The Lexical Integrity Hypothesis
in a New Theoretical Universe

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0.   Introduction

Twenty five years ago, at the outset of generative morphology, the Lexical Integrity Hypothesis was a widely accepted part of the landscape for morphologists. The LIH, or the Lexicalist Hypothesis came in a number of different forms:

(1)   Lapointe (1980:8) *Generalized Lexicalist Hypothesis*
          No syntactic rule can refer to elements of morphological structure.

(2)   Selkirk (1982:70) *Word Structure Autonomy Condition*
          No deletion of movement transformations may involve categories of both W-structure and S-structure.

(3)   Di Sciullo & Williams (1987:49) *The Atomicity Thesis*
          Words are "atomic" at the level of phrasal syntax and phrasal semantics. The words have "features," or properties, but these features have no structure, and the relation of theses features to the internal composition of the word cannot be relevant in syntax – this is the thesis of the atomicity of words, or the lexical integrity hypothesis, or the strong lexicalist hypothesis (as in Lapointe 1980), or a version of the lexicalist hypothesis of Chomsky (1970), Williams (1978; 1978a), and numerous others.

Although there are slight differences in these formulations, they have a common effect of preventing syntactic rules from looking into and operating on the internal structure of words.

It should also be pointed out that at this early stage of discussion, a Weak Lexicalist Hypothesis and a Strong Lexicalist Hypothesis were often distinguished, the former merely stating that transformations could not look into word structure (i.e., derivation and compounding), the latter adding inflection to the domain of the LIH (Spencer 1991:73, 178–9).

Another possible statement of the earliest versions of LIH in terms of ordering can be found in Borer (1998:152–3):

(4)   "The way in which LIH is enforced in many of these models is by assuming that the WF component, as a block of rules, is ordered with respect to the syntax. The WF component and the syntax thus interact only in one fixed point. Such ordering entails that the output of one system is the input to the other. This

notion of the autonomy of the syntax and the WF component, and the restricted interaction between them, thus mimics the notion of autonomy developed for the interaction between the syntax and the phonology, where it is the output of the former which interacts with the latter."

We note that the earliest versions (Selkirk, both of Lapointe's versions, Borer's interpretation of the LIH) are of course stated in terms of the theoretical universe of the late seventies and early eighties. For all intents and purposes, syntax was a matter of ordered components, phrase structure rules and transformations, so to say that morphology and syntax did not interact was essentially to say that transformations could not look down into word structure and manipulate it. As Borer points out, if components are ordered and Morphology precedes Syntax, Lexical Integrity follows from the structure of the theory.

By the time we get to the mid-eighties, things are already a bit more complicated, with Government Binding / Principles and Parameters models expanding what we thought of as syntactic rules, principles, etc. Ordering is no longer a theoretical device, and by this time even the notion of what we mean by "component" is in question. In Bresnan and Mchombo's statement in the mid-nineties, all mention of transformations has of course been dropped. Nevertheless, the notion that words are unanalyzable units is still firmly entrenched.

(5)   "A fundamental generalization that morphologists have traditionally maintained is the *lexical integrity principle*, which states that words are built out of different structural elements and by different principles of composition than syntactic phrases. Specifically, the morphological constituents of words are lexical and sublexical categories – stems and affixes – while the syntactic constituents of phrases have words as the minimal, unanalyzable units; and syntactic ordering principles do not apply to morphemic structures." (Bresnan & Mchombo 1995:181)

All of these statements of LIH still have in common that they assume a firewall between morphology and syntax, in whatever form syntax takes.

We should also mention that the No Phrase Constraint (NPC), proposed by Botha (1983), is related to the LIH, in that it prohibits root compounds from containing syntactic phrases. However, as we will see below, there is ample evidence that this sort of data exists, and is derived productively, at least in Germanic languages.

In fact the two principles LIH and NPC were intended to prevent intramodular interactions: the LIH preventing syntax from "looking into" morphology and the NPC preventing morphology from "looking into" syntax. Both directions of possible interaction were forbidden. This separation historically was well motivated. Its main effect was to delimit specific and consistent fields of research. Now that morphology is a well-established domain, however, this aprioristic separation cannot be maintained, at least not in the form it was proposed, because the data discovered and studied in the meantime have proved that it was too strong.

Even very recent statements of the LIH are subtly different, and as we will show, still appear to be not quite right. Given the formulation of LIH of Anderson: "the syntax neither manipulates nor has access to the internal structure of words" (Anderson 1992:84), Booij (2005) proposes to split the LIH in two parts:

(6)   a.   Syntax cannot manipulate internal structure of words.

         b.   Syntax cannot enter into the internal structure of words.

Spencer (2005: 81) also proposes a two-part statement of the LIH:

(7)   *Revised Lexical Integrity*:
        syntactic rules cannot alter the lexical meaning of words (including argument structure); syntactic rules have no access to the internal structure of X^0 categories.

The data we will review here suggest that while (6a) is true, (6b) is not, and that although the first clause of (7) may be correct (syntactic rules cannot alter the semantics of words), the second one cannot be (syntactic rules have no access to the internal structure of X^0 categories).

        We have a number of reasons to think that this is a good time to reassess the LIH, and that even the most recent statements of the LIH are not quite right. The first is that over the years a number of sorts of data have been uncovered that call the LIH into question. We need to highlight what these data are, and just what kind of threat they pose to the LIH. The second is that the theoretical universe in which we find ourselves is vastly more complex these days. Not only are there a number of competing models of syntax to assess – all roughly within the generative rubric – but there are also a number of different models of morphology which embrace or deny the LIH to different extents. In this theoretical universe we have any number of ways in which we can understand the notions of syntactic rule and morphological rule.

        We will first take up the nature of the problematic data, and then we will try to untangle this new theoretical universe. Both are of course tasks too big for this talk, but we will at least try to sort out some of the issues that arise within different possible frameworks. In the end, we will try to assess what the LIH amounts to a quarter century after its first statement.

        Given the data that we will show, we think it's likely that we need to say that morphology and syntax can interact in both directions; we wish to take a more 'mature', less ideological look at data that have been amassed in this period of intense morphological research. We will show in what follows that we know that morphology and syntax interact, and that this interaction is not a one way affair: morphology sees syntax and syntax sees morphology. Nevertheless this two way interaction is highly constrained. Our goal, then is not so much to come up with a theoretical framework that will predict this interaction – although we will make a tentative suggestion – but rather, as closely as we can to assess what the scope and limits of a new LIH should be. We start by assessing some relevant data, and then proceed to assess theoretical possibilities and where they leave us.

1.   Data

One difficulty we have at the outset is that the amount of data that could enter into this debate is potentially vast. In this talk we cannot hope to highlight all of it. We have therefore chosen some areas that we think are particularly important for our assessment, fully realizing that there might be other types of data that will again force us to change our minds. Specifically, we have chosen a number of cases that we consider to be very strong challenges to the LIH, as well as a few others that we feel to be quite revealing. We leave aside others which we feel are less convincing, among them cases like noun incorporation in various languages (e.g. Baker 1988 and much other literature) or resultative verbs in Chinese (Li 2005) which – although they may be consistent with syntactic analyses – yield nicely to morphological analyses as well (cf. Borer 1998:166). Similarly, we leave aside cases like English synthetic compounds or conversion verbs, which have been analyzed syntactically, but clearly need not be.

1.1.   Phrasal Compounds in English

One kind of data that has offered a strong challenge to the LIH is the phrasal compound. Phrasal compounds (cf. Lieber 1992) are compounds headed by a noun with a phrasal non-head. They can occur quite freely in Germanic languages (and in fact most of the known data come from English, German, Dutch and Afrikaans). Consider the data in (8):

(8)   a *pipe and slipper* husband   a *floor of a birdcage* taste
         over the fence gossip   *in a row* nests
         a *slept all day* look   a *who's the boss* wink
         God is dead theology

Lieber argued in her 1992 book that phrasal compounds offer a strong argument in favor of abandoning the LIH entirely, but even she now thinks that that position is too strong. Nevertheless, we think that phrasal compounds still tell us a great deal about what is right about the LIH and where it is wrong.

One way in which theorists have sought to maintain the LIH in the face of this data is by explaining it away – in some sense denying that these are compounds, or that they are productively formed. As an illustration, let us give Bresnan and Mchombo's take on phrasal compounds.

While they have no trouble in acknowledging that these are indeed compounds, they argue that the phrasal constituent either is lexicalized or can be lexicalized on the spot:

(9)   "In sum, we suggest that true phrasal recursivity is lacking in word structure. Where syntactic phrases appear to undergo morphological derivation, it is by virtue of their being lexicalized. Although lexicalization can be innovative, the non-syntactic status of lexicalized phrases embedded in word structure can be detected in properties such as lexical gaps, and can be confirmed by the other lexical integrity tests." (Bresnan & Mchombo 1995:194)

Bresnan & Mchombo (henceforth B&M) argue that phrases within compounds often have the flavor of quotations, and can include foreign phrases. Some phrases do seem quotative or contain a foreign phrase (or both!, e.g., *Ich bin ein Berliner speech*), but certainly not all of them, and as for the presence of foreign phrases or words, these can occur in syntactic collocations as well, as the literature on code switching shows us. B&M also point out that pronouns used within the phrasal part of the compound do not refer, as pronouns usually do – but again, this is not surprising, since it is a well-known characteristic of compounds that the non-head constituent of a compound has no independent reference (so in a compound like *catfood*, the stem *cat* cannot refer to any particular cat). Finally, they point to what they call "lexical gaps" citing forms that they've made up and asserting that they are much less plausible as phrasal compounds than other examples. We are skeptical of this argument as well, as it often turns out that words that seem odd to us out of context can be used given sufficient context.

The most problematic part of B&M's claim is that where phrases are not obviously fixed or quotative, they can be innovatively lexicalized. This is a truly odd claim: it amounts to saying that any phrase that is used in a compound is instantaneously listed (before the creation of the compound?), and therefore can qualify to be incorporated into the compound. It's hard to see what this claim amounts to. And in any case it requires a completely new view of what we mean by "lexicalization".

In contrast to B&M, Hohenhaus (1998) has argued that certain sorts of compounds – phrasal compounds among them – are largely *non-lexicalizable*. Non-lexicalizable formations, according to Hohenhaus, are ones that are context-dependent; often they are nonce formations. Further, they frequently occur only in a restricted realm – say, conversation rather than written forms. They occur on the fly. We are rarely aware of them. And as they tend to be conversational, we are possibly less aware of them than words we see in print.

Our conclusion is that the existence of phrasal compounds still offers a challenge to the LIH, or at least to some forms of it.

1.2.   Conjunction in English Derivation and Compounding

Germanic languages have other expressions which might be analyzed as phrases within words, specifically conjunctions within synthetic compounds:

(10)   a.   a truck driver

        b.   a [[car and truck] driver]

As with the phrasal root compounds discussed above, they still seem to be compounds, and as such, they pose a problem for LIH.[1] Interestingly, the type of phrase that can occur as the non-head is far more limited than those that occur in phrasal root compounds. While conjunctions are permitted, it is not the case that just any NP can be the non-head. For example, it is not possible to have a non-head which is modified by and adjective, as in (11):

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[1] Interestingly, Ackerman & LeSourd (1997) suggest that constructions of this sort in Hungarian do not contain phrasal constituents, but rather that conjunction can happen at any level, including the X^0 level. If so, we would remove this case from our list of challenges to the LIH.

(11)   a [[red truck] driver]

We will return to what this means below.

Spencer (2005:82) (cf. also Strauss 1982), points out a similar problem for derivation in English, citing examples such as those in (12)

(12)   a.   pre- and even to some extent post-war (economics)

        b.   pro- as opposed to anti-war

        c.   hypo-but not hyper-glycemic

Spencer notes that the prefixes that allow this sort of conjunction are relatively limited (one can't conjoin *un-* and *re-*), for example, and considers using the traditional designation of "prefixoids" for them. For our purposes, it doesn't matter whether we call these prefixes, prefixoids, or something else (semi-words). The inevitable point seems to be that they constitute a clear violation of the LIH, as do cases of so-called *Gruppeninflection* or "suspended affixation" (Spencer 2005:83) which seem to constitute a similar phenomenon, albeit concerned with inflection rather than word formation.

*1.3.   Italian "trasporto latte"-*type *Constructions*

Italian also has a sort of construction that poses a strong challenge to the LIH. Consider the following data:

(13)   *arruolamento volontari*   'volunteers enlistment'
        produzione scarpe   'shoes production'
        trasporto merci   'goods transportation'
        asporto rifiuti   'litter removal'
        elaborazione dati   'data processing'

We can subject these forms to some of the classic tests (cf. ten Hacken 1994) that distinguish lexical forms from syntactic ones. These tests are:

(14)   i.   conjunction
        ii.   wh-movement of the head and the non-head constituent
        iii.   non-head topicalization
        iv.   pronominal reference

(15)   Test i.: conjunction:
        a.   *il   trasporto   passeggeri e il   ___ merci sono fallimentari*
                the transportation passengers and ___ goods are   not convenient
                in   questa   stagione
                in   this   season
                'passenger and freight transportation are not convenient in this season'

b.　　*la produzione carta e la ___ schede sono in piena attività*
　　　the production paper and ___ cards are in full　service
　　　'paper and card production are in full service

c.　　*l' elaborazione dati e la ___ programmi richiedono tempi lunghi*
　　　the elaboration data and ___ programs demand　long times
　　　'data and program elaboration demands long times'

(16)　Test ii.: wh-movement of the head (a-b) and the non-head constituent (c-d)
　　　a.　　*che cosa ___ carta è stata sospesa?*
　　　　　what　　　paper has been stopped?

　　　b.　　*che cosa ___ passeggeri è efficiente?*
　　　　　what　　　passengers is efficient?'

　　　c.　　*cosa produzione ___ è stata sospesa?*
　　　　　what production　　has been stopped?'

　　　d.　　*cosa trasporto ___ è efficiente?*
　　　　　what transportation is efficient?'

(17)　Test iii.: non-head topicalization
　　　a.　　*carta, è stata sospesa la produzione ___.*
　　　　　paper has been stopped the production

　　　b.　　*passeggeri, è efficiente il trasporto ___.*
　　　　　passengers, is efficient the transportation'

(18)　Test iv.: pronominal reference
　　　a.　　*il trasporto passeggeri$_i$ è efficiente, e noi li$_i$ conosciamo*
　　　　　the transportation passengers is efficient, and we them know
　　　　　'passenger transportation is good, and we know them'

　　　b.　　*la produzione carta$_i$ ha avuto un notevole sviluppo, ma noi non*
　　　　　the production paper has had a good growth, but we do not
　　　　　la$_i$ compriamo
　　　　　it buy
　　　　　'paper production had a good growth but we do not buy it'

As illustrated, three of the four tests give ungrammaticality and we are therefore tempted to conclude that the constructions under examination are compounded words. But if we apply the test of insertion/modification, which is traditionally the main test of cohesiveness, we find the following situation:

(19)　a.　　*produzione accurata scarpe*
　　　　　production accurate shoes
　　　　　'accurate shoe production'

b. *produzione   scarpe   estive*
    production   shoes   summer
    'summer shoe production'

c. *produzione   accurata   scarpe   estive*
    production   accurate   shoes   summer
    'accurate production summer shoes'

d. **produzione   limitata   nel tempo   scarpe*
    production   limited   in time   shoes'
    'a limited in time shoe production'

Items of this sort are thus transparent to insertion/modification (though with some restrictions, since insertion/modification seems to be limited to only one adjective). An adjective can modify the first noun (19a), the second one (19b) or both (19c). What is impossible, however, is the insertion of anything other than an Adjective. Even a parenthetical is not allowed (19d).

Summarizing, the test results given for the three different kinds of expressions are illustrated in the following table:

(20)

	PHRASES	COMP-LIKE PHRASES	COMPOUNDS
CONJUNCTION	+	−	−
WH-MOVEMENT	+	−	−
TOPICALISATION	+	−	−
INSERTION	+	+	−
PRON. REFERENCE	+	−	−

According to four of the five tests these constructions are more similar to compounds than to phrases. Nevertheless, our sense is that these are not phrasal compounds akin to the Germanic cases – the types of phrases that occur internal to the compound are restricted to ones in which either the head or the non-head noun is modified by an adjective. If anything, they are more akin to the English phrasal synthetic compounds, in which the non-head is highly restricted in its nature – in the English case, limited to conjoined Ns. Although we don't have the space here for a full analysis, we believe that these Italian compound-like structures would best be dealt with as a sort of construction in the sense of Booij (2005), involving a fixed template for the phrasal element, which is then down-graded to a word, following the schema in (21):

(21) $[[[N] [N(A)]]_{NP}]_N$ or $[[[N(A)] [N]]_{NP}]_N$
      $[[[produzione] [scarpe estive]]_{NP}]_N$ $[[[produzione accurata] [scarpe]]_{NP}]_N$
         production   shoes   summer   production accurate   shoes

We will return below to what this analysis means in terms of a theoretical model. To summarize to this point: it seems so far that there is good evidence from compounds and compound-like expressions in several languages which indicates interaction between morphology and syntax, specifically that morphology must be able to "see" into syntax or that syntax may "feed" morphology.

1.4. Phrasal Derivation in Various Languages

The jury is still out, however, on the possibility of derivation on phrasal bases. Certainly there is little support for it in Italian, where the phrases to which affixes can be attached really do seem to be lexicalized, cf. (22):

(22) a. menefreghismo   'I don't care-ism'
           *cenefreghismo   '*we don't care-ism'

      b. cento metrista   'runner of the hundred meters'
           *centoventimetrista '*runner of a hundred twenty meters'

As for English, it appears that phrasal derivation is at very best limited. There are certainly a few examples in which the suffix *-ish* seems to attach to a phrase. Spencer (2005:83), for example, says the following:

(23) "Another type of deviation from strict lexical integrity is found when an affix apparently attaches to a whole phrase, as in *a why-does-it-have-to-be-me-ish expression*. I am not aware of any serious study of such formations, and their status is unclear to me. A cursory internet search reveals large numbers of such coinings, though it also reveals that for some speakers *-ish* has become a free morpheme with roughly the meaning 'approximately'"

It's not hard to find fixed expressions with the affix *-ish* such as the one in (24a), but (24b) sounds less plausible, and our search of the internet turned up fairly few *-ish* forms on phrases (24c):

(24) a. old maidish

      b. ?young girlish

      c. self-sufficient-ish, $50M-ish, New Years Day-ish, Space Hulkish Report Don's Long-Awaited Photo Tutorial-ish Thing

If anything, it seems possible to attach *-ish* to names – for example *Shelly Lieber-ish* doesn't sound all that bad, or even *Lieber and Scalise-ish* if it were known, for example, that we were in the habit of working together. But it's hard to document productivity on real phrases in this case. At best we would have to say, with Spencer, that not enough work has been done.

As for other languages, Ackema & Neeleman (2004:11) mention a case in Quechua where a particular affix attaches to phrases to nominalize them. This case is

perhaps a promising example of derivation on a phrasal base, but as yet we know too little about it to assess how much of a threat it poses to the LIH.

Finally, it is less difficult to find examples where inflections seem to attach to the outsides of phrases, for example, the English genitive. In any case, to the extent that phrasal derivation (or inflection) is attested, we will assume that it has a structure like that in (25):

(25)   [[YP] X]$_X$ *or*   [X [YP]]$_X$ *or*   [[YP] X]$_Y$ *or*   [X [YP]]$_Y$

In the first two cases, we assume that X is the head, and in the last two that X is the non-head.

1.5.   *Kageyama's Word Plus (W+) Data*

Another set of data that poses a challenge to LIH can be found in the work of Kageyama (2001). The so called Word-Plus cases are complex phrase-like expressions involving prefixation and compounding, or a mixture of both which show properties of both morphological and syntactic constructs:

(26)   *Morphological properties of W+*:
   - syntactic atomicity – lexical integrity (neither modification nor deletion of constituents)
   - absence of case marking

   Syntactic properties of W+:
   - syntactic internal semantic relations, sentence level anaphora, phrase-like accent contour
   - internal pauses indicating constituent boundaries

(27)   a.   *zén | gaimu- dáizin*   *hán | taiséi*
              ex- foreign minister   anti- establishment
              'ex-foreign minister'   'anti-establishment'

        b.   *Yomiuri-Kyozingun | toosyu*   *booeki- gaisya | syatyoo*
              Yomiuri Giants   pitcher   trading-company president
              'a pitcher of the Yomiuri Giants' 'a president of a trading company'

        c.   *Yomiuri-Kyozingun-no toosyu*   *booeki-gaisya-no   syatyoo*
              Yomiuri Giants-GEN   pitcher   trading-comp.-GEN president

In (27a) we find examples of W+ with prefixes (note that here the prefix bears a main stress of its own, and it is followed by a pause, indicated by " | "); in (27b) we find examples of compound W+, which, in contrast with the corresponding phrases in (27c) lack case marking and are subject to syntactic atomicity.

Kageyama proposes to treat these contradictory expressions as a new category of words, Word Plus (W+), which are larger than words (X^0) but nonetheless constitute a morphological object distinct from phrases (X'). The category W+, rather than X^0, is the maximal projection of morphological structure. We suspect, however, that the former

two cases might plausibly be analyzed as prefixation (27a) and compounding (27b) on a phrasal base, along the lines shown in (25).

1.6.   Scope in Spanish Prefixation

Another sort of data challenging LIH has been noted for Spanish prefixation (Rainer & Varela 1992; Felíu & Fábregas 2003; Kornfeld & Saab 2003):

(28)   a.   *el* [***ex**- [futbolista del Barça*]NP]
                the ex- footballer of Barça
                'the former Barça footballer'

        a'.   *comisión* [***pro**- [legalización de las drogas*]NP]
                committee pro- legalization of the drugs
                'pro- drug-legalization committee'

        b.   ***inter**-comunicación departamental*
                (argumental reading)   'reciprocal communication between departments'
                (locative reading)   'communication between people in a department'

        b'.   *comunicación **inter**-departamental*
                (argumental reading)   'reciprocal communication between departments'

Work on these affixes has noted two types of phrasal scope: as shown in (28a-a') although phonologically prefixation takes place on the N head of an NP, semantically the prefix affects the whole NP. It also appears that when the prefix *inter-* is attached to a predicate's argument (cf. (28b') vs. (28b)), it has obligatory semantic scope over the whole NP. Similar data can be found in English:

(29)   a.   postinfluenzal, premeditiation
                [[post-influenza]al]

        b.   post dog show coffee
                [[post [dog show]] coffee]

        c.   post digestive disorder complications
                [[post[digestive disorder]]complications]

        d.   pre and post FDR era
                [[pre and post] [FDR era]]

        e.   pre and post synaptic dopamine function
                [[[pre and post]synapt]ic]

(30)   my ex-car

In (29a), *post-* seems to have scope over the stem *influenza*; *postinfluenzal* means 'pertaining to the period after influenza'. In (29b), *post-* has scope over the compound *dog show*. In (29c) it appears to have scope over an entire phrase *digestive disorder*. Further, note that in (29d) the conjunction of *pre and post* has scope over a compound and in (29e) it has scope over the stem *synapse*. We have already mentioned the challenge to the LIH posed by conjoined prefixes. The fact that such prefixes (or whatever we call them) can take scope over phrases further suggests strongly that there is interaction – in this case between morphology and semantics.

The behavior of the prefix *ex-* also exhibits scopal properties in English, and strengthens the conclusion we draw from *pre-* and *post-*: *ex-* can take scope over a possessive pronoun rather than the stem to which it attaches. So, for example, in (30), in the phrase *my ex-car* the car in question is still a car, but it is no longer mine.

All this data suggests that we cannot build an absolute firewall between morphology and syntax. Neither, however, do we want to allow free interaction between morphology and syntax or to say that morphology can be reduced to syntax. We therefore need to consider what our options are.

1.7. Sublexical Co-reference

Another area in which there has been dispute about lexical integrity concerns coreference into complex words, the so-called Anaphoric Islands type of data. Lieber (1992) argues that this data also falsifies the LIH, at least if one speaks a dialect in which coreference is allowed in sentences like (31):

(31)   Clinton$_i$-ites no longer believe in him$_{i,j}$.

Of course, there has been long dispute over both the judgments and the analyses of this case, so we will not go further into it here. We note simply that further investigation is needed on various factors which seem to influence judgments, including differences between derivation and compounding, the type of syntactic construction involved, the typology of the language in question, the productivity of forms, and so on. This is just to point out the scope of the data that might need to be accounted for.

2.   Theory

One of the things that makes a reassessment of the LIH so challenging at this point is that – as we have noted above- we have available to us not only multiple theories of syntax to consider, but also multiple theories of word formation. It is impossible to reassess the LIH without considering a multitude of possibilities.

As an example, certain syntactic theories virtually force an abandonment of the LIH. One of these, as we see it, is Minimalism. Minimalism (where what we mean is the strict Minimalism of Chomsky 1995) requires words to come fully inflected from the lexicon. As Marantz (1995:379) expresses one view of minimalism:

(32)   "Under the MP, all inflected words are formed in the lexicon. The question arises, then, whether all explanations of the distribution of morphemes within words should be left to whatever principles govern affixation in the lexicon. In addition, Chomsky explicitly limits the computational system to the path from lexical resources to LF. If any operations on tree structures occur between Spell-Out and PF, they would seem to fall outside the mechanisms, if not the principles, characteristic of the computations in the syntax proper."

Chomsky himself has varied on the location of morphology, at various points (1995:133) claiming that inflection is syntactic, but more recently (1998) maintaining that inflection is in the lexicon. In his (1995) book, Chomsky says in an offhand way that derivation is probably in the lexicon. Nevertheless, this claim is at odds with what Chomsky claims elsewhere. Specifically, if computation is restricted to the syntax proper, and we assume that some sort of computation is involved in the generation of derived words or compounds, it appears that derivation and compounding must be syntactic. Minimalism is incompatible with the LIH, then.[2]

Distributed Morphology (DM) is a Minimalist-sympathetic framework that rejects the LIH outright (cf. Harley & Noyer 1999), but rejects as well the notion that forms are pulled fully inflected from "the lexicon." Within DM, inflection and derivation are separated from what Halle & Marantz (1993) call Vocabulary Insertion. The former involves the manipulation of features within a syntactic tree, with Merge and Move as possible operations. The latter is a matter of Spell-out, which happens late in the derivation (Marantz 1995:379):

(33)   "In proposing and detailing the theory of 'Distributed Morphology,' Halle and Marantz (1992) suggest that functional heads like Tense and AGR should in fact serve as the locus of lexical ('Vocabulary') insertion and that all word formation should occur in the syntax, as a result of the syntactic combination of heads. In addition, we argue that the operations taking place in a derivation between Spell-Out and PF are of the same sort and obey the same principles as the operations in the rest of the syntax."

Our chief objection to DM is that it is untested with respect to the kind of data we have outlined in this talk. As Spencer (2005) points out, much of the literature on DM is unpublished, or available only from websites, and we would add that very little of what

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[2] Note too that this turns on its head a weaker version of LIH advocated by Anderson in which derivation and compounding are lexical, but inflection is syntactic!

is published is explicitly concerned with derivation and compounding, as opposed to inflection. Of course, proponents of DM are free to explicitly reject the LIH, but in doing so they must explain why the data for syntax/morphology interaction appears to be so limited. In frameworks such as DM we should expect a much freer interaction between word formation and syntax than we actually find.

Other syntacticians with clear Minimalist sympathies continue to embrace the LIH, or at least to accept it in a modified form, however. We have in mind here the recent work of Yafei Li (2005). Li allows some minimal interaction between morphology and syntax, proposing a principle which he calls *The Morphology-Syntax Mapping Hypothesis (MSMH)*:

(34)   Li (2005:4) *The Morphology-Syntax Mapping Hypothesis* (MSMH)
        If morphological components X and Y are in a word W and there is a relation R between X and Y, then R is reflected in syntax if and only if:
        a. R is thematic, and
        b. the representation of R in syntax obeys all syntactic principles.

In effect, words are invisible to syntax unless there is a thematic relation expressed sublexically. Things like noun incorporation and the formation of applicative verbs are therefore legitimate fodder for the syntax. Li goes into great detail on the ways in which such constructions obey syntactic principles, but he is conspicuously silent on just what the morphological component looks like, what form morphological rules take, and indeed whether there is actual computation involved in non-syntactic morphology. Significantly, his proposal for the limited interaction between morphology and syntax does not help us with some of the data sets that we outlined above.

For example, with respect to phrasal compounds, since there is no thematic relation between the phrase that forms the first element of the compound and the second stem, we must assume that Li's theory would still prevent syntax-morphology interaction. This leaves open what sort of derivation we could propose for phrasal compounds within his theory.

Also roughly within the realm of Minimalist Syntax falls the work of Ackema & Neeleman (2004)(henceforth A&N). However, their work is much more explicit about the contents of the morphological component (or subcomponent) and the nature of the interaction between morphology and syntax.

A&N (elaborating a proposal put forth by Jackendoff 1997:39) propose that the grammar is constituted by three modules (syntax, semantics and phonology) but that each contains "a submodule that generates phrasal representations and a submodule that generates word-level representations" (2004:3). The main idea is that morphology is a "set of submodels within these bigger modules" (2004:6).

Morphology and syntax can thus share common principles – for example, a vocabulary of features and a process of merger -- but they can at the same time be based on different principles. Nevertheless, A&N argue that there can be a number of different types of intramodular interactions between morphology and syntax: first, words and sentences consist of a certain amount of shared vocabulary (certain features, the notion of Merge, etc.); second, word syntax and phrasal syntax are in competition (2004:9); and finally, the process of insertion works both ways between morphology and syntax: words can of course be inserted into syntactic structures, but it is also possible for phrases to be inserted into words (2004:10).

A&N maintain that the LIH is basically correct (2004:109). Their arguments are largely theory internal, in the sense that the structure of complex words – according to them – is invisible to syntax because syntax builds up the "host structure" and morphological complex words are inserted into this structure. But principles operative in the host structure are insensitive to the structure of words. For example, they claim that the head of a complex predicate cannot itself be complex (35a) (what they refer to as a "complexity constraint"), but this principle is not valid for morphological complex words (35b) (2004:33–4):

(35) a.   dat   Jan   en   Piet   [samen werken]
            that   Jan   and   Piet   together work

            dat   Jan   en   Piet   het voorstel   [uit werken]
            that   Jan   and   Piet   the proposal   elaborate

            *dat   Jan   en   Piet   het voorstel   [uit [samen   werken]]
            that   Jan   and   Piet   he proposal   out together work

      b.   dat   Jan   de   foto's   [ver groot]
            that   Jan   the   pictures   enlarge

            dat   Jan   de   foto's   [uit [ver groot]]
            that   Jan   the   pictures   up   enlarge

A&N therefore make a good case for differentiating between syntactic and morphological complex heads. Nevertheless, it is not clear to us that their treatment either of insertion or of competition is sufficiently restrictive. For example, with respect to insertion, their analysis of phrasal compounds seems to us to have a number of problems. A&N's rule for root compounding is that in (36)

(36)   Structure for compounds (A&N 2004:80)
         $<_M \alpha \beta >$

This basically says to merge two objects and count them as a morphological object. Presumably this means that these can be any two things – lexical or phrasal. A&N also seem to allow the notion of feature matching between a lexical node in a compound and a phrase that is inserted into that compound. But given the range of phrases that can occur in phrasal compounds, it's hard to see how this would work. For example, phrasal compounds allow PPs and CPs in the non-head position. In the former case, we would have to allow a sort of compounding that is all but ruled out in English. In the latter case, it's unclear what would be matched at all.

As for securing adequate restrictions on the insertion of phrases as the base of affixation, A&N rely on their notion of distributed selection. If an AFFIX (a morpho-syntactic affix) corresponds to a phonological word, then it should be able to attach to any phrase, and not just to the head of the phrase. If an AFFIX does not correspond to a phonological word, it will only be able to attach to the head of the phrase. There are two problems with this. First, A&N give us no criteria for determining what AFFIXES count as phonological words – certainly an affix like *-hood* should in English. Yet *-hood*

certainly does not allow a phrasal base. Further we have the impression that for AFFIXES that are not phonological words, A&N's theory still overgenerates wildly. It should be possible on their story to generate words like those in (37).

(37)   [[untrained military]ize]   [[highly humid] ify]

It is also not clear to us that A&N's notion of competition is the right way to breach the firewall between morphology and syntax. According to A&N, morphology and syntax are in competition, and all other things being equal, syntax takes precedence. This means that, for example, the verbal compound *truckdrive* is blocked by the existence of a syntactic phrase *to drive trucks*.

   Our problem with A&N's notion of competition is that it drives them to a rather odd analysis of derivation and compounding in English. A&N argue that derivation – i.e., word formation by means of affixes – is lexical because the semantic effect of affixation is unpredictable and because derivation does not always preserve the argument structure of the base. Root compounds are derived in the lexicon because the semantic effect of root compounding is also indeterminate. From this we can conclude that one criterion for a word formation process being lexical is semantic unpredictability.

   Oddly, however, A&N then argue that synthetic compounds are also derived lexically – they must be, in their system, because they involve the addition of an affix to a [NV] compound, even though the semantic effect is utterly predictable. Further, we can point to various affixation processes which are semantically utterly regular and which preserve argument structure (-*er* affixation in English for example). Given the existence of such affixes, it appears that the alignment of semantic irregularity with morphological derivation and semantic regularity with syntactic derivation is an arbitrary move on A&N's part, without which the notion of competition would not work. We are forced to conclude that although A&N make an excellent attempt to rework the LIH in such a fashion that it makes sense of some of the examples that have plagued morphologists over the last twenty years, they still have not arrived at the right restrictions.

   Of course, not all syntacticians embrace the Minimalist paradigm – far from it. And it's clear that our discussion of the morphology/syntax interaction now needs to be attentive to these theories as well. One theory that comes to mind is that of Construction Grammar.

   Goldberg (1995) argues that the trend in G-B/P&P and later Minimalist syntax to consider constructions an epiphenomenon of the interaction of more general rules and principles attributes too much semantic weight to individual lexical items. In particular, Goldberg argues that the traditional notion of construction is still an important one, and that individual constructions are associated with a meaning that is independent of particular lexical items. For example, the intrinsic meaning of the "caused motion" construction allows us to extend the use of a non-motion verb like *sneeze*, as in (34) (Goldberg 1995:3):

(38)   Pat sneezed the napkin off the table.

That is, the verb *sneeze* itself has no motional component in its meaning. This part of the meaning of the sentence must be attributed to the construction itself.

Constructions need not only be syntactic objects, however. Goldberg in fact recognizes no firewall between syntax and morphology (1995:7):

(39)   "In Construction Grammar, no strict division is assumed between the lexicon and syntax. Lexical constructions and syntactic constructions differ in internal complexity, and also in the extent to which phonological form is specified, but both lexical and syntactic constructions are essentially the same type of declaratively represented data structure: both pair form with meaning. It is not the case, however, that in rejecting a strict division, Construction Grammar denies the existence of any distinctly morphological or syntactic constraints (or constructions). Rather it is claimed that there are basic commonalities between the two types of constructions, and moreover, that there are cases, such as verb-particle combinations, that blur the boundary."

It is not entirely clear what constitute particular morphological as opposed to syntactic constraints, as Goldberg is not concerned with morphology in her book, but it seems clear that Construction Grammar pushes us towards at least a partial rejection of the LIH.

Goldberg's ideas have recently been extended to morphology by Booij. In particular in a recent article, Booij (2005) argues that there are constructions in Dutch which involve both an idiosyncratic syntactic element and an idiosyncratic morphological element. One such construction is the Quantifier Adjective-s construction, as illustrated in (40):

(40) $[Q \ldots [A\text{-}s]_N]_{NP}$

iets leuks   'something nice'
niets moois   'nothing beautiful'
wat zoets   'something sweet'

Booij points out that there are a number of odd things about this construction. First, there are a limited number of quantifiers that can occur in it. Second, the suffix *-s* does not normally attach to adjectives. Booij argues that in this case the *-s* is a category-changing inflection. The fact that the construction seems to have both idiosyncratic syntactic aspects and idiosyncratic morphological aspects therefore calls into question the LIH, at least insofar as it rules out syntax having access to word internal structure. (Booij still agrees that the LIH should exclude syntax overtly manipulating word internal structure – for example movement).

A major issue that remains unresolved in Construction Morphology, however, is the issue of computation or generativity. Goldberg is fairly explicit that constructions are created and learned on the basis of analogy (1995: 70–2, 123), rather than generated. We would assume the same to be true of morphological constructions. In contrast to this, generative syntax is based on the notion of computation, rather than analogy, and computation involves some sort of notion of 'rule'.

Similarly, generative morphology embraces the notion of rules, at least for highly productive morphological processes. There may be and have been fierce

disagreements over the formal nature of these rules, but the basic idea is that both syntax and morphology involve rule-based computation, some version of what has come to be called in recent parlance "Merge". This is such a fundamental difference between the two types of frameworks that it's difficult to see the impact this would have on the LIH.

At this point, we are willing to propose that there are indeed things in both syntax and morphology that we would call "constructions", for example, our case of the Italian compounds and Booij's construction for morphological examples, and the "Verb X's way PP" construction in (41):

(41)   *V X's way PP:*
        Fred sneezed his way out the door

We are not, however, willing to concede that because there are some constructions in morphology and syntax that *all* of morphology and syntax should be constructional. It has yet to be shown that independent meaning can be attributed to every syntactic or morphological pattern. Rather, we believe that a constructional approach should be reserved for cases like the ones we've described which are open in certain respects, but quite limited in others.

Meanwhile, for those of us who have become skeptical of syntactic analyses of word formation and who also reject the premise of Construction Grammar that morphology is analogical and declarative rather than generative, what theories do we have at our disposal? Where does all of this leave us with respect to the LIH? The data show us that the interaction between word formation and syntax goes both ways, but that nevertheless it is quite restricted. This is the biggest problem that faces us, and to resolve it we must take stock of what our data really tell us.

We use the table in (42) to summarize a range of cases that have been brought to bear on the LIH, even beyond the ones we have mentioned here, categorizing them according to our assessment of the strength of the challenge they pose. We summarize the cases we think are strong in (43), leaving out cases such as Booij's where what is at stake is arguably inflectional. Our hope in doing this is that by putting together many different examples that have been discussed independently, a clearer pattern will emerge from which we will be able to assess what a new version of the LIH should look like:

(42)

Strong challenges (i.e. concerns productive class, not lexicalized, no good uni-modular analysis)	**Possible/weak challenges** (i.e. class is not productive, examples tend to be lexicalized, or judgments tend to be murky)	**Probably not a challenge** (i.e., class is clearly not productive, or a reasonable uni-modular analysis is available)
NON-INFLECTIONAL		
Phrasal compounds in English, German, Dutch, Afrikaans	Phrasal derivation in English	Resultative V-compounds in Chinese (can be analyzed morphologically)
Insertion/modification into *trasporto latte* constructions in Italian	Compound prefixes in English	Most synthetic compounds in English (can be analyzed morphologically)
Kageyama's W+	Sublexical co-reference in English	Clitics (can be analyzed syntactically)
Quechua nominalizations (A&N)	Phrasal stress on English root compounds (Giegerich)	Noun incorporation (morphological analyses are reasonably strong)
Scope in prefixes		Phrasal derivation in Italian
Conjunction in compounds and prefixed words in English		Causatives (some analyzed as syntax, others as word formation, on language specific basis)
		Verb-particle constructions (some analyzed as syntax, others as word formation, even in the same language, cf. A&N on Dutch)
INFLECTIONAL		
Agreement features in East Netherlandic dialects (A&N: 11)		English genitive (can be analyzed as a clitic)
iets leuks construction in Dutch		
Gruppeninflection or "suspended affixation" (like English conjoined compounds above, but inflectional)		

If, now, we take only those cases that we think are the strongest challenges to LIH, we can categorize them according to the type of inter-component interaction that they imply:

(43)   a.   Morphology has access to Syntax
- syntactic phrases within words (phrasal compounds)
- insertion/modification into trasporto latte constructions (Italian data)
- conjunction in compound and prefixed words in English
- Quechua nominalizations on phrases (nominalizing suffix selects for phrasal base)(Lefebvre & Muysken 1988)

       b.   Syntax has access to Morphology
- Quechua nominalizations : position of verb is dependent on whether VP is nominalized or not.
- Agreement in East Netherlandic dialects: word order is dependent upon choice of inflection (or vice versa ?).

       c.   Morphology/Semantics interactions
- scopal properties that go beyond the boundaries of a word
- anaphoric properties of sublexical elements (Kageyama 2001)

       d.   Morphology/Phonology interactions
- phrase level phonology operating within word (Kageyama 2001)

One interesting thing to note about these examples is that only examples in (43a) and (43b) have to do with the morphology/syntax interface with which the LIH was originally concerned. The (43c) examples might conceivably be characterized as concerning the morphology/ semantics interface and the (43d) example the morphology/phonology interface. If so, the original LIH was silent on these, and we might consider whether any new formulation of the LIH should pertain to them at all. Perhaps the jury is still out on this sort of interaction in the absence of systematic study.

     The examples in (43) point to the fact that there is interaction between morphology and syntax, but that it is not free, as illustrated in option (44a). Rather, it is it circumscribed (44b). If we can identify the nature of this circumscription, we can come closer to having a new formulation of the LIH.

(44)   a.

      b.
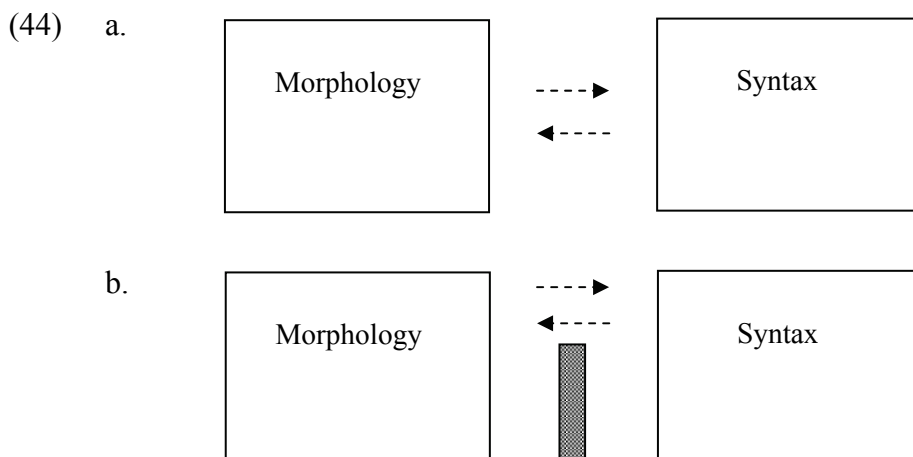
Descriptively, a generalization might go something like this:

(45)   *Towards a new LIH:*
         Syntax and morphology are normally blind to each other. However, limited intermodular access may be allowed by virtue of allowing configurations like:

         a. $[[XP] Y]_Y$ / $[Y [XP]]_Y$
         b. $[[XP] [Y]]_Y$ / $[[Y] [XP]]_Y$
         c. $[[XP] Y]_X$ / $[Y [XP]]_X$
         d. $[[XP] [Y]]_X$ / $[[Y] [XP]]_X$

         where Y may be null. If any of these configurations is selected for, morphology will obviously have limited access to syntax.

We assume, then that the principles needed to construct phrases and sentences are distinct from the principles needed to construct complex words: in current parlance let us say that Syntactic Merge is different than Morphological Merge. Syntactic Merge produces phrases and sentences, and Morphological Merge produces words. However, there is a point of contact between them, in that languages can allow word formation of certain sorts to Merge syntactic phrases. It is possible, as well, that sentences and phrases can be 'downgraded' to words as part of a process of grammaticalization. The interaction that we seem to need might be stated in the following principle:

(46)   *The Limited Access Principle*
         Morphological Merge can select on a language specific basis to merge with a phrasal/sentential unit. There is no Syntactic Merge below the word level.

We might go further and try to formalize what we mean by Morphological Merge (leaving Syntactic Merge to the syntacticians!). A tentative statement might be something like (47):

(47)   *Morphological Merge*
         Let there be items α, β, such that α is a base and β a base or affix. MM takes α, β (order irrelevant)[3] and yields structures of the form $< α, β>γ$
         a. where γ is an X^0, categorically equivalent to α or β, and
         b. α or β can be null.

Morphological Merge, together with the Limited Access Principle, yields the sorts of structures that we have highlighted in (45). English phrasal compounds, and probably the compounds with conjoined non-heads in English have the structure (45a). We assume that the Italian compound-like structures have (45b) or (45d), although we must also assume that Y is null in this case, as the structure involves an NP that has been degraded to an N.[4] This sort of down-grading of phrases to words is permitted by clause (b) of Morphological Merger.

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[3] Note that making the order irrelevant allows us to cover cases of prefixation as well as cases of suffixation.

[4] As we have seen above, the first constituent or the second constituent can be modified by an adjective, and even both of them (*trasporto veloce latte / trasporto latte fresco / trasporto veloce latte fresco*) but

Quechua nominalizations seem to have something like the structure in (45a). Kageyama's examples could also potentially be analyzed as cases of prefixation to a phrase or compounding with a phrase (with the absence of Genitive marking being explained by the phrase-internal status of the phrase). And Booij's *iets leuks* analysis might yield to an analysis in which the plural ending *–s* is attached to semi-fixed phrases like *iets leuk*. Many of the examples of scope in prefixes – both the Spanish and the English examples – appear to be analyzable as cases like this as well, where the prefix is syntactically outside a phrase, and therefore has semantic scope over that phrase. As yet, we do not know if all the cases in (45) are actually attested. For example, we do not know if phrasal compounds exist in languages in which the morphology is left-headed as well as in languages that are right-headed. We will have to leave this point open for the time being. Also open is whether it is correct that all structures of this sort are endocentric. We assume so, as the data so far suggests that this is correct.

We believe that some of the examples mentioned in (42) show that syntax may also be allowed a limited view below word level in that syntax may be sensitive to the nature of the non-phrasal constituent in a word with a structure like that in (44) – as in Quechua – but as yet we have too few examples, and too little knowledge of how they work to say with confidence how interaction in this direction must be constrained. In any case, this "view" would not involve Syntactic Merge below the word level.

3.   Concluding Remarks

As yet, there are also too few examples to understand fully the interaction of morphological and phrasal semantics, and we confess we have not scoured the literature on the morphology/phonology interface as closely as we could for examples of interaction, so restatements of LIH in terms of other modules will have to wait. Nevertheless we feel that an examination of both the relevant data and the theoretical possibilities leads us in the right direction. We know now that any adequate statement of the LIH must be sensitive to interactions between morphology and other components as well. The data tell us that we do not need to sanction a complete collapse of morphology into syntax or other components, for that matter – this possibility predicts far more interaction than we find. Nor can we explain away the data and maintain that morphology is an island unto itself. There is a point of contact – a small one – between morphology and syntax (and probably between morphology and phrasal semantics and phonology), and our theory must eventually allow for that point of contact.

We feel that our restatement of the LIH as the Limited Access Principle, together with the statement of Morphological Merge that we suggest allows us to loosen the original strictures of the LIH without vitiating it entirely. In other words, we neither deny any contact between morphology and syntax, nor allow free access. Ultimately one would want our statement of the LIH and the Limited Access Principle to follow from something in the architecture of our theory, but at present we are not yet prepared to offer such a theory. We therefore leave this as a goal for future research.

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the acceptability of these expressions is not the same, the second one being the most acceptable (intended as a fixed compound-like expression).

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