rather, as the following section will make clear, we believe that the ECDR and PSR are related phenomena, and that the organization of formal grammatical features and the way in which formal features are targeted in language acquisition, are the most important ingredients of the appropriate explanation.

3.3   A model of featural constraints

Considering the data presented in section 2, an analysis of Dative Substitution should (A) account for the pervasive intra-speaker variation found with DS and (B) additionally explain the Person Specific Retention as well as the rare cases of productive accusative subject, the Elsewhere Condition Death Rattle. The same model should account for the general phenomenon and its side effects. We argue that this can be done by incorporating featural constraints to a model which assumes weighted grammatical rules that can apply with a probability <100% (Yang 2002) and a mechanism of Elsewhere Condition Serial Search (ECSS), where more specific rules are applied first. We assume that the relevant lexical items are linked to a hierarchy of case-assigning rules based on specificity and productivity.

Children acquire rules for nominative, accusative and dative subjects, drawing the respective weights (probabilities) from the input. This entails a competition of rules within the grammar: If the input is invariant, one of the rules will attain a probability of 1.00 while the other one(s) will be reduced to 0. Following Yang (2016) for definitions concerning rule productivity, structural nominative for subjects would be the productive default rule that can always be applied. We then have an additional, more specific, productive rule that still would not be default, dative for experiencer subjects. Finally, we have a third unproductive rule for the exceptions to the dative experiencers, licensing accusative.[2] The representation for a stable input (no variation) with experiencer would then be as follows (11):

(11)   IF [+experiencer]

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[2]Note that +experiencer might be a too wide context for oblique subjects. Our model could easily incorporate narrower conditions, such as the ones proposed by Jónsson (2003).

THEN use ACCexception IF VERB {langa, vanta...}

(weight ≈ 1.00)

ELSE IF [+experiencer]

THEN use DATproductive

(weight ≈ 1.00)

ELSE

use Rdefault

As can be seen, the verbs receiving accusative have to be specifically listed, as would be assumed under an analysis where accusative on subjects is lexical case. This is in contrast with the licensing of dative for experiencer subjects, where the case is inherent and therefore not lexically specified. This difference in conditioning justifies the ordering of the rules. The dative rule, which is productive for experiencer subjects, is always applied if a verb is not listed in the set of exceptions which follow the first rule. The mechanism involved in the application of the rules would be the ECSS mentioned earlier, a serial search algorithm that goes through the list of exceptions before applying the productive rules. This implies a certain processing cost that only pays off if the exceptions to the productive rules are few enough. The Tolerance Principle (Yang (2016)) quantifies this threshold of productivity based on the proportion of exceptions to a rule. The threshold, Mc, is calculated on the grounds of type frequency and Zipfian distribution. The fact that the Tolerance Principle is completely dependent on the type frequency found in the input entails that a rule can be productive for one individual even though it is not for another – if the type frequencies in their input differ enough.

Put more simply, a rule is productive under the Tolerance Principle if the maximum number of exceptions, calculated through the natural log of the total number of types, is not exceeded. Preliminary calculations for this threshold in the case of Icelandic dative subjects have been conducted (Yang 2016) and support the present analysis. By applying the Tolerance Principle to the number of attested oblique subjects (Jónsson and Eythórsson 2005), Yang (2016) predicts that dative subject verbs are not numerous enough for productivity in the case of theme subjects, while there are enough dative types (such as *finnast* 'find') to attract the accusative verbs in the

case of experiencers (e.g. *langa* 'want'). Crucially, the number of accusative experiencer verbs does not exceed the computed productivity threshold. The dative productivity prediction for experiencers seems to be borne out, since the existence of DS relies on said productivity (see further discussion about theme subjects and the Tolerance Principle in Guðmundsdóttir et al. (2019)).

We now move on to the application of the model in an unstable input. When the input is variable, the child receives contradictory information rather than too little information, certain verbs being associated both with the accusative and dative rules in the primary linguistic data. Since the dative rule is productive its probability stays at 1, but the probability of a verb being listed as an exception (linked to the accusative rule) is somewhere between 0 and 1, depending on the distribution in the input as shown in (12),

(12) IF [+experiencer]

THEN use ACCexception IF VERB {langa, vanta...}

(weight $\approx$ 0.30) $\rightarrow$ or other weight between 0 and 1

ELSE IF [+experiencer]

THEN use DATproductive

(weight $\approx$ 1.00)

ELSE

use Rdefault

The model therefore predicts intra-speaker variation when the weight of a certain rule is lower than 1. Increased DS results in the weight of the first rule decreasing progressively until it disappears completely, as shown in (13).

(13) IF [+experiencer]

THEN use DATproductive

(weight $\approx$ 1.00)

ELSE

use Rdefault

Accusative experiencer subjects would then have disappeared from the language, as they have in Faroese. Although this seems to be representative of the directionality of this change, we have to consider the possibility of stable variation. In a scenario where accusative experiencer subjects disappear, no specialization of the variables is assumed. The data presented in this paper, as well as previous research, suggest that this is not an appropriate analysis. Instead, we see featural constraints as a form of specialization. We suggest that this can be modeled with a novel rule specializing the accusative for the first and second person singular. This would account for a large part of the PSR, since the first and second person singular seem to differentiate themselves in the DS data for children and adults. This rule creates an additional step to the model with a higher probability of accusative in that particular context (14).

(14)   IF [+experiencer, +participant]

THEN use ACCexception IF VERB {langa, vanta...}

(weight ≈ 0.80) → or other weight between 0 and 1, higher than in the next rule

ELSE IF [+experiencer]

THEN use ACCexception IF VERB {langa, vanta...}

(weight ≈ 0.30) → or other weight between 0 and 1

ELSE IF [+experiencer]

THEN use DATproductive

(weight ≈ 1.00)

ELSE
use Rdefault

The formation of this additional +participant rule could be explained by the high frequency of first and second personal pronouns with experiencer subjects in child language and child-directed speech (see discussion in Nowenstein 2017). The frequency of different types of subjects would not be enough to form other specific rules but could still have an impact on the distribution. The +participant rule could also explain reported instances of the accusative overgeneralizations we call the Elsewhere Condition Death Rattle. The Tolerance Principle gives room for individual differences resulting from different compositions of input, and we could therefore imagine that

this rule could be (temporarily) productive and therefore result in the overgeneralization of accusative subjects in the first and second person singular. Within such a scenario, the first rule in (14) would not involve a list of verbs which are eligible for accusative case marking, allowing speakers to overgeneralize the accusative on 1st and 2nd person experiencer subjects.

In general, we do not think it is a coincidence that we see a specialization based on person and number. In a sense, formal features seem to be the currency dealt in when affecting the trajectory of morphosyntactic change in a categorical way. In the case of DS, as shown above, we assume a rule based on Noyer (1992) ±participant feature to account for the person specificity. The loss of relevant context results in different probability settings for our rules. This is how the Person-Specific Retention is an example of how the feature inventory of natural language constrains change and forces a specialization based on differential aspects of phi-features (cf. Harley and Ritter 2002, Wiltschko 2008). The exceptionality of 1st/2nd person pronouns is suggestive of a person hierarchy effect (Silverstein (1976)), but we think the person-hierarchy is not a grammatical primitive. Instead, the relevant side effect of DS result from the way children target specific features in language acquisition.

The probabilistic rules for the Person-Specific Retention of DS are schematized below (see Noyer 1992 for ±part(icipant)), in (15).

(15)   [+experiencer, +part, +sg] –> Higher probability of ACC rule

   [+experiencer, +sg] –> Lower probability of ACC rule

   [+experiencer] –> Even lower probability of ACC rule

As can be seen, we assume a probability driven Elsewhere Condition approach to the case assignment rules, where a more specific rule is more likely to be retained in a richer featural context. Additionally, the PSR could be thought of as a test case for different featural approaches to grammatical person, where the grouping of first and second person into a specific, active rule seems to favor features as [+participant] (e.g., Harbour 2016, Cowper and Hall 2017) under economy, as well as providing a novel context for its empirical relevance within variation and change. As noted by a reviewer, if having additional features increases the probability of the accusative rule applying, we would expect differences between 1st and 2nd person under

certain proposals about person, e.g. a tripartition of person using the feature [+author] feature (Harbour 2016, Cowper and Hall 2017). As the results in figure 4 suggest, this might very well be the case for Icelandic, since children chose the original accusative subject case of *langa* more frequently with the 1st rather than the 2nd person singular. The role of grammatical features as opposed to other constraining factors in conditioning variation and change is the subject of the next section.

4 Implications for theories of variation and change

We have now seen that formal features can presumably have a categorical, conditioning role in morphosyntactic variation. In the following section, we explore the implications this has for general theories of variation and change. Starting with the Borer-Chomsky conjecture, we discuss the necessity of assuming morphological case to be a realizational PF process. We then move on to a broader context of conditioning and specialization and discuss the different predictions available based on the nature of conditioning factors.

4.1 Realizational morphology and the Borer-Chomsky conjecture

Because case is sometimes implicated in deep abstract syntactic licensing mechanisms, it is reasonable to be concerned with an example of case variation that seems to be superficial and tied to idiosyncratic properties of one language, as seems to be the case with the conditioning of Dative Substitution in Icelandic. Whatever the theoretical implementation details, it is not in the spirit of the Borer-Chomsky conjecture if a case of syntactic variation does not correlate with systematic cross-linguistic differences in syntax and its interpretation. For us, it is crucial that we assume morphological case to be a realizational PF process where certain feature distinctions can be introduced or neutralized at the PF branch. While some theories, such as McFadden (2004), aim to eliminate case from the syntax altogether, such a radical move is not necessary to account for Dative Substitution as long as the PF operations that refer to syntactic features can apply with a probability lower than 100%.

The view that PF can modify certain aspects of the structure received from the syntax,

in limited ways, is widely assumed, especially in the framework of Distributed Morphology (Halle and Marantz 1993). If we adopt the (McFadden 2004, 2006) impoverishment analysis of Icelandic accusative subjects, shown above in (6), the variation is formally accounted if we assume it entails variable deletion of oblique features associated with Appl in the context of certain verbs like *langa*. Similarly, analyses assuming an enriching if the Appl head at PF in (Sigurðsson 2012) also should provide us with the relevant structural position of variation.

4.2   Conditioning and specialization

The cases we have presented here are furthermore relevant for work on variation conditioning in individuals, as well as the effect conditioning factors have on specialization and therefore the directionality of language change. Tamminga et al.'s (2016) recent framework on the dynamics of variation in individuals recognizes three types of factors conditioning variation: sociostylistic (s-) (both static and dynamic), internal linguistic (i-) and psychophysiological (p-). P-conditioning can only entail variable alternations as it is extragrammatical, universal and automatic. It applies to effects which are constant or at least predictably-distributed across the population. I-conditioning, on the other hand, can entail both variable and categorical alternations as it is grammar internal and language- or variety specific, arbitrary and therefore learned. We argue that this framework fits to the Dative Substitution data. Although we have focused on the effects of person and number, a few other conditioning factors have been mentioned. We have briefly discussed the social stigma surrounding DS (Svavarsdóttir 1982), but previous research also indicates possible syncretism effects (Nowenstein 2014) as well as variable prosodic preferences (Ingason 2015). Another potential source of individual differences in dative subject productivity could be vocabulary size, drawing from the importance of type frequency within the Tolerance Principle (Yang 2016). Differences in individual vocabulary compositions could determine whether dative is productive for a speaker or not. We therefore find the three types of conditioning in Tammingas et al.'s (2016) framework. The obvious s-conditioning of a non-standard variant, arguably p-conditioning (prosody, saliency through syncretism and vocabulary size) and finally i-conditioning in the PSR. We have argued for a

categorical distinction arising from the PSR, which is compatible with the distinctions made within the framework.

This type of distinction is important if we want to make predictions on the directionality of change based on the type of conditioning factors. In other words, if the possible variants are specializing in one way or another, the nature of the dimension this specialization occurs on appears to be relevant in determining whether replacement, complete specialization or stable variation will follow. Fruehwald and Wallenberg (2013) provide evidence for this through a few diachronic case studies which form the basis for their Minimalist Theory of Variation. This approach assumes that if categorical variants specialize along a categorical dimension, complete specialization should eventually result. On the other hand, if categorical variants specialize along a continuous or ordinal dimension, then complete specialization can never result. Instead, we should expect stable variation/optionality. This attractively simple model seems to run into problems when applied to cases like Icelandic Dative Substitution, where the variants appear to be specializing along a categorical dimension (person and number through PSR) as well as continuous ones (style through social stigma). In this case, we could imagine that categorical specialization can be blocked by optionality on a continuous dimension.

5   Conclusion

The side-effects of DS presented in this chapter demonstrate how systematic linguistic simplification can have complex consequences. Although leveling can be traced to overgeneralization mechanisms in language acquisition, the subsequent variation in the primary linguistic input also is interpreted and analyzed by the child learner. This creates a scenario where a pattern of intra-speaker variation is acquired in a probabilistic fashion. Still, the distribution of case variation we have reviewed here is not random: The person and number effects of the PSR show otherwise. By accounting for these effects with a model assuming weighted rules which can be productive, we are able to account for both common and rare side-effects of predictable morphosyntactic change. We believe that it is no coincidence that the rules which seem to be created depend on formal features described in natural languages. Instead, this shows us how children target

these features when establishing a context for morphosyntactic variation.

This is consistent with recent models of variation which assume that internal linguistic factors conditioning variation can be the basis for categorical alternations, as opposed to psychophysiolocial conditioning which also seems to be present in DS in addition to the third type of conditioning, sociostylistic conditioning. This interaction between different types of conditioning leads us to the directionality of change. Although predictions can be made based on the nature of specialization, more complicated situations need to be assumed as well. In the case of Icelandic Dative Substitution, categorical conditioning based on grammatical features seems to be potentially blocked by the sociostylistic dimension of DS. In general, teasing apart and studying the different components of linguistic variation is important, but a comprehensive accounts of the phenomena as a whole seems crucial for an appropriate analysis.

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