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Some thoughts on the complexity of syntactic complexity

1 Introduction

Walkden and Breitbarth (henceforth: *W&B*) outline an innovative research pro-
gramme which, among other things, aims to probe the notion of syntactic
complexity by approaching it from a socio-linguistically informed second-lan-
guage (L2) perspective. Given the valuable insights, synchronic and diachronic,
that have been emerging from socio-linguistically sensitive generative work,
there can be little dispute about the feasibility and value of going beyond the
classic idealized generative paradigm in advancing our understanding of lan-
guage variation and change in general. The purpose of this short commentary is
to consider three aspects of W&B's proposed socio-linguistically informed inter-
pretation of (syntactic) complexity in terms of L2 difficulty: Sections 2 and 3 are
concerned with conceptual matters, while Section 4 focuses on technicalities
associated with the proposed operationalization of "syntactic complexity" in
terms of uninterpretable features.

2 Minimalism and Kolmogorov complexity

In considering potential measures of syntactic complexity, W&B (p. 185) write off
the most well-known metric, Kolmogorov complexity, in terms of which an object's
complexity is given by the length of its shortest possible description. This decision
rests on their consideration of recent corpus-based work by Ehret and Szmrecsányi
(2016, 2019), which harnesses Kolmogorov complexity to probe the linguistic com-
plexity of naturalistic L2 data produced by (tutored) English L2 writers. More
specifically, Ehret and Szmrecsányi approach Kolmogorov complexity as a "text-
based, quantitative, holistic, and global measure of structural surface redundancy"

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(2019: 23), applying compression algorithms to written L2 English essays from the International Corpus of Learner English (ICLE) to measure "the predictability of upcoming text based on previously seen text" (Ehret and Szmrecsányi 2019: 25). In terms of this work, texts that can be compressed by a simpler algorithm count as linguistically simpler than texts that require a more complex algorithm. The "counterintuitive" result that rigid word order ends up counting as "more complex" than freer word order follows from the fact that both syntactic and morphological complexity are *indirectly* measured via a distortion technique also employed in earlier text-based L2 complexity work by Juola (1998, 2008): as the distortion takes the form of randomly deleting 10% of word tokens within a text, it will necessarily affect rigid word-order languages like English disproportionately, creating the impression that they are less predictable – and thus in need of a more complexly specified algorithm – than freer word-order systems. This type of Kolmogorov-based syntactic complexity measurement, then, will clearly not aid W&B in their objective to develop a theory of variation and change in syntactic complexity which builds on Trudgill (2011).

Importantly, however, Kolmogorov complexity does not have to be applied to texts or utterances rather than grammar; and it has been applied to grammatical structure in previous work on grammatical typology, for example (see, i.a. Miestamo et al. 2008; Newmeyer and Preston 2014 for discussion). Ehret and Szmrecsányi explicitly move away from grammar-based Kolmogorov complexity because they wish to probe an L2 complexity metric that does not fall foul of the sorts of shortcomings that past Second Language Acquisition research on existing grammar-based L2 complexity metrics had criticised. These include the unclarity surrounding what is actually being measured, and how this maps onto relevant theoretical constructs, and the worry that the grammatical metrics employed might model only part of the theoretical construct they are meant to operationalize (see Ehret and Szmrecsányi 2019: 25 for discussion and references). These concerns are, of course, also relevant to W&B's proposed enterprise (see Sections 3 and 4 below for further discussion), but if we accept their general premise that modern generative syntax – and, specifically, lexically oriented, feature-centred minimalism – offers a suitable means to probe L2 complexity in the context of Trudgill's framework, then Kolmogorov complexity may, after all, prove worthy of further consideration.

In particular, Kolmogorov complexity would seem to be rather readily operationalizable if we adopt the kind of approach to formalizing morphosyntactic variation that has emerged from two recently completed ERC-funded projects, the ReCoS[1] and LanGeLin[2] projects. Both assume the locus of syntactic

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[1] https://recos-dtal.mml.cam.ac.uk.

[2] https://www.york.ac.uk/language/research/projects/completed/langelin/.

variation to be the featural specifications of functional items, as W&B do; and both assume these featural specifications to be systematically constrained by UG and general cognitive/third-factor constraints (Chomsky 2005), such that their make-up can meaningfully be compared in Kolmogorov terms.

To be more precise, the LanGeLin research rests on the idea first articulated in Gianollo et al. (2008) that UG contains templates constraining the form that parameters in the adult grammar may take, called *schemata*. As Longobardi's discussion (2017) of this model shows, the assumption is that the featural make-up of functional heads is systematically fleshed out on the basis of the specifications determined by schemata such as the following (Longobardi 2017: 531–532 in fact proposes 9 schemata, of which I list only 5 here for expository purposes[3]):

(1) a. Is F, F a feature, grammaticalized?
    b. Does F, F a grammaticalized feature, Agree with (i.e. probe) X, X a category?
    c. Is F, F a grammaticalized feature, "strong", i.e. does it bear an EPP-feature triggering movement?
    d. Does F, F a grammaticalized feature, probe the minimal accessible category of type X, or is pied-piping possible, i.e. does movement target just the goal X, or some category containing X ?
    e. Is F, F a grammaticalized feature, spread onto X, X a category, i.e. do we see an overt manifestation of agreement?

What the UG-given schemata produce, then, is a grammar consisting of functional heads that are specified in formally comparable ways, with the number of positive specifications – i.e. *yes*-responses to the innately specified questions given in (1), which are assumed to be "asked" of functional heads during the acquisition process – determining the length of the formal description of each functional head in the grammar. Consider (2) in this connection; F_n in each case designates a different functional head, and italicized specifications in parentheses are not formally specified, i.e. stored as part of the specification of the functional head, as negative specifications of the kind at stake in the schemata do not require either the computational system (syntax) or the interfaces to act on them:

(2) a. F_1: [F] Agrees, is strong, triggers X-raising, spreads onto X
    b. F_2: [F] Agrees, is strong, triggers X-raising (*doesn't spread onto X*)

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3 For clarity, I have adjusted the formulation of some of the schemata in (1). None of this reformulation affects the import of Longobardi's original formulation, which, however, reflects technical discussion in the paper from which it is drawn that is irrelevant to our concerns here.

    c. F_3: [F] Agrees, (*is weak*), (*doesn't trigger movement*[4]), spreads onto X

    d. F_4: [F] Agrees, (*is weak*), (*doesn't trigger movement*), (*doesn't spread onto X*)

For the functional categories in (2), it is clear that the description of F_1 in (2a) is the longest, and that F_4 has the shortest description. To the extent that each specification carries the same "weight" (see notes 4 and 5), we can readily calculate the Kolmogorov complexity associated with different functional heads, both within (parts of) a system and between systems. This kind of approach would also allow one to probe currently largely unasked let alone answered questions like the extent to which syntactic complexity is most usefully conceptualized in terms of the specification of individual as opposed to classes of functional heads; whether certain specifications are more significant than others in determining complexity, i.e. whether it is feasible just to adopt a "counting" approach to comparable specifications like those in (2) (see again note 4)[5]; and whether it is possible to identify systematic kinds of functional-head specification change in different sociolinguistic circumstances.

    The ReCoS research, too, raises the possibility of testing the potential value of a Kolmogorov-based approach to syntactic complexity.[6] As set out in i.a. Biberauer et al. (2014), and Biberauer and Roberts (2015, 2016), the investigation of quite diverse empirical phenomena (word order, null arguments, negation, *wh*-movement, case, and agreement, among them) suggests that a "size"-based approach to the distribution of syntactic properties may be a productive way to compare languages. More specifically, the proposal is that syntactic phenomena may surface in four broadly defined size-types – macro, meso, micro or nano – with size being determined by the amount of formal specification that is required

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4 A weak F cannot, by definition, trigger movement, rendering the size-of-moved element specification redundant. That is, these specifications are in an implicational relationship, with the size-of-movement specification being dependent on the strength specification. This is clearly an acquisitionally significant fact, and also one that highlights the fact that calculations of syntactic complexity need to take into account not just individual featural properties, but also how these interact with one another in the context of a formal system.

5 A further indication that "counting" the number of formally represented properties – i.e. treating each formal specification as equal – probably isn't the right way to go about quantifying syntactic complexity comes from research like that reported in Guasti (2013). As Guasti shows, properties involving both Agree and movement (i.e. positive specifications for (1b), (1c), and possibly also (1e)) appear to be more robust in acquisition than those involving just Agree (i.e. (1b)). Notes 4 and the current one, then, suggest that the nature of the relationship between the existing parameter schemata would need to be carefully considered when establishing the comparative lengths of different formal specifications.

6 This is also explicitly discussed in Bazalgette (2015).

to delimit the domain in which the relevant property surfaces. Consider (3) in this connection:

(3)   For a given value v_i of a parametrically variant feature F:
   a. **Macroparameters**: all functional heads share v_i;
   b. **Mesoparameters**: all functional heads of a given naturally definable class, e.g. [+V], share v_i;
   c. **Microparameters**: a small subclass of functional heads (e.g. modal auxiliaries) shows v_i;
   d. **Nanoparameters**: one or more individual lexical items is/are specified for v_i

Here it is clear that the number of formal features required to delimit a meso-sized property is smaller than that required to delimit a micro-sized property, for example. Similarly, the amount of specification required within a size-type may vary: some meso- or microparameters may be featurally more specific than others of the same broad class, for example. For our purposes, the key point is that we might expect properties associated with a longer description length (i.e. more formal features) to be later-acquired and thus also more complex and, potentially, less stable diachronically (see Biberauer and Roberts 2012, Biberauer and Roberts 2016 on the latter point in particular).[7] Focusing specifically on L2 acquisition, greater featural complexity would again be expected to constitute a challenge in this context (though see also Section 3 below). To the extent that we can establish suitably detailed parameter hierarchies of relevant phenomena, capturing the featural considerations determining the distribution of different syntactic properties, then, a ReCoS-type approach would also seem to facilitate the possibility of measuring syntactic complexity via a Kolmogorov-based metric, and considering how this holds up in sociolinguistic circumstances of different kinds.

 Kolmogorov complexity may thus after all be harnessable in the context of the kind of enterprise that W&B envisage, either independently, or as a tool to investigate the extent to which this means of probing L1 complexity corroborates the predictions of the proposed L2 difficulty approach.

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7 As they are simply listed – i.e. not the focus of a formal generalization of some kind – nano properties are expected to fall outside the more general description length-based predictions, which seems right: nano properties associated with high-frequency lexical items are acquired early and remain stable, while the same is not true for those not associated with high-frequency elements.

3 The Fundamental Difference Hypothesis and UG-oriented approaches to SLA in the Minimalist era

W&B (p. 185) state that they, "adopt the Fundamental Difference Hypothesis (FDH) of Bley-Vroman (1989)" in terms of which L2 acquisition is assumed to be fundamentally different to L1 acquisition: whereas L1 acquisition is UG-mediated, the FDH assumption is that "whatever we learn after the period of normal first-language acquisition, we learn in a different way" (Anderson and Lightfoot 2002: 209, as cited by W&B *ibid*.). Given that W&B propose operationalising L2 syntactic complexity in terms of Tsimpli and Dimitrakopoulou's (2007) version of the Interpretability Hypothesis (IH), two points seem worth highlighting here.

Firstly, the IH is a partial UG access theory, i.e. it falls into the family of Second Language Acquisition (SLA) theories that assume UG to constrain L2 acquisition in some way; see the introduction to Tsimpli and Dimitrakopoulou's paper for a clear statement of this orientation. As such, the IH does not meet the characterisation of the FDH given above: L2 acquirers are assumed not to have access to the uninterpretable features made available by UG, but they do have access to UG principles and also to UG-given interpretable features; in other words, they are not assumed to be learning their L2 in the kind of fundamentally different way assumed in Bley-Vroman (1989), which is a No-Direct-Access-to-UG approach (see White 2003: 15–16).

On its own, this is a rather minor point, but it is worth clarifying on account of a second FDH-related consideration that seems to me to merit serious consideration in the context of minimalistically oriented work of the kind W&B outline, and also more generally. This is the point which is central to Bley-Vroman's unfortunately less commonly cited (2009) revisitation of his original FDH proposal, namely that it is not so clear in the sparse-UG minimalist era that the predictions of the FDH are in fact so different to that of UG-Access approaches.[8] Bley-Vroman (2009: 183) cites Dekydtspotter and Hathorn's (2005) rendering of Ken Hale's observation that "given the level of generality of principles of Universal Grammar in Minimalist understanding, all grammatical principles are instantiated in all languages. The distinction [between the first language (L1) and UG] becomes vitiated" (1996: 317). To the extent that minimalist UG is exhausted by principles, then, UG-Access and No-Direct-Access

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8 In the rich-UG era in which the FDH was originally proposed, there would, of course, have been a very significant difference between fully or even partly UG-mediated L2 learning and Bley-Vroman's UG-only-via-the-L1/No Direct Access-based learning.

or FDH-based approaches are no longer distinct: a Hale-style maximally pared down UG – since repeatedly endorsed in the work of Chomsky, among many others – will not have anything to offer the L2 learner that is not also reflected in the grammar of their L1.

This is, of course, not the Minimalist perspective adopted by W&B or, indeed, by most Minimalist researchers working in the field of SLA (see Rothman and Slabakova 2018 for an overview). W&B, specifically, appeal to a "consensus view in syntactic theorizing, that speaker-hearer grammars result from the interaction of no more than a handful of combinatorial mechanisms that are highly general in their application … and a substantial inventory of language-specific features" (p. 184). In other words, they reject the radically empty UG approach outlined above, leaving open the possibility that UG may supply both L1 and L2 acquirers with formal features from which to construct their grammars. Importantly, however, the commitment to a rich UG-given inventory of formal features is anything but a matter of consensus in twenty-first century Minimalism: even leaving aside the ultra-bare approach advocated by Chomsky, Hale and others, there are growing numbers of comparatively oriented minimalists whose work, in the last decade or so in particular, has led them to the conclusion that a rich UG-given feature inventory raises more questions than it answers (see, among many others, Wiltschko 2014; Ramchand and Svenonius 2014; Harbour 2017; Biberauer 2017; Graf 2019). Crucially in the present context, these questions include the long-standing, unresolved learn-ability-oriented ones surrounding the so-called *Linking Problem* (Pinker 1984), or how acquirers are able to *link* complex UG-given knowledge to the (accessible) input that they encounter (see Fodor and Sakas 2017 for an overview of the state of play). This problem is arguably exacerbated in the L2 context, particularly if L2 learners have the possibility – as they do in terms of the IH – of (partly) referencing their L1 in attempting to flesh out the grammar of the L2. Given these live questions about the featural specification of UG, it is not so obvious that Minimalist SLA theories assuming a rich UG-given featural inventory or access to rather specific UG-given formal features are as well motivated as they might have seemed at earlier stages of the Minimalist enterprise; the possibility that the featural specifications structuring adult grammars are largely emergent, constructed on the basis of a minimal UG-given feature inventory needs to be taken seriously. And this, in turn, has implications for the feasibility of adopting a feature-rich UG theory as the basis for a syntactic complexity metric.

A further, no less relevant consideration in this connection is the way in which Minimalist SLA theories to date have, for the most part, neglected the relevance of the so-called *third factor* in shaping L2 learning. In a Three Factors Minimalist model of the general kind outlined in Chomsky (2005), L2 learners – like L1

acquirers – would be expected to have access not only to (a sub-part of) UG and (the intake component of[9]) the input, but also to general cognitive biases, like those favouring economy or simplicity, thus producing generalisation, regularisation, and harmony effects, among others (see i.a. Culbertson et al. 2013; Culbertson and Kirby 2016; Biberauer 2017). As Bley-Vroman (2009) also points out, there are numerous indications that L2 learners – particularly adults – may draw on their general cognitive strategies to a much greater extent than L1 acquirers, potentially targeting quite superficial patterns in the process, and ending up with L2 grammars that feature linguistic knowledge that is not consistently encoded in the UG-mediated way L1 knowledge is. In the present context, this consideration is principally relevant because it highlights the need for caution in relation to the assumption that L2 complexity/difficulty necessarily reflects the presence of uninterpretable features: all of the empirical phenomena discussed by W&B – bipartite negation, null subjects and case marking – involve prosodically weak elements that are known to pose challenges in the L2 context (see Goad and White 2008, Goad and White in press), with complex factors conditioning (non-)realisation; quite independently of whether or not L2 learners are able to establish whether or not these elements bear uninterpretable features, then, we might expect third factor-mediated regularisation and generalisation biases to play a role in modulating or eliminating these properties over time – potentially at different speeds, taking into account the kinds of sociolinguistic considerations the authors highlight.[10]

4 The difficulty with uninterpretable features

The preceding discussion aimed to raise some conceptually motivated concerns about Minimalist SLA theories that adopt a primarily UG-Access, feature-based approach to L2 difficulty/complexity. In this section, I will highlight technical concerns which seem to me to undermine the plausibility of the IH as a basis for operationalizing this notion.

As W&B indicate (p. 188), the IH rests on the hypothesis that uninterpretable features are effectively subject to a critical period, being inaccessible to adult L2 learners; by contrast, the interpretable features specified in UG *are* accessible to these learners. Leaving aside the UG-richness question, a desideratum for a

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9 See i.a. Gagliardi (2012) on the key distinction between "intake" and "input".
10 Note that this alternative Minimalist possibility does *not* predict that *all* prosodically weak elements will prove problematic to L2 learners; this depends, among other things, on the learner's L1, and the make-up of the L2 "target" grammar more generally; see again the discussion in Goad and White (2008, in press).

hypothesis that specifies one or other sub-type of feature as (in)accessible to L2 learners is that the characterisation of these features be well defined and coherent. Unfortunately, however, feature (un)interpretability is one of the most ill-defined, shifty notions in Minimalist theorising. Consider, for example, the enduring unclarity surrounding what uninterpretable features are uninterpretable in relation to: as they are often thought to spell out as agreement and in other overt ways, they cannot be uninterpretable to PF; but the idea that they are necessarily uninterpretable to LF is also not so straightforward in light of empirical considerations like "stacking" phenomena – consider, for example, (i) Korean-style Nominative-Nominative Case-stacking, where the two Nominatives are interpreted, respectively, as the canonical subject marker (the inner Nominative) and an honorific marker (the outer Nominative; see Levin 2016), despite Nominative being an uninterpretable feature *par excellence*[11]; and (ii) conceptually driven theoretical arguments demonstrating that *interpretable* features need to be uninterpretable at LF to distinguish them from ungrammaticalized, truly semantically contentful features (see Zeijlstra 2014).

In general, the trend in Minimalist work has been to follow the "LF bias" that also governs Chomsky's thinking about the evolution of language (see Berwick and Chomsky 2016), with interpretable features being equated with semantically (LF) interpretable features (*pace* Zeijlstra 2014); but many empirical phenomena are such that it is not clear what the locus of the uninterpretable feature should be, or, in fact, that there can be only one. Consider, for example the case of null subjects. W&B characterise this property by appealing to Walkden's (2014) proposal that null-subject languages involve [uD] in some part of the system, i.e. an uninterpretable feature either on T or on a DP, depending on the type of null-subject language (NSL). While it is possible to formulate a coherent analysis of consistent and partial NSLs on this basis, it is important to note that it is equally possible to formulate a coherent analysis in terms of which consistent NSLs differ from non-NSLs in featuring *interpretable* formal features where the corresponding features in the non-NSL are uninterpretable; consider, for example, the by now classic Barbosa (1995) and

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[11] At least in approaches to Case that view it as a syntactically represented formal feature, which W&B appear to want to do, given their suggestion (section 4.2) that Case would also constitute a worthwhile focus for future exploration of the hypothesis that uninterpretable features are L2-complex. There is, however, also an on-going debate about the formal status of Case (see i.a. Baker and Bobaljik 2017), with growing recognition of the diversity of Case phenomena (see Baker 2018). As with the phenomena to be discussed in the main text, the complexities associated with Case point to the conclusion that it does not seem possible to identify L2-difficult properties on the kind of phenomenon-based grounds that W&B suggest; instead, an I-perspective is required.

Alexiadou and Anagnostopoulou (1998) analyses of consistent NSLs, which are assumed to feature "prononimal agreement" or agreement inflection expressing interpretable phi-features, in contrast to non-NSLs, where agreement spells out uninterpretable features. In a theoretical context where neither the significance of "interpretability" nor the direction of Agree (and, thus, the necessary locus of uninterpretable features[12]) is established, it is not obvious how the theorist is to decide where uninterpretable features are located. This being so, it is also not obvious how clear IH-based predictions about L2 complexity and, by extension, likely directions of contact-induced change can be reliably formulated.

The extent of the difficulty surrounding feature interpretability is, in fact, also already quite apparent in the diachronic domain, with different researchers having adopted diametrically opposed positions on the relative complexity of interpretable and uninterpretable features. Appealing to the IH, W&B pinpoint uninterpretable features as L2-difficult and thus likely to undergo loss in strongly L2-mediated contact-induced change. By contrast, van Gelderen (2004 *et seq.*) formulates a (putatively third factor-based) principle of Feature Economy, which takes the form schematized in (4):

(4) **Feature Economy**: Minimize the semantic interpretable features in the derivation.
     For example:
     Adjunct/Argument   Specifier   Head   Affix
        Semantic   >   [iF]   >   [uF]   >   --
                                                  (van Gelderen 2011: 299)

As (4) shows, van Gelderen's Feature Economy seeks to model the frequently observed diachronic pattern in terms of which a phrasal element (a Complement or Adjunct) appears to become grammaticalized to fulfil a particular formal function (as a Specifier; see also (6) below), whereafter it reduces to an independent head and, finally, becomes a dependent affix. Many grammaticalization and, where the process loops back from the Affix to the Argument/Adjunct stage, cyclic developments, including Jespersen's Cycle, appear to take on this form, as van Gelderen (2011) demonstrates in detail. Crucially for our purposes, van Gelderen takes interpretable features to be computationally costly: her argument is essentially that the operations of the computational system (probing, etc.) are, at base, driven by *un*interpretable features, with the result that interpretable features are secondary and thus best kept to a minimum (see below for further discussion). In the diachronic domain, then, both uninterpretable and

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12 See i.a. Baker (2008a, 2008b) Zeijlstra (2012), Preminger (2013), and Himmelreich (2017).

interpretable features have been argued, by different researchers, to introduce "complexity".

Against this backdrop, it is interesting to consider W&B's formal characterisation of Jespersen's Cycle. Their (2) (p. 189) is given in (5):

(5)   a. $[_{NegP}$ ___ $[_{Neg'}$ $Neg^0_{[uNEG]}$ $[_{VP}$ ...$]]]$ Stage I
       b. $[_{NegP}$ $XP_{[iNEG]}$ $[_{Neg'}$ $Neg^0_{[uNEG]}$ $[_{VP}$ ...$]]]$ Stage II
       c. $[_{NegP}$ $XP_{[iNEG]}$ $[_{Neg'}$ $[_{Neg^0}$ $\emptyset]$ $[_{VP}$ ...$]]]$ Stage III

As they indicate, (5) is a simplified representation based on van Gelderen (2011: 304). That is, W&B adopt the same featural characterisation of Jespersen's Cycle as van Gelderen, despite apparently incompatible assumptions about the status of uninterpretable features: taking Feature Economy (4) to be a third-factor driven bias, as van Gelderen does, we would expect it to be active in all acquirers, L1 and L2 alike, with the result that W&B's IH-driven L2 acquirers would be stuck without access to uninterpretable features while also trying to minimise the interpretable features in their grammars. Given what W&B (p. 188, note 2) say about L2 learners' failure to operate in terms of Schütze's Agree Maximization Principle – another plausible third-factor-driven bias (see Biberauer 2017) – and what has been observed about the very different character of L2 grammatical knowledge more generally (see again the FDH discussion in Section 3), this might not seem especially problematic: L2 grammars may just be structured less around formal grammatical features than has typically been assumed in Minimalist accounts of SLA. However, if both interpretable and uninterpretable features are under pressure in L2 learning, it becomes less clear why L2 complexity should specifically correlate only with *un*interpretable features in the way that W&B suggest.

Returning to the specifics of the formal characterization of Jespersen's Cycle that W&B and van Gelderen share: W&B explicitly state that "the crucial property for the current paper is that the original negative marker is a syntactic head with an uninterpretable negation feature [uNeg]" (p. 190). If the single negation marker at Stage I (5a) is [uNEG], while the single negation marker at Stage III (5c) is [iNEG], we can understand the Jespersenian change as one involving a reduction in uninterpretable features and, thus, a reduction in L2-complexity. Importantly, however, (5) is by no means the only interpretable-feature-based characterisation of Jespersen's Cycle, and some much-discussed alternatives would precisely *not* assign [uNEG] to the Stage I negator. Zeijlstra's seminal interpretability-based analysis would, for example, not ascribe [uNEG] to Stage I/IV negation elements on the grounds that [uNEG] must always be triggered by some kind of doubling pattern (see i.a. Zeijlstra 2004, Zeijlstra 2008). Similarly,

Wallage's very careful analysis of the history of English negation leads him to the formal characterisation in (6) (note that Wallage's "extra" Stage follows from the fact that he represents the optional and obligatory bipartite negation sub-stages of van Gelderen and W&B's Stage II as distinct stages, II and III, respectively):

(6) a. Neg^0 ne_1 [iNEG]   Stage I
     b. Neg^0 ne_1 [iNEG] + adverb not_1 [uNEG]   Stage II
     c. Neg^0 ne_1 [uNEG] + spec,NegP not_2 [iNEG]   Stage III
     d. Neg^0 Ø [uNEG] + spec,NegP not_2 [iNEG]   Stage IV
                                                      (Wallage 2017: 201)

Here Stage 1 – (6a) corresponding to (5a) above – is predicted to be unproblematic in W&B terms, whereas all the other stages, including (6d), the counterpart of unproblematic (5c) above, should be L2-troublesome. If analysts like Zeijlstra and Wallage are correct, bipartite negation may not fit W&B's predictions as clearly as they suggest.

More seriously, (6d) also highlights a much more general difficulty with the proposal that uninterpretable features are L2-complex: on standard Minimalist approaches to Agree, *both* interpretable and uninterpretable features are required for there to be an Agree operation; further, there is no requirement that a language lexicalise both of the elements bearing the Agreeing features, i.e. both uninterpretable and interpretable feature-bearing elements would potentially be phonetically null. If this is on the right track, the superficial loss of a doubling element, as in (6d), would not, in an L1 grammar at least, result in the loss of an uninterpretable feature. It is, of course, possible that it may do so in an L2 grammar, i.e. that the outcome of Jespersen's Cycle in heavily L2-influenced situations is formally distinct from the outcome of Jespersen's Cycle in circumstances where L2 learners do not appear to have been driving the change.[13] Whether this could be a long-term grammatical outcome is a further question: if the heavily L2-influenced variety is subsequently acquired by L1 acquirers, who, by hypothesis, systematically postulate "regular" Agree relationships, involving both interpretable and uninterpretable features to structure their grammars, this

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13 In fact, this possibility, raised by W&B's proposals, may constitute a potentially useful avenue for future research, particularly given the apparent existence of contact systems in which bipartite negation is stable, seemingly complexifying an earlier single-marking system. Bipartite negation in modern varieties of Afrikaans is a case in point. Intriguingly, the varieties where bipartite negation is stable fit Trudgill's sociolinguistic prediction that they will be varieties spoken in a situation of long-term co-territorial language contact involving a high proportion of L1 speakers.

would not seem to be a likely outcome. Also worth considering here is whether an L2 grammar constructed partially around interpretable formal features and partially on an alternative, non-featural basis – possibly harnessing the kinds of *patches* and/or *viruses* discussed in Bley-Vroman (2009) and other sources – is in fact formally simpler than one in which systematic formal properties are consistently encoded in featural terms.

Returning to our chief concern here, however: if the dominant approaches to Agree are right in requiring the establishment of a relation between interpretable and uninterpretable features, it is not so clear that all the phenomena singled out for attention in this paper are necessarily special. We have already discussed bipartite versus single negation marking. Null subjects, in turn, may require the postulation of [uD], as W&B suggest, but overt subject-T/Infl Agree relations are also standardly assumed to involve the presence of (potentially different) uninterpretable features. For the loss of null subjects to produce the kind of simplification that Trudgill's hypothesis about the effects of extensive second language acquisition in a community would lead us to expect, it would seem to have to be the case that the overt subjects in the resulting grammars (at least temporarily – see the discussion above) incorporate into the clausal domain in a way that does not require the uninterpretable features usually assumed for this dependency. But then the question remains whether this formal representation will survive in a "regularly" acquired L1 grammar, and whether we are really dealing with a formal simplification to begin with. The kinds of Case phenomena that W&B highlight as potentially worth investigating in future work vary strikingly in "size", covering abstract, inherent and lexical, and may therefore also be formally quite distinct (see note 11). If we assume abstract Case to be parameterisable, following Diercks (2012), the same concern arises about the apparent loss of this phenomenon as that which we have already discussed in relation to bipartite negation and null subjects: will it really be the case that loss of overtly manifest abstract Case marking reflects a reduction in uninterpretable features? For the "smaller" Case phenomena – inherent and lexical Case – the situation may be different as it is conceivable that the loss of these Case types could turn on the loss of a (potentially quite specialised) *pair* of interpretable and uninterpretable features, i.e. that both instantiations of the feature are lost from the grammar.

More generally, "smaller", more micro properties, where it is credible that *both* members of an uninterpretable/interpretable feature pair are lost, may provide a productive research avenue for W&B's enterprise. Establishing the content of "interpretable" versus "uninterpretable", however, remains a desideratum; as does clarifying the relationship between the format/make-up of an L2 grammar and a strongly L2-influenced L1 grammar; and considering whether the

structures of greatest interest are likely to be identified more effectively by pursuing a surface phenomenon-oriented approach, as W&B do in fixing on bipartite negation, null subjects and Case here, or, instead, a more I-oriented perspective, in terms of which certain formally defined sub-types of given surface phenomena will be the focus of interest. Like all valuable research, W&B's proposals, then, do not fail to produce thought-provoking and challenging (new) research questions.

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