Uniformity and diversity

A minimalist perspective

Halldór Ármann Sigurðsson
Lund University

This essay discusses language uniformity and diversity in the light of recent developments of the minimalist program (Hauser et al. 2002; Chomsky 2008; Berwick & Chomsky 2011, and much related work). It pursues two leading ideas. First, Universal Grammar (UG) is maximally minimal: hence early internal language (I-language) is largely uniform across individuals, language variation being mainly or entirely confined to externalization. Second, the mapping from I-language to external language (E-language) is non-isomorphic (the Non-isomorphy Generalization), morphological processes such as agreement and case marking being E-language phenomena, taking place in the externalization component. The first line of reasoning converges with many of Chomsky's recent ideas, the second one is more divergent.

Keywords: E-language; externalization; I-language; person; tense; non-isomorphy generalization

1. Introduction[1]

At the outset, let us contend that it makes sense to assume Universal Grammar:

(1) Languages reflect or represent a universal body/mind-internal reality, here referred to as Universal Grammar, UG

Assume also that the faculty of language (in the narrow sense, see shortly) is a mental organ in the following sense of Berwick and Chomsky (2011:20–21):

> From the biolinguistic perspective, we can think of language as, in essence, an "organ of the body," more or less on a par with the visual or digestive or immune systems … it is a cognitive organ, like the systems of planning, interpretation, reflection … We can think of language as a *mental organ*, where the term "mental" simply refers to certain aspects of the world, to be studied in the same way as chemical, optical, electrical and other aspects …

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On this view, the faculty of language is largely autonomous or separated from other mental subsystems, for instance perceptual systems. However, the approach also breaks sharply with the Principles and Parameters approach of the 1980s (Chomsky 1981 and related work) in that it takes the language faculty to be minimal, in a sense to be explained shortly. Nowadays, it is commonly referred to as biolinguistics, the biolinguistic approach or the biolinguistic program (this is a recent development even though bilolinguistics has been around for a much longer time; see Jenkins 2011).[2]

The structure of the essay is as follows: Section 2 discusses basic notions, including Faculty of Language in the narrow and the broad sense, I-language, Narrow Syntax, and Universal Grammar, explicating the sense of these and related concepts under minimalist assumptions. Section 3 argues that Universal Grammar is maximally minimal and that initial I-language, therefore, is largely uniform and cannot be considered to contain any complex items or a parametric switchboard. Section 4 discusses I-syntax, claiming that the mapping from I-language to E-language is non-isomorphic (the Non-isomorphy Generalization), a suggestion that diverges radically from mainstream conceptions of grammar. In Section 5, I discuss externalization, arguing that morphological processes such as agreement and case marking are E-language phenomena, distinct from albeit based on I-language syntax. Section 6 concludes the essay by briefly addressing some further research questions that arise under the approach pursued.

The results of the inquiry undertaken suggest, first, that a sharp distinction has to be made between I-language syntax and traditional conceptions of syntax, applying to E-language, and, second, that E-variation cannot be taken at face value as direct evidence of I-language. Any functional category in E-language seems to represent at least two I-categories (non-isomorphy), suggesting that linguistics needs to adopt a 'nuclear physics approach' by splitting complex E-units into smaller I-units.

2. Minimalist foundations

The notion of 'minimalism' reflects the idea that the language faculty is biologically minimal.[3] That is, the evolutionary step that linguistically separated humans from other primates, say 50,000–200,000 years ago, was a single and sudden minimal change, not a chain of evolutionary developments over an extended period of time.[4] In other words, the term suggests that the biological differences between the organism before and after the change were minimal. It does not follow that *languages* should be minimal or simple in some sense, a common misinterpretation (see for example Pinker & Jackendoff 2005). Knowledge of the mind side of

language is limited, but even if we only study oral or manual/facial (visible or tactile) linguistic expressions, it is clear that most of the mechanisms involved are highly complex and very far from being minimal or specifically linguistic. Body parts such as tongues, eyebrows and fingers are (obviously) neither 'minimal' nor specified 'language organs' in any meaningful sense.

Hauser et al. (2002, see also Fitch et al. 2005) introduced a distinction between the faculty of language in the narrow and the broad sense, FLN and FLB, respectively, FLB properly including FLN. In addition to FLN, FLB consists of at least the sensorymotor interface, SM, and the conceptual-intentional interface, C-I, often referred to as the phonological and semantic interfaces. Furthermore, it is said to contain "the biological capacity of humans that allows us … to readily master any human language without explicit instruction" (Hauser et al. 2002: 1571).

(2) FLB = FLN + SM + C-I + the acquisition capacity + …

FLN, in turn, is truly minimal, comprising "only the core computational mechanisms of recursion as they appear in narrow syntax and the mappings to the interfaces" (Hauser et al. 2002: 1573). That is to say, FLN contains only recursive Merge, where Merge is either External Merge or Internal Merge (movement). "Operating without bounds, Merge yields a discrete infinity of structured expressions" (Chomsky 2007: 5).

The terms *Universal Grammar* (UG), *Faculty of Language* (in the narrow sense), *Narrow Syntax*, and even *I-language* are commonly used in more or less the same sense, making it troublesome to use them in discourse. In the following, I will try to explicate the sense of these and other core minimalist notions.

I-language and E-language are related and distinguished by *externalization*. I-language is thus a cover-term for mind-internal language (as an individual-internal system of 'linguistic thought'), E-language, in turn, being a cover term for any form and occurrence of externalized language (used for communicative and other social means). In Chomsky's words, I-language is a "state of FL" (FL = Faculty of Language), whereas Universal Grammar is "the theory of the initial state of FL" (2007: 1). While Universal Grammar is invariable, the I-language of an individual is amenable to changes, growing as the individual grows. Any addition to UG, say, by a category or an item, yields a distinct I-language, IL_x. Nevertheless, it is unclear whether or to what extent the growth of I-language leads to variation among individuals (whereas it is obvious that externalization yields extensive E-language variation). I will return to this issue.

Hauser et al. (2002) do not really discuss UG and Narrow Syntax, only mentioning these notions in passing. Actually, they seem to have two contradictory conceptions of the relation between FLN and Narrow Syntax, assuming, on the one hand, that "a key component of FLN is a computational

system (narrow syntax) that generates internal representations and maps them into the [interfaces]" (2002: 1571), and shortly after suggesting that "FLN comprises only the core computational mechanisms of recursion as they appear in narrow syntax and the mappings to the interfaces" (2002: 1573). In other words, Hauser et al. are inconsistent as to whether FLN comprises Narrow Syntax or vice versa.

I adopt the standard assumption that Narrow Syntax involves more (for instance Agree) than "only the core computational mechanisms of recursion", thus being a meeting place for UG and more general principles (of the 3rd factor, see shortly). As for UG and FLN, in turn, UG must be 'larger than' FLN, given that the latter comprises "only the core computational mechanisms of recursion." That is, in addition to FLN, UG must contain some building elements, a *Universal Lexicon* (UL), as stated in (3).

(3) UG contains:

a. FLN: a computational faculty, applying Merge without bounds
b. UL: a set of atomic building elements[5]

I thus assume that the correlations in (4) hold, where the symbol > reads 'is larger than.'

(4) FLB > Narrow Syntax > UG > FLN

A stronger claim would be that the relation between these systems or notions is that of a proper inclusion ('FLB properly includes Narrow Syntax', etc.), but I will not pursue this stronger stance here (it is not necessary for my purposes).

Chomsky (2005: 6) distinguishes between "three factors that enter into the growth of language in the individual", that is:

1. Genetic endowment, apparently nearly uniform for the species, which interprets part of the environment as linguistic experience …
2. Experience, which leads to variation, within a fairly narrow range, …
3. Principles not specific to the faculty of language

These are referred to as the *first*, *second* and *third factor*, respectively.[6] Chomsky does not define or discuss these notions in relation to the notions of Hauser et al. (2002). My understanding is that the 1st factor is roughly tantamount to FLN (perhaps minus interpretation of "part of the environment as linguistic experience"), whereas FLB intersects with the 3rd factor.

Much of what was thought of as principles of language in the Principles and Parameters approach of the 1980s is now seen as 3rd factor phenomena. While the 1st factor is taken to be specific "for language, the topic of UG", the 3rd factor is "not specific to … [language], and may be organism-independent" (Chomsky

2008: 133), that is, non-species specific. In particular, the 3rd factor comprises the interfaces as well as principles of structural architecture and computational efficiency, including binary branching (see Chomsky 2005: 16), minimality and (some notion of) the Phase Impenetrability Condition. These factors enter Narrow Syntax, in the traditional conception of that term, hence the understanding above that it is 'larger than' FLN.

As FLB contains the interfaces, it intertwines I-language and E-language properties. At the other end of the scale, FLN and UG are components of I-language only. UG obviously shapes and constrains E-languages, but it is not a component of E-languages in any meaningful sense. A more intriguing issue is whether there is a distinction to be drawn between syntax in I-language and E-language, *I-syntax* and *E-syntax*. Given that Narrow Syntax only includes computation of LF, feeding mapping to the C-I interface (Chomsky 2001: 3, 15), Narrow Syntax *is* I-syntax. A problem with that understanding, however, is that early minimalism (Chomsky 1995 and related work) analyzed abstract morphology in part as narrowly syntactic. As will be discussed in Section 5, the morphological derivation takes place *after* transfer to (deep) PF, justifying the term E-syntax, at least as a descriptive notion. For consistency and clarity, I will thus be using the term I-syntax (rather than Narrow Syntax) about the pre-transfer computation, using E-syntax about the post-transfer externalization derivation – not semantically/syntactically controlled but driven by 3rd factor forces.

3. Maximally minimal UG

In an approach where UG is maximally minimal (or 'maximally empty', Richards 2008), containing only FLN and UL, there is no room for UG-anchored parametric statements, including classical parameters such as the null-subject parameter, the head parameter, the polysynthetic parameter, and the ergative parameter (see Baker 2001). Postulating a special parameter or a complex statement in order to account for some observed variation introduces a *deux ex machina*, expanding the explanatory and descriptive machinery, which is incompatible with minimalist reasoning. From a biological and evolutionary point of view, such statements or directives would be puzzling, requiring some extra explanation instead of being explanatory (Boeckx 2011). In addition, parameters are usually stated in E-language terms (order, case, agreement, etc.), thus not bearing on I-language or UG, as we will see.[7]

However, variation that arises from *underspecification* of UG is obviously compatible with a maximally minimal UG (see Roberts & Roussou 2003; Biberauer et al. 2009; Holmberg 2010). The null-subject parameter, probably the most widely

assumed and discussed of all parameters since proposed by Rizzi (1982), is a good case in point. It is evidently an epiphenomenon, that is, there is no rule or statement in grammar that takes the form in (5) – understandably so, as the notion of 'subject' is not a primitive of language (Chomsky 1981: 10).[8]

(5) "Do not spell out your subject"

Rather, null-argument phenomena derive from a number of factors. The most widely discussed factor is rich ϕ-feature marking of the finite verb in T (for valuable overviews, see Huang 2000; Cole 2009; Biberauer et al. 2009). Null-subject languages of the common Italian type have rich ϕ-agreement, as exemplified in (6).

(6)	*Parl**o**/Parl**i***	*islandese.*	*Italian*
	speak.1SG/2SG	Icelandic	Verb agreement, null subject
	'I/You speak Icelandic.'		

With respect to ϕ and T, there are basically two other types of languages, the rare German, Icelandic, and, to an extent, French type (see Gilligan 1987), with ϕ spelled out both on overt subjects and T, and the more common Afrikaans, Chinese, Japanese, Mainland Scandinavian type, with no ϕ-marking on T. This is exemplified in (7) and (8) (Ø-AGR in (8) indicates 'absent agreement').

(7)	a.	***Ég*** *tal**a***	*íslensku.*	*Icelandic*
		I	speak.1SG Icelandic	Verb agreement, overt subject
	b.	***Þú*** *talar*	*íslensku.*	
		you	speak.2SG Icelandic	
(8)		***Jag*/*Du*** *talar*	*isländska.*	*Swedish*
		I/you	speak.Ø-AGR Icelandic	No verb agreement, overt subject

Many researchers agree that the relevant ϕ-richness of T comes about by incorporation of ϕ into T (see Anderson 1982; Alexiadou & Anagnostopoulou 1998; Platzack 2004; Holmberg 2005; Holmberg et al. 2009; Roberts 2009).[9] The proposed analyses differ in technical details, but for our purposes the simple basic idea can be expressed as in (9), where the n-hyphen indicates that Ø and T_{ϕ} make up a single unit.

(9) Incorporate ϕ into T: ϕ …T > Ø–T_{ϕ} *Italian*, etc.

Similarly, the other two language types can be described as in (10) and (11).

(10) Copy ϕ onto T ϕ … T > ϕ … T_{ϕ} *German*, *Icelandic*, etc.
(11) Do not operate on ϕ: ϕ … T > ϕ … T *Chinese, Swedish*, etc.

There are no further possibilities here, so the language learner is forced to select among these three options (much as one is forced to walk in some direction in a

landscape, without the selection of direction being specifically preprogrammed). That is, the variation is simply accommodated by underspecification, without the extra cost of a preprogrammed (and a biologically puzzling) parameter.[10]

Incorporation of ϕ singles out the Italian null subject language type, but the incorporation process itself ("Y incorporates into X") is a general architectural option, frequently found in the biological world, outside of language.[11] There is another salient distinction between the language types in (9)–(11), commonly overlooked: Neither the Italian nor the German/Icelandic types are ϕ-silent (in finite clauses), whereas subject pronoun (topic) drop leads to ϕ-silence in the Chinese/Swedish type. That is, remarkable as it may seem in the light of the extensive null-subject discussion, *full ϕ-drop* is possible only in the Chinese/Swedish language type. Again, this is a general architectural (3rd factor) option: if ϕ is neither incorporated nor copied and also not spelled out in Spec,T, there will be no trace of it in the clause, while not spelling out Spec,T in Italian or Icelandic does not affect T_{ϕ}.

The null-argument phenomenon is a relatively simple example of variation that can be profitably analyzed in terms of 3rd factor effects (see Sigurðsson 2011a). Given minimalist assumptions, we expect this to extend to more complex phenomena, such as ordering variation (the head parameter and related issues).[12] Or, to view it from the opposite direction: If it should turn out that language variation cannot be analyzed without resorting to biological UG-anchored parametric directives, we would be forced to reject the hypothesis that UG is maximally minimal (and, instead, to develop a plausible theory or at least some ideas of how non-minimal it is and of how and why it developed that way).

As cited above, Hauser et al. (2002: 1573) take it that FLN, the computational department of UG, is truly minimal, comprising "only the core computational mechanisms of recursion," and this stance is widely adopted by minimalist researchers. In contrast, it is commonly assumed that UL, the 'lexical' department of UG, is nontrivially non-minimal. Chomsky (2001: 10) suggests that the Faculty of Language "specifies the features **F** that are available to fix each particular language L … We adopt the conventional assumption that L makes a one-time selection $[F_L]$ from **F**. These are the features that enter into L; others can be disregarded in the use of L" (see also Thráinsson 1996; Bobaljik & Thráinsson 1998). Call this *F-selection* ('L-selection' in Sigurðsson 2004a). The relevant features were suggested by Borer (1984: 3) to belong to "one single component: the inflectional component". In Chomsky's words (2001: 2), the variation is "restricted to the lexicon, and … morphological properties, primarily inflectional."[13]

F-selection presupposes that there is some set or pool to select from (cf. Jakobsson 1968/1941 on phonological feature selection, cited by Thráinsson 1996 in support of a similar selection of syntactic features, see also Yang 2002,

2004, etc.). In other words, it presupposes that UL contains a number of features or items, and, in view of the attested feature variation across languages (see Dryer & Haspelmath 2011), that number would seem to be high, at least in the hundreds. However, that contradicts the tenet that UG is maximally minimal.

Materializing or 'crystallizing' processes are evidently at work in externalization and hence in the shaping of E-languages and E-language variation (see Sections 4 and 5). As for UG, on the other hand, the natural assumption is that it is 'generally minimal' rather than only 'partly minimal'. In other words, the null-hypothesis is that UG is not only computationally but also 'lexically' minimal, and I will assume that it is. I thus hypothesize that UL contains only two elements, an initial root, Root Zero, and an initial functional feature, Feature Zero (the Edge Feature in Chomsky 2008) – zero as they are void of content, to be repeatedly copied and filled by some content in the language growth process. The growth of I-language in the individual thus involves 'propagation' of roots and features, that is, reiterated Copy & Merge of $\sqrt{}_0$ and F_0 and subsequent specification of their content, yielding $\sqrt{}_1$, F_1, $\sqrt{}_2$, F_2, etc., in some particular internal language, IL_x.[14] We may refer to the functional features of any particular I-language as its *F-atoms*.

Mainstream generativism (Chomsky 1981, 1995, 2001, and related work), has long pursued mixed lexicalist approaches where syntax operates on both individual features and complex items, provided by UG. In "Approaching UG from Below", Chomsky (2007: 6) thus maintains: "In addition to Merge …, UG must at least provide atomic elements, lexical items, each a structured array of properties (*features*) to which Merge and other operations apply to form expressions." It would thus seem that Chomsky is assuming that there is an 'item factory' somewhere, external to UG.[15]

A different aspect of the 'lexical issue' is discussed in "On Phases", where Chomsky (2008: 139) considers the possibility that "a language has the simplest possible lexicon: just one LI, call it 'one'. Application of Merge to the LI yields {one}, call it 'two.' Application of Merge to {one} yields {one, {one}}, call it 'three.' And so on." – further suggesting that the arithmetic capacity may have been abstracted from the language faculty "by reducing the latter to its bare minimum … a single membered lexicon." I assume, instead, that arithmetic and natural language have a common 'lexical' ground, UL,[16] natural language departing from this common ground as language grows in the individual. At the end of Section 4, I will tentatively suggest that I-language has access to a 'mine' of language-external 'raw material' which it transforms into I-language elements (by repeatedly copying and filling or loading Root Zero and Feature Zero), I-language itself thus being the 'item factory'. In contrast, UG, the maximally minimal initial state of the (hereditary) Faculty of Language, does not contain any elements other than Root Zero and Feature Zero.

E-languages do vary, among other things in their inventories and their expressions of functional categories. A maximally minimal UG is compatible with materialization variation in the externalization process, yielding feature variation in E-languages,[17] but it precludes such variation arising as a direct F-selection from UL, as UL does not contain any contentful elements that could be selected in the first place. In other words, the burden of explanation cannot be loaded on a minimal UG. It does not disappear, of course, but it must be placed outside of UG. Plainly, if UG is minimal, it is also minimally explanatory, distressful as that may seem.

If there is no F-selection, *L-uniformity* (language uniformity) as stated in (12) applies (Sigurðsson 2004a, 2011b).[18]

(12) Any normal human, hence any human I-language, IL_x, has access to any F-atom, F_y, regardless of whether or how F_y is expressed in (the externalized form of) IL_x.

This is a relatively weak version of L-uniformity, not claiming that all I-languages *are* identical, only that they are not in principle excluded from being identical. Nevertheless, L-uniformity suggests that E-language variation is largely due to externalization variation. In Berwick and Chomsky's words (2011: 37–38):

> Parameterization and diversity, then, would be mostly – possibly entirely – restricted to externalization. That is pretty much what we seem to find: a computational system efficiently generating expressions interpretable at the semantic–pragmatic interface, with diversity resulting from complex and highly varied modes of externalization, which, furthermore, are readily susceptible to historical change.

4. On I-syntax

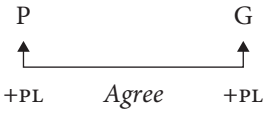
Externalization involves both *materialization* (commonly misconceived of as 'lexicalization') and *localization* of the material, where localization covers not only placement of prosodic markers and temporal segmentation (linearization) in oral languages but also localization in sign languages (see Sandler & Lillo-Martin 2006). Localization has been discussed in a wide range of studies since Chomsky 1957, including typological studies (Greenberg 1966, etc.), analytical works by Chomsky and others (Kayne 1981, 1994, etc.; Biberauer et al. 2008, 2009, and related work), and studies that aim at combining typological and analytical approaches (Cinque 1999; Baker 2001, 2008; Julien 2002, etc.). Localization variation (or at least the linearization part of it) is a good example of variation that can be analyzed in terms of 3rd factor underspecification (see Chomsky 2005: 15), but I will nevertheless put it aside here.

Materialization, in contrast, is 'widely undiscussed', presumably as it has commonly been taken for granted that UG contains a 'pool' of features (see Chomsky 2001:10) from which languages pick their functional categories, 'at leisure.' If this was the case, that is, if languages get their categories handed down from UG (or God, for that matter), then there is obviously nothing to discuss.[19] However, all this changes dramatically if UG is maximally minimal, containing a single root, Root Zero, and a single functional feature, Feature Zero (the Edge Feature), the latter providing a syntactic 'glue', thus enabling recursive Merge of roots (and larger structures, already built by Merge). Focusing on functional categories (putting roots aside), then, each occurrence of Copy & Merge of Feature Zero yields a new building element, an F-atom, F_y, in some internal language, IL_x.

Notice that I say F-atom in some *internal* language, assuming that E-language materialization is preceded by I-language 'materialization'. At first sight, one might be inclined to believe that all materialization (or 'grammatical crystallization') is a matter of externalization, but, if I-language is the language of thought, or at least *a* language of thought, then it must be largely uniform across individuals (abstracting away from peripheral concept variation).[20] I thus take it that E-language materialization is distinct from I-language materialization, substantiating only an inaccurate and an incomplete representation of I-language rather than 'copying' it. A desirable conclusion, as it suggests that I-languages may be radically more uniform than E-languages, which seems to be essentially correct.

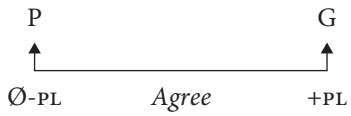
Consider this with respect to abstract Agree and overt agreement. Agree is a probe-goal relation that commonly yields overt feature agreement of the probe and the goal. This is easily illustrated by a simple example of subject-verb agreement, as in (13); P and G stand for 'probe' and 'goal'.[21]

(13) There **have** never been so many trees singing in the rain.



In this case, the Agree relation results in overt agreement, so here we have a nice harmony between morphology and syntax. However, harmony of this sort is rather an exception than a rule, as suggested for example by the fact that many languages lack verb agreement altogether (see Nichols & Bickel 2011). The point can be easily illustrated for English, as in (14), where Ø-PL indicates absent plural marking.

(14) There **should** never have been so many trees singing in the rain.



Variation of this sort is also seen across closely related varieties and languages. Thus, inasmuch as speakers of English accept clauses like "The girls *is* here" (see Henry 1995), they arguably have abstract Agree, only lacking overt PF agreement. Consider also the Germanic facts in (15) (capital N stands for 'nominative', small capital M and PL for 'masculine' and 'plural').

(15) a. They would be bought. *English*

b. *Sie* ***würden*** *gekauft werden.* *German*
they would.3PL bought be

c. *De skulle bli* ***köpta****.* *Swedish*
they would be bought.PL

d. *Þeir* ***mundu*** *verða* ***keyptir****.* *Icelandic*
they.N.M.PL would.3PL be bought.N.M.PL
'They would be bought.'

English shows no agreement here, German has finite verb agreement, Swedish has number agreement of the participle, and Icelandic has finite verb agreement as well as case, gender and number agreement of the participle.

Simple but often overlooked facts of this sort suggest that abstract Agree applies in the same manner across I-languages, whereas overt ϕ-agreement shows extensive differences (see Julien 2002; Corbett 2006; Baker 2008; Preminger 2011), even among closely related languages. If so, the relevant agreement features, here Person, Number, Gender, and Case, must somehow express features and relations that are active in I-syntax, regardless of their appearance in E-syntax. That is, as suggested above, E-language materialization does not 'copy' I-language materialization, instead substantiating only a (variably) incomplete representation of I-language.

Facts of this sort are commonly taken to be straightforwardly analyzable by very simple means, such as null-markers in morphology. If so, one could, for example, say that English has abstract number, gender and case agreement of participles, only differing from Icelandic in 'expressing' these categories by inflectional null-morphemes. Linguists are variably willing to adopt analyses of this sort – many would for example reject the hypothesis that the participle 'bought' is abstractly marked for number, gender and case while readily accepting that it is nevertheless abstractly feature distinct from the past tense form 'bought'. However, the problem with analyses that assume one-to-one mappings from syntax onto morphology is not their abstractness, rather the opposite. Mapping analyses of this sort are on an entirely wrong track, regardless of what degree of abstractness their proponents are willing to accept. Morphological E-syntax categories, such as Person, Tense, Number, Gender, and Case, do not have any direct counterparts in I-syntax, hence any analysis that assumes simple mappings from I-syntax onto E-syntax/morphology is seriously mistaken.

This may seem contradictory. On the one hand, I-language F-atoms are universally available (L-uniformity) and to an extent represented by morphological E-categories. At the same time, however, morphology does not in fact represent or express I-syntax in any direct fashion. Let me try to explain this in the following.

The mismatch between I- and E-language arises as a *single* functional E-category expresses values (1st person, past tense, etc.) that are the outcome of an I-syntactic process (Agree) that computes and values *two or more* I-categories in relation to each other. The reason behind this is that Agree links phases, vP-internal categories being uninterpretable at the interfaces unless they match and get valued in relation to features of the C-system.[22] This is a corollary of Full Interpretation (Chomsky 1986 *et seq*.), call it the *Full Interpretation Corollary*, FIC. The relevant understanding of it, for our purposes, is stated in (16).

(16) I-syntax categories cannot be fully interpreted phase-internally, hence the full computation is never phase-bounded: a phase-internal category X must be licensed and computed (interpreted/valued) in relation to at least one phase-external category Y.[23]

It follows that a single functional E-language category expresses the computed value of a relation between two or more I-language categories, merged in distinct phases. The formulation in (16) suggests that C-features get valued in relation to categories of the CP-external context (which is borne out, see Sigurðsson 2011a). However, I will limit the present discussion to vP-CP relations.

Consider FIC with respect to Person. Abstract Person is arguably a universal I-category (in accordance with L-uniformity) and it is also extremely commonly expressed in E-languages, in one way or another (Siewierska 2004: 8ff). However, there is no atomic unit in I-syntax that corresponds to what is usually referred to as 1st or 2nd person in the study of language. That is, there is no syntactic head that could be meaningfully analyzed as the '1st person head' or the '2nd person head' of a clause or a phrase. Thus, while it makes sense to assume that I-syntax contains an abstract Person category, that assumption does not explain how values like 1st person or 2nd person 'get into' E-syntax, nor does it explain the I-syntax behind these values.

Arguments enter syntax as variables, getting their ϕ-values by means of matching relations. That is, any clause has silent but active Speaker and Hearer features in its C-system, the *logophoric agent* and the *logophoric patient*, Λ_A and Λ_P, matched by event participants ($NP_{\alpha\phi}$) in the v-system, via ϕ-variables in the T-system (Sigurðsson 2004b and related work).[24] This is sketched for Person (Pn) in (17) (where I conflate Λ_A and Λ_P, for simplicity).

(17) $[_{CP} \ldots \Lambda_A\text{–}\Lambda_P \ldots \ [_{TP} \ldots \text{Pn} \ldots \ [_{vP} \ldots NP_{\alpha\phi} \ldots]]]$

Pn, thus, enters an Agree relation with $NP_{\alpha\phi}$, valuing it as NP_{-Pn} or NP_{+Pn}, NP_{+Pn} in turn matching Λ_A and Λ_P, as shown in (18) and (19) (where the arrow reads 'gets valued as').

(18) $NP_{\alpha Pn} \rightarrow NP_{+Pn}$ or NP_{-Pn}

(19)

a1.	+Pn	→	$+\Lambda_A, -\Lambda_P$	=	1st person by computation
a2.	+Pn	→	$-\Lambda_A, +\Lambda_P$	=	2nd person by computation
a3.	+Pn	→	$-\Lambda_A, -\Lambda_P$	=	3rd person by computation
b.	–Pn:			=	3rd person by default ('no person')

Indefinite NPs are canonically -Pn and hence 3rd person by default ('no person'). Definite 3rd person arguments, in contrast, are canonically valued as +Pn, thus 3rd person by computation ('true person').

On this approach, call it the *phase-linking approach*, pronouns are exhaustively computed in syntax.[25] The evidence supporting this conclusion comes from a variety of facts, including bound variable readings, fake indexicals and indexical shift in subordinate clauses, as in the Persian (20).[26]

(20)

Ali	*be*	*Sara*	*goft*	[*ke*	***man***	***tora***	*doost*	*daram*].
Ali	to	Sara	said	that	I	you	friend	have.1SG

Persian

a. 'Ali told Sara that he likes her.'
b. 'Ali told Sara that I like you.'

On the shifted reading in (20a), the pronouns in the subordinate clause positively match their logophoric C-features, hence getting valued as 1st and 2nd person, the reference of the logophoric features, in turn, being decided in a control relation with the matrix arguments. This is sketched in (21) for the 1st person *man* (the curly brackets indicate that a category is silent, albeit syntactically active).

(21) $[_{CP} \ldots \{\Lambda_A\}_i \ldots [_{TP} \ldots \langle \text{Ali} \rangle_k \ldots [_{CP} \ldots \{\Lambda_A\}_k \ldots [_{TP} \ldots \langle \text{man} \rangle_k \ldots \quad i \neq k$

Control *Agree*

That is, indexical shift boils down to shifting of the silent logophoric C-features, rather than shifting of the pronouns themselves.

The non-shifted reading of *man*, 'I', in (20b) is illustrated in (22).

(22) $[_{CP} \ldots \{\Lambda_A\}_i \ldots [_{TP} \ldots \langle \text{Ali} \rangle_k \ldots [_{CP} \ldots \{\Lambda_A\}_i \ldots [_{TP} \ldots \langle \text{man} \rangle_i \ldots \quad i \neq k$

Agree

Indexical shift, as in (20a), has been documented for, e.g. Amharic, Donno Sɔ, Kannada, Kurdish, Matses, Navajo, Nez Perce, Persian, Punjabi, Slave, Tamil,

Uyghur, and Zazaki (Speas 2000; Schlenker 2003; Sigurðsson 2004b; Anand & Nevins 2004; Anand 2006; Deal 2008; Ludwig et al. 2009; Shklovsky & Sudo 2009).

The works cited above are all relatively recent. It has taken philosophers and linguists quite some time to accept the fact that indexical shift exists. Kaplan (1989) famously argued that it would require 'monstrous' operators, claiming that such monsters are nonexistent in natural languages (in spite of being logically coherent, see Israel & Perry 1996). Kaplan is obviously proven wrong by the facts, but it is still commonly assumed that the phenomenon is limited in scope. Thus, while Schlenker (2003) strongly argues that Kaplanian monsters do exist, he assumes that they are limited to attitude predicates, arguing that such predicates are "*quantifiers over contexts of thought or of speech*" (2003: 32; Schlenker's emphasis), suggesting that "the problem can be treated … with a semantic stipulation" (2003: 99). Anand (2006: 11), following Anand and Nevins (2004), argues that "indexical shift arises not via binding in the syntax but by overwriting of the semantic evaluation sequence … [that is] the *context* parameter (Kaplan 1989), which serves as the locus for indexical items."

Indexical shift is a *general* trait of language, seen most pervasively in regular direct speech ('Sue said to Bill: "I will help you"'), but also observable in more colloquial constructions, like the ones in (23)–(25), with or without overt attitude predicates.[27]

(23) *Då utbrast Britt att den filmen vill jag se.* *Swedish*
then burst-out Britt that that movie want I see [SAG 4: 866]
'Then Britt burst out that I want to see that movie.'

(24) *Han räknade du är skyldig mig 53 dollar.* *Swedish*
he calculated you are owing me 53 dollars
'He calculated you owe me 53 dollars.'

(25) … and he's simply I don't care.
http://forum.purseblog.com/louis-vuitton/dilemma-my-bf-is-evil-53783.html (2011-07-27)

The generality of the phenomenon is expected under the present approach, where the 'monstrous' Λ-features are inescapable features of the C-system.[28] On the other hand, the option of shifting their reference is constrained by a number of factors (as discussed by Schlenker 2003; Anand 2006, and others), an interesting but a different issue.

Next, consider the Full Interpretation Corollary with respect to Tense. Any theory of Tense (see, for example, Hornstein 1990; Cinque 1999; Higginbotham 2009) must accommodate the basic insights of (neo-)Reichenbachian tense logic, where event time, E, relates to reference time, R, the thus established relation (E/R),

in turn, relating to speech time, S (yielding a secondary relation, S//E/R).[29] More specifically, non-finite verb forms express a relation between E and R, whereas finite verb forms express a relation between S and E/R, that is, the tense system splits into a non-finite part (typically expressed by participles and infinitives) and a finite part. This can be accommodated if clausal structure contains three tense heads, a vP-internal event tense head, $\mathbf{T_E}$, the referential tense head of the T-system, $\mathbf{T_R}$ (or simply T), and the speech tense head of the C-system, $\mathbf{T_S}$. On the present phase-linking approach, T_E gets valued in relation to T_R (as prior to/no later than T_R, etc.), the T_E/T_R relation, in turn, getting valued in relation to T_S. Consider the past perfect clause in (26).

(26) Mary had painted the house green.

The event of Mary's painting, expressed by the participle *painted*, happened prior to or no later than the past reference time, which is expressed by the auxiliary *had* (and can be further specified by an adverbial), and this reference time, in turn, was past in relation to the speech time. This past-in-the-past relation is sketched (in a simple and simplifying manner) in (27).

(27) $[_{CP} \ldots \Lambda_A\text{–}\Lambda_P \ldots T_S \ldots [_{TP} \ldots Pn \ldots T_R \ldots [_{vP} \ldots T_E \ldots]]]$

past *past*

I will not go into further details of this analysis here (but see Sigurðsson 2010; Sigurðsson & Maling 2011). What matters for our purposes is that the speech time, T_S, is a 'monster', much like the Λ-features. In 'normal' clauses it is unshifted, that is, contemporary or simultaneous with the overall speech time of the discourse. In Sequence of Tenses contexts, however, it is shifted, such that it becomes simultaneous with the reference time and/or event time of the matrix clause. This can be illustrated by comparing indicative and subjunctive clauses, such as the Icelandic (28) and (29) (PST.IND = past indicative, PST.SBJ = past subjunctive).

(28) *María veit/vissi* [*að Ólafur var veikur* (*í gær*)].
Mary knows/knew that Olaf was.PST.IND sick (in yesterday)
'Mary knows/knew that Olaf **was** sick (yesterday).'

(29) *María* ***sagði*** [*að Ólafur* ***væri*** *veikur* (**í gær*)].[30]
Mary said that Olaf were.PST.SBJ sick (*in yesterday).
'Mary said that Olaf **was** sick (*yesterday).'

The conceived 'speech' time of subordinate clauses is sometimes referred to as *perspective time* (see Kiparsky 2002). This perspective time, T_S, is shifted backwards in time (into 'another possible world', if one likes) in past subjunctives, as in (29). That is, the past tense of the subjunctive does not tell us that Olaf's 'being sick

event' took place in the past, but, instead, that it relates to a past perspective time, this perspective time, in turn, being simultaneous with the past time of Mary's saying in the matrix clause. The event time interpretation of the past subjunctive, in contrast, is basically the same as that of the simple present tense (non-past with respect to a reference time), that is, the subjunctive in (29) tells us that Olaf's 'being sick event' took place at or after the past event of Mary's saying.[31] This is sketched in (30), where, for simplicity, T_R is not indicated ($T_R = T_E$ in both CPs).

(30) $[_{CP} \ldots T_{S1} \ldots \quad \ldots$ say-$T_{E1} \ldots \quad [_{CP} \ldots T_{S2} \ldots \quad \ldots$ sick–$T_{E2} \ldots$

past *simultaneous* *non-past ('present')*

As T_{S2} is set simultaneous with Mary's matrix saying, the 'present' interpretation of the past subjunctive yields a non-past interpretation relative to the past T_{E1} ($= T_{S2}$).[32]

The essence of the subjunctive mood type found in Icelandic and many related languages is precisely this: it has a 'monstrous' T_S, shifted under control, in a parallel fashion to Λ_A–Λ_P in pronominal shift contexts. The features of the speech event (in the sense of Sigurðsson 2004b), including Λ_A–Λ_P and T_S, are *the* Kaplanian monsters, present in the C-system of every single clause.[33] Notice that the monsters operate independently of each other (there being no co-shifting of temporal and pronominal monsters). Notice further that even languages that largely lack subjunctive morphology, such as English, have the same 'subjunctive syntax' as does Icelandic; that is, they also have a monstrous T_S, shifted under control in SOT contexts. Evidently, there are 'subjunctive E-differences' but no corresponding I-differences between these language types. I will return to SOT phenomena in Section 5, demonstrating this point further.

Grammatical E-categories are entities that express relations between two or more I-elements (F-atoms). We have seen this for Person, Tense and Mood, and scrutiny suggests that this is true of other categories as well, including Case, Gender, and Number (see Sigurðsson 2004a, 2006, 2009, 2012, and the references cited there). Basic minimalist assumptions, including Full Interpretation, suggest that there are no direct mappings from I-language categories onto E-language entities. The general conclusion of the preceding discussion can thus be summarized as in (31); call it the *Non-isomorphy Generalization*.

(31) The mapping from I-language to E-language is non-isomorphic; that is, there are no one-to-one relations between the minimal building elements of I- and E-language.

We have come to a seemingly paradoxical situation. UG is maximally minimal, but I-language is evidently rich, full of abstract categories (entering relations

that get interpreted as overt markers of Person, Tense, Case, and so on). If these abstract I-categories are not part of UG, they must be part of and 'given to' language by a mind-internal but language-external conceptual department, call it *the concept mine*. The issues that arise are poorly understood, if at all.[34] However, in the absence of any other obvious way out, let us optimistically experiment by assuming that there is such a mine, where the language faculty can 'dig' for the raw material which it 'loads' into the units or 'vehicles' provided by UG, Root Zero and Feature Zero, thereby 'producing' linguistic items and categories. By hypothesis, the concept mine is part of human biology, accessible to all normal humans; hence, individual 'digging' in it does not lead to any radical I-language variation.[35]

Early internal *language emergence*, then, is nativistic and thus largely uniform. In contrast, lexical and structural expansion in later language acquisition/learning, including second language learning, evidently involves much *internalization*, that is to say, (at least partly) active and conscious learning by imitation. A sharp distinction must thus be drawn between early and later language growth. Much confusion has arisen from the fact that protagonists of 'nativism' and 'empiricism' commonly fail to make this distinction clearly enough (discussing 'language' as if that notion had only one sense, the sense they themselves happen to have in mind).

However, even if internalization is part of late language growth, it does not seem to lead to historical I-language changes. Given the concept mine metaphor I just made use of, such changes are not inconceivable. One could think of a scenario where language learners never encounter any perceivable marker of some I-category, say, Person or Negation, thus never 'digging' for it and never activating it in their I-language, but this does not seem to be what happens (even though I-categories commonly remain non-externalized in individual E-languages). I-language develops in individuals as they mature, so it is obviously amenable to some individual changes in a life time. One conceivable type of change would be adult 'cell-death' of some F-atoms. However, inasmuch as I-language changes of this or any other sort do occur, they do not seem to be historically persistent across generations, hence not permanently affecting E-languages. That is, they do not seem to be the source of historical language change.[36]

5. On externalization

The Babel effect is a fact. E-languages vary and change extensively, and the variation seems to be largely or exclusively confined to externalization. In Section 3, I discussed null-subjects in terms of ϕ-visibility. The variation does not arise as a consequence of languages having or not having I-language ϕ-syntax and

ϕ-categories; it arises as languages externalize these categories differently.[37] The same applies to the phenomena discussed in Section 4. Reconsider the Sequence of Tenses phenomenon, SOT, seen in Icelandic subjunctives, such as the one in (29), with the tense interpretation sketched in (30), both repeated here.

(29) *María* ***sagði*** [*að Ólafur* ***væri*** *veikur* (**í gær*)].
Mary said that Olaf were.PST.SBJ sick (*in yesterday).
'Mary said that Olaf **was** sick (*yesterday).'

(30) [$_{CP}$ … T_{S1} … … say-T_{E1}… [$_{CP}$ … T_{S2} … … sick–T_{E2} …

past *simultaneous* *non-past ('present')*

The past tense in SOT complement clauses, such as the one in (29), arises by formal (uninterpretable) Tense Agreement; that is, the subordinate subjunctive verb copies the morphological past feature from the matrix clause, without any concomitant copying of the matrix tense semantics (as seen by the ungrammaticality of the narrow scope reading of *í gær* 'yesterday'). This same kind of copying is even found in some infinitival ECM complements, as illustrated for present infinitive *munu* and the past infinitive *mundu* in (32).

(32) a. *María* ***segist*** ***munu*** *fara.* PRES.IND – PRES.INF
Mary says-herself will.INF go
'Mary says that she will go/leave.'

b. *María* ***sagðist*** ***mundu*** *fara.* PST.IND – PST.INF
Mary said-herself would.INF go
'Mary said that she would go/leave.'

Non-SOT languages such as Japanese (Ogihara 1996) and Hebrew (Sharvit 2003), and split SOT languages like Russian (Comrie 1986, *inter alia*), do not apply Tense Agreement in argument clauses like the one in (29), instead using the simple present tense, as illustrated for Russian and Japanese in (33) and (34).

(33) *Tanja* ***skazala*** [*čto ona* ***tancuet***]. *Russian*
Tanja said that she dances
'Tanja said that she was dancing
(at the moment of Tanja's saying so).' (Comrie 1986: 275)

(34) *Taroowa* [*Hanakoga Siatoruni* ***iru***] *to* ***itta***. *Japanese*
Taro Hanako Seattle-in is that said
'Taro said that Hanako was in Seattle
(at the moment of Taro's saying so).' (Ogihara 1996: 5)

However, as seen in the translations, the tense interpretation of the present tense complement clauses in (33) and (34) is the same as that of the past tense

subjunctive in (29): 'non-past relative to the past saying in the matrix clause'. In all three cases, the embedded perspective time or 'speech' time, T_{S2}, is shifted back in time, such that it becomes simultaneous with the past event/reference time of the matrix verb. This shift is accompanied by formal copying of the past feature in the Icelandic subjunctive in (29), whereas no such morphological copying process takes place in the Russian and the Japanese complement clauses in (33) and (34). Evidently, Icelandic +PAST is silently copied onto T_{S2} under control and spelled out on the verb in T_{E2} under Agree with T_{S2}.

Tense Agreement is a fairly strict rule in Icelandic, more so, it seems, than in many other languages that, to a variable extent, observe overt SOT, including English. It behaves like a reflex of sorts, utilizing a syntactic control relation between T_{E1} and T_{S2} as a kind of a path or gateway to pass down the morphological tense value from the matrix verb (established under T_{S1}/T_{E1} Agree/valuation). Strikingly, the value in examples like (29) is *shifted* (+PAST), while the syntactic control relation between T_{E1} and T_{S2} establishes an *unshifted* identity relation (as control relations generally do; here, the identity is temporal 'sameness', simultaneity).

Tense Agreement is thus distinct from the I-syntactic matching processes that yield tense interpretation. First, it operates on or with a feature (here +PAST) that is not a syntactic element but a morphological interpretation of the syntactic computation (here the $T_S//T_R/T_E$ computation in the matrix clause). Second, even if it utilizes the 'path' established by syntactic control and Agree relations, it seems to do so in the opposite direction, by top-down percolation. This seems in fact to be a common or even a general trait of overt agreement, suggesting that it is entirely separate from syntactic Agree, proceeding top-down in a directional externalization process.[38] This accounts, for instance, for the meaningless case agreement of Icelandic PRO (see Sigurðsson 2008).[39]

Reconsider Person computation, as sketched in (17), repeated here.

(17) $[_{CP} \ldots \Lambda_A - \Lambda_P \ldots \ [_{TP} \ldots Pn \ldots \ [_{vP} \ldots NP_{\alpha\phi} \ldots]]]$

Positive matching of Pn by $NP_{\alpha\phi}$ yields NP_{+Pn}, and positive matching of Λ_A by NP_{+Pn}, in turn, licenses lexical 1st person pronouns, such as 'I' and 'we'. In addition, many languages overtly copy the morphological person value or feature, commonly on the finite verb but sometimes on other elements, for example prepositions and complementizers. While the syntactic Agree/valuing process involves a number of atomic elements ($NP_{\alpha\phi}$, Pn, Λ_A, Λ_P), the morphological agreement process operates on a 'composite' and a 'compact' unit: the value (1st person) that results from NP_{+Pn} positively matching Λ_A.

Similarly, the syntactic relations that underlie morphological case-marking of various elements in a language like Icelandic, for example predicative participles, are found in caseless languages as well. Consider (35).

(35) a. *Þeir voru* ***kosnir***.
they.N.M.PL were.3PL elected.N.M.PL

b. *Þær voru* ***kosnar***.
they.N.F.PL were.3SG elected.N.F.PL
'They were elected.'

As seen, the form of the participle is *kosn**ir*** in the nominative masculine plural and *kosn**ar*** in the nominative feminine plural. The full paradigm of four cases, two numbers and three genders contains 24 'slots' with 13 distinct forms (*kosinn*, *kosnum*, *kosins*, *kosinnar*, etc.), but due to agreement the actual forms in (35) are (of course) the only ones that are grammatical there. Similarly, only the accusative forms (*kosna*, *kosnar*, etc.) are grammatical in (non-quirky) ECM constructions (as in 'we believed the men.A have been elected.A.M.PL').

Regardless of exactly how we describe the syntactic relation between an NP and its predicate, stating it in terms of case, gender and number would be misguided. The syntactic Event/Participant relation is reflected by morphological non-syntactic elements in Icelandic while it is not in English (and many, perhaps most, other languages). This is not only evidenced by agreement, as in (35), but also by case assignment to arguments. Consider the object case marking in (36)–(37); A, D, G = Acc, Dat, Gen.[40]

(36) a. She threw **the stone**. *English*

b. *Hon kastade* ***stenen***. *Swedish*
she threw stone.the

c. *Sie hat den* ***Stein***/**dem Stein*/**des Steines geworfen*. *German A/*D/*G*
she has the stone.A/*D/*G thrown

d. *Hún kastaði* ***steininum***/**steininn*/*steinsins*. *Icelandic D/*A/*G*
she threw stone.the.D/*A/*G
'She threw the stone.'

(37) a. She missed **him**. *English A/D*

b. *Hon saknade* ***honom***. *Swedish A/D*
she missed him

c. *Sie hat* ***ihn***/**seiner*/**ihm vermisst*. *German A/*G/*D*
she has him.A/*G missed

d. *Hún saknaði* ***hans***/**hann*/**honum*. *Icelandic G/*A/*D*
she missed him.G/*A/*D
'She missed him.'

These and other case-marking contrasts between these languages (as well as other languages) do not accompany or reflect any semantic/syntactic cross-linguistic differences; if they did, we would expect all languages to have more or less the same case system, which is obviously off the track (in fact, not having any case marking at all seems to be the most common 'case system', found in 100 of the 261 languages in Iggesen 2011). Case marking is an externalization strategy, relating only indirectly to underlying semantic/syntactic distinctions within individual E-languages – not across languages. Contrary to common conceptions, being an 'ornament', unnecessary from a deep syntactic or biological point of view, is entirely compatible with being largely regular within a given community. It is easy to make the prediction that most indirect objects in Icelandic will turn up in the dative case next Monday, but it is at least as easy to predict that most English male bankers or MPs will wear a tie at their job. Neither prediction can be made for Chinese noun phrases or Icelandic fishermen, the observed regularities being non-biological (in the relevant sense), even though they hold of the behavior of certain humans in certain contexts.

I-language relations, including Person and Tense computation, pronominal indexical shift, perspective or 'speech' time shift in Sequence of Tenses contexts, Event/Participant relations, and so on, do not seem to vary. Rather, what varies is how these relations are expressed by the units of E-languages, including morphological E-categories, such as Person, Number, Gender, Case and Tense.

Again, this is a welcome result, as it suggests that I-languages are radically more uniform than E-languages. However, this result also highlights the fact that our understanding of the processes involved in externalization is limited. The E-language phenomena discussed above have traditionally been taken to belong to syntax. Given minimalist assumptions, this is a misconception: morphological marking is *based on* the syntactic computation but it does not *take place in* I-syntax, instead taking place in a component that 'sees' syntax but is out of semantic/syntactic reach (deep PF, comprising abstract morphology). Accordingly, case marking, finite verb agreement, predicate agreement, mood selection, and so on, has *no* semantic/syntactic effects. That is, as expected under the Non-isomorphy Generalization in (31), morphology *never* does any I-syntax work. The syntax-morphology relation is syntactically non-arbitrary, but it is PF arbitrary, as evidenced by the extensive morphological variation attested across languages.[41]

The traditional understanding that morphological processes, such as agreement and case marking, are syntactic reflects the fact that these processes are fed by I-syntax relations and also sensitive to structural properties and restrictions, such as minimality and intervention, that have traditionally been assumed to be syntactic, but seem, instead, to be 3rd factor effects. That is: the grammar computation proceeds in E-language, after transfer to deep PF, suggesting that

PF ('post-transfer grammar') is more complex and more layered than commonly assumed. Morphology does not serve any I-language or 'linguistic thought' purposes. Within an E-language, it commonly has processing advantages (disambiguating and diacritic effects).[42] However, that is obviously not a necessity but a luxury that different languages allow themselves to a varying extent.[43] Processing E-language is possible not because of morphology but because language users decode E-language in relation to their I-language, understanding it as if it was their own I-language.[44]

Deep (morphological, non-phonetic) PF is more 'syntactic' than usually assumed, constrained by structural relations; for expository purposes, we may thus refer to it as E-syntax. I-syntax, in turn, is more powerful or more 'semantic' than predicted by stringently structural approaches to syntax (as for example evidenced by multiple matching of the logophoric C-features, by subjects, objects, etc.). I will not address this issue here, though.[45]

6. Concluding remarks: Some further research questions

Developing a coherent understanding of the I/E-language correlation, and therefore of uniformity and diversity in language, is the central task of linguistic inquiry. Minimalism, as developed over the last two decades, has made important progress in this respect, considerably extending our understanding of the Faculty of Language. Using the switchboard metaphor (for different purposes than in the parametric tradition), we can say that some 'switches' have been turned to 'yeses' while others have been turned on 'no's', and these 'yeses' and 'no's' will hopefully be of guidance in future minimalist research. The most important 'yes' is, plainly, that there is a crucial distinction to be made between I- and E-language, yielding, in turn, the 'no' that we cannot draw direct conclusions about UG on the basis of E-language observations – but, hopefully, some indirect or inferential ones. For that to happen, however, linguistics needs to adopt a 'nuclear physics approach', splitting E-units into more atomic I-units. Another 'no' is that there cannot be any composite or contentful items in a maximally minimal UG, and a third 'no' is that morphological derivation is quite distinct from, albeit fed by the I-syntax computation. Importantly and centrally, non-isomorphy holds, there being no one-to-one relation between the minimal building elements of I- and E-language. Yet another 'no' is that there is no room for a parametric switchboard in a maximally minimal UG, yielding, in turn, the 'yes' that language variation is largely or entirely restricted to externalization.

Many murky (and commonly unasked) questions arise. Placing language variation in the externalization component (PF, deep and shallow) does not release

linguistics from the task of developing some coherent understanding of it. Underspecification of UG in the sense of Ian Roberts and others is compatible with commonly observed language variation, so looking at the possibilities provided by underspecification seems to be a promising strategy. However, underspecification does not *explain* language variation, nor does it make any specific predictions about putative limits to it or solve the 'logical problem of acquisition' – as a matter of fact, it is unclear to what extent we can expect these problems to have specific or definite solutions.

A moot question is whether E-language variation can in some meaningful way be analyzed in terms of externalization parameters, *E-parameters*. That is: are the strategies applied in materialization and localization of linguistic material, including morphological processes, somehow limited or 'predestined' by the physiological/mental properties of the subsystems involved in externalization? Plausibly, they are, but it is not easy to recognize such factors in commonly observed types of variation (the 'head parameter', etc.), as variation is usually analyzed in terms of traditional grammatical notions, rather than biological ones. Again, looking for accounts compatible with underspecification (making room for albeit not triggering variation) seems to be a promising strategy.

In contrast, and contrary to common assumptions, looking for acquisition accounts is misguided: it is clear that varying primary linguistic data yields varying E-languages, but, it is also quite obvious (although commonly overlooked) that the nature and origin of variation cannot be accounted for by variable input (Sigurðsson 2004a). The first humans that externalized I-language possibly did so independently and variably, but they did not have any E-language input, variable or invariable. Simply put, diversity cannot be explained by diversity. Rather, it seems, variation is inevitable, bound to arise because of the inbuilt non-isomorphy between I- and E-language – which is not surprising if E-language is ancillary to I-language (as frequently argued by Chomsky): a mixture of properties from distinct biological subsystems, primarily used for social advantages.

Assuming that the notion of E-parameters may be a useful one, the question arises as to whether such parameters are specific to distinct modes (audible, visible, tactile), mode-nonspecific, or variably mode-specific and mode-nonspecific. Once again, the issues are poorly understood, if at all, and, clearly, most of the work remains to be done (but for valuable discussions and observations, see Sandler & Lillo-Martin 2006; Hohenberger 2007).

'Lexical insertion' is yet another central issue. The late insertion approach of Distributed Morphology (Halle & Marantz 1993 and much related work) was a step forward, and so was the insight of nanosyntax (see Fábregas 2009; Starke 2011) that E-lexical items may represent or express larger structures than just terminal nodes. However, even though it seems possible to build on and develop

these ideas,[46] the question of how syntactic structures get reinterpreted as phonetic expressions or as visual or tactile shape formations remains a largely unresolved puzzle. Recall that overt functional items, such as tense and person markers, express relations that scope or stretch over more than one phase (commonly a clause, but sometimes two or more clauses). Therefore the 'insertion' of such items cannot just target a terminal node or a phase-internal substructure.

As words and morphemes are discrete entities (at least prototypically), they must somehow be 'put in place' in audible, visible or tactile structures, but, given I-/E-non-isomorphy, the structures in question cannot be I-syntactic or E-copies of I-syntax. Rather, the relevant E-structures are built under the externalization process, on the basis of the outcome of the syntactic derivation. There are thus at least two separate externalization or transfer processes: *deep transfer*, from I-syntax to the semantic interface and deep PF or E-syntax (including abstract morphology), and *surface transfer*, from fully computed E-syntax to phonology and phonetics. With Merge and deep transfer in place, the individual makes use of whatever surface transfer modes that are independently available to the organism: audible, visible, or tactile.[47] 'Lexical insertion' takes place under surface transfer (with I-syntax still in hindsight); hence, it cannot apply to I-syntactic structures, be it by insertion into terminal nodes or by phrasal spell-out.

Another reasonable conclusion (empirically substantiated, as far as can be seen), is that the complexities of surface externalization seen in many morphological systems are not narrowly linguistic, instead arising (in deep PF and subsequent surface externalization) as language is put to use for social and socio-biological purposes (communicative, territorial, etc.). Overt agreement and case marking, for instance, are fascinating but obviously unnecessary 'ornamental quirks' from a narrowly linguistic point of view (while mastering these phenomena in a language community is of a great social importance).

The reinterpretation of I-syntax in terms of externalized structures and entities is a highly complex process – "not a simple task" in Berwick and Chomsky's soft-spoken words (2011: 37). Developing a detailed understanding of this process is the central challenge of a general theory of language externalization that will hopefully take shape in the near future.

Notes

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2010. The writing of the essay partly overlapped in time with the writing of "On UG and materialization" (Sigurðsson 2011b), the two essays thus partly overlapping in content as well.

2. There are of course other much discussed theories about the relation between language and the human body/mind, ranging from the zero claim of cognitive linguistics that there is no specific language faculty (see Croft & Cruse 2004), to the maximalist claim that the language faculty is multimodular (Jackendoff 2002 and related work). I will not consider these and other alternatives here. The problems I will be concerned with arise in one way or another regardless of what (minimally plausible) approach to language one assumes.

3. This is the sense of the term that is relevant in the present context, notwithstanding that it was also meant to express the fact that minimalism aimed at reducing the technical/theoretical machinery of the Principles and Parameters approach. There is obviously a logical connection between the two senses of the term.

4. However, Merge and (deep) transfer (see Section 6) may have come about in two distinct evolutionary steps, an issue that I must put aside here.

5. UL contains only Root Zero, and an initial functional feature, Feature Zero, see Section 3 and Sigurðsson (2011b).

6. Actually the order and numbering or the first and the second factors are switched in Chomsky (2008: 133), but I disregard this here.

7. But for a challenging I-language parameter proposal, regarding scope relations between negation and disjunction, see Crain and Khlenthzos (2010).

8. Alternative formulations, such as "Do not spell out your Spec,T" or "Do not spell out your thematically most prominent argument", do not fare any better.

9. Alexiadou & Anagnostopoulou (1998) and Platzack (2004) argue that the resulting structure does not contain a Spec-T position, while others, including Holmberg (2005) and Roberts (2009), suggest that it contains *pro* in Spec-T, in line with Rizzi's initial understanding (1982, 1986). I put this disagreement aside here.

10. The acquirer grammaticalizes one of the options in (9)–(11) on the basis of experience, regardless of whether these options are parametric or just general architectural options. However, the main text discussion is a simplification in that the targets of ϕ-incorporation and ϕ-copying vary, being C- or v-type heads rather than (or as well as) T in some languages and/or constructions.

11. Massimo Piattelli-Palmarini (pers. comm.): "Instances of incorporation of genetic material into genomes is ubiquitous (horizontal transfer, Transposable Elements). 45% of our genome has that origin, though only a few are still active. Carl Woese, the one who has discovered and labeled the third kingdom, the archaea, questions neo-Darwinism on that basis. The longest time of evolution has witnessed horizontal transfer."

12. As ponted out by a reviewer, this would seem to suggest that overt movement is exclusively an E-language phenomenon, taking place in deep PF (traditionally referred to as 'syntax'). If so, PF is even 'deeper' or more layered than assumed in Sigurðsson (2012) and related work. However, important as it is, I put this issue aside here (but for a few related remarks, see Section 6).

13. This is the so-called *Borer-Chomsky Conjecture*, see Baker (2008:156).

14. The Copy Theory of Language Growth. See "On UG and materialization" (Sigurðsson 2011b), where I suggest that not only Internal Merge but also External Merge is preconditioned by Feature Zero or the Edge Feature, EF, the derivation thus typically involving numerous silent copies of EF.

15. This may well be a misconception, but due to Chomsky's briefness, it is difficult to tell whether it is.

16. With the caveat that Feature Zero may not enter arithmetic; I put this aside here.

17. Minimalist reasoning applies to UG and early I-language. Adult E-syntax is a hybrid system, operating with abstract universal features and also with a great number of discrete items of an internalized community-specific communication lexicon, the number of and the internal space taken up by such items growing with growing age in the unmarked case (a 'lexicalist' approach to adult E-language along these lines is close to the approach (to I-language) pursued in early minimalist studies, including Chomsky 1995).

18. Notwithstanding frequent claims to the opposite. See for example Ritter and Wiltschko (2009).

19. It would then be an unresolved mystery why and how distinct languages should have begun picking different categories from the 'universal pool', in the first place. That is, linguistics would then provide basically the same kind of 'Babel explanation' for language diversity as the Bible: a scientific account is unavailable – it just happened (see Sigurðsson 2004a on this and numerous other problems with F-selection). Taken to its extreme, F-selection makes the claim that it is just a lucky coincidence that every natural language in the world, including all known sign languages, seems to be largely interpretable/translatable in terms of all other natural languages. Mathematical and other artificial computational 'languages', in contrast, apply F-selection of sorts (not using interchangeable items) and are not in general mutually convertible. Notice also that such 'languages' are commonly (meant to be) exhaustively explicit, whereas natural languages have large amounts of invisible or silent grammar ('dark matter'), most of which is arguably universal.

20. Assuming a special language of thought, distinct from I-language, "leads to an explanatory regress as well as being unnecessary and quite obscure" (Berwick & Chomsky 2011:38, Footnote 6). Having access to some specialized vocabulary, say, a particularly rich snow vocabulary or the vocabulary of some scholarly field, for example linguistics, may be a valuable enrichment. However, this much debated issue is largely beside the point here, so I put it aside.

21. It is not obvious that English verbs have singular/plural morphology, but I assume that they do for expository purposes. The description in (13) accords with the common assumption that the finite verb agrees with the subject. There are good reasons to assume, instead, that the clause contains separate Number heads, the subject agreeing with the highest of these heads, that Number head, in turn, subsequently combining with Tense in PF (see Sigurðsson & Holmberg 2008). However, as the differences between these analyses are irrelevant for my present purposes, I disregard them here.

22. Negative markers are overtly expressed in every single of the 1159 languages in Dryer (2011), and Neg might seem to be an exception here, that is, it might seem to be independently

interpretable in at least some languages and some contructions (Zeiljstra 2010). However, scrutiny suggests that clausal Neg always 'links' two or more phases (see Holmberg 2011).

23. I say the 'full computation' as Agree of X and Y within a phase, yielding a phase-internal relation X/Y, is not evidently excluded. By FIC, however, any such relation must, in turn, be licensed/computed in relation to some phase external category Z, yielding Z//X/Y (the slashes simply indicate a primary and a secondary relation).

24. 'Speaker', 'speech', 'speech time', 'speech act', etc., are traditional terms, but, as a matter of fact, they are rather unfortunate misnomers. An actual speaker has two distinct roles, that of a perceiver/thinker and that of a sender, and it is the perceiver/thinker role (center of consciousness) that is primary in relation to the sender role, not vice versa (as evidenced by a number of facts, not discussed here). In addition, as we will see, the 'speaker' category does not always refer to the actual speaker, instead representing a conceived center of consciousness. For expository ease, however, I use the traditional terms here (along with the somewhat more pertinent 'logophoric agent/patient').

25. Thus being non-lexical ('zero' or 'minimal' in the sense of Kratzer 1998, 2009). This applies to all personal pronouns, regardless of their referential properties (*pace* Kratzer 2009).

26. Gh. Karimi Doostan, pers. comm.

27. For a discussion of a new quotation marker in colloquial Swedish, *ba(ra)* 'just, simply', see Svensson (2009: 133ff) and the works cited there.

28. Long Distance Reflexivization and so-called logophoricity must also, crucially, be explained in terms of silent C-features, and so must control into PRO infinitives, but space limitations prevent me from discussing this here.

29. Recall that the slashes just indicate that there is a valuating (Agree) relation between the elements in question. A single slash indicates a primary relation, a double slash a secondary relation. The slashes do not specify the computed values ('past', etc.) of the relations.

30. The star applies to a narrow scope reading of the adverbial *í gær* 'yesterday' (a wide scope reading, where the adverbial specifies the time of Mary's saying is also deviant, but not sharply ungrammatical). A shifted past tense reading in the subjunctive clause, licensing a narrow scope *í gær*, is expressed by the pluperfect ('had.SBJ been sick' = 'was sick before the moment of Mary's saying').

31. Subjunctives, past and present, share their basic non-past reading with infinitives as well as with the simple present tense (Sigurðsson & Maling 2011). Notice, however, that the ambiguity of the non-past reading (present/future) is somewhat variably 'resolved' by (the aktionsart of) different predicates, the copula and other stative verbs usually only having the present reading, whereas, e.g. verbs of motion usually get a future reading.

32. The same semantic/syntactic relations are also established for the numerous Icelandic verbs that do not show any morphological distinctions between subjunctive and indicative past forms:

(i) *María veit/vissi að Ólafur leitaði að þér.* *leitaði* = PST. IND.3P.SG
Mary knows/knew that Olaf searched for you
'Mary knows/knew that Olaf **was searching/searched** for you.'

(ii) *María* ***vonaði*** *að Ólafur* ***leitaði*** *að þér.* *leitaði* = PST.SBJ.3P.SG
Mary hoped that Olaf searched for you
'Mary hoped that Olaf **was searching/would search** for you.'

33. Ironically, then, the monsters are omnipresent in natural language, its defining trait, if anything is. They are the basic ingredients of the powerful displacement property (in the sense of Hocket 1960, see also Hauser 1997: 211ff), setting human language apart from other signing systems. Without this property, storytelling, for instance in the form of a fiction or a scientific paper, would be impossible and so would much or most of everyday conversation. Even the hotly debated Pirahã people tell stories (of course) and it is not obviously relevant that their "stories about the past [only go] one or two generations back" (Everett 2005: 622). To be able to tell stories about one's grandparents is a nontrivial capacity – not shared by other species (as far as can be judged).

34. Research on early conceptual development is obviously only indirect, based on observable external markers in behavior, linguistic or non-linguistic (see for example Bowerman & Levinson 2001).

35. This is not only a theoretical but also in part an empirical issue: empirical observations (language learnability, interchangeability, etc., see Sigurðsson 2004a) suggest that 'digging' does not lead to any radical I-language differences.

36. Acquirers may well be excluded or isolated from some possible data in their surrounding E-language, such data drought leading to a historical E-change. Early I-language, in contrast, is a biological system, and normal individuals are, of course, not isolated from their biology (in any relevant sense). In addition, historical linguistics provides evidence that I-categories that have no exponents over centuries start getting expressed in ways that are not borrowed from any other linguistic community (see Bickerton 1999 on creoles, Sigurðsson 2004a on Icelandic, and Sandler et al. 2005 on the isolated Al-Sayyid Bedouin Sign Language in Israel). Developments of this sort would be mysterious if extended silence of grammatical categories led to the extinction of underlying I-categories. Rather, UG as well as the whole concept mine is accessible to all newborns, enabling them to construct their own I-language from scratch (the process later on being enhanced, perhaps altered in some ways, by experience of both E-language and other aspects of mind-external reality).

37. 'Externalization variation' covers 'silence variation' in the sense of Sigurðsson (2004a).

38. Notice, however, that this is quite distinct from assuming that the I-syntactic derivation is top-down (as in Chiesi 2007 and related work).

39. See also Wood (2012) for a more recent discussion of the Icelandic 'control issue'.

40. I cannot do any justice here to the extensive discussion of case marking in Icelandic and German in the literature (but, see, for example, Maling 2001; Wunderlich 2003; Sigurðsson 2012). Genitive and especially dative marking of direct objects is much more common in Icelandic than in German, accusative nevertheless being the most common case of Icelandic direct objects.

41. In Otto Jespersen's words (1992: 52, cited in Chomsky 1995: 3): "no one ever dreamed of a universal morphology."

42. For observations and discussions about these aspects of morphology, see Sigurðsson (2006, 2009).

43. Icelandic is an extreme example. Thus, for a comprehensive description of the noun declension minimally around 70 different paradigms are required, even if much morphophonological variation is disregarded (needless to say, the descriptions found in most Icelandic grammars are much simplified). It also makes extensive use of agreement of various sorts, including nominal agreement (adjectives, for example, commonly having around 30 distinct forms each, distributed across 144 inflectional slots).

44. Communication being "a more-or-less affair, in which the speaker produces external events and hearers seek to match them as best they can to their own internal resources" (Berwick & Chomsky 2011:40).

45. This would take us much too far afield; for some discussion, see Sigurðsson (2011a).

46. For some suggestions to this end, see Caha (2009, 2010).

47. The FOXP2 gene (cf. Berwick & Chomsky 2011; Piattelli-Palmarini & Uriagereka 2011) is presumably involved in surface externalization and surface processing rather than in deep transfer.

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Author's address

Halldór Ármann Sigurðsson
SOL, Centre for Languages and Literature
Lund University
Box 201, 221 00
Lund
Sweden