Some countercyclic problems at the nexus of phonology and syntax

Luke Smith

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Abstract

Here I overview some of the "counter-cyclic" examples in language of phonological constraints affecting syntactic structure or natural language semantics. I argue that the Minimalist Program has moved desirably into the a view of language which syntax is singularly motivated by phonology and semantics, but is still marred but an overly linear and modular view of grammar that makes the more vibrant and productive interface between syntax and phonology messy or contrived to model. I argue that a move toward a model where semantic, phonological and therfore syntactic derivations are simultaneous is desirable, and present a variety of syntactico-phonological alternations that lead one in this direction.

1 Introduction

In traditional Chomskyan grammar, the core of the language faculty is a formal syntactic system which generates strings which are interpretable on two interfaces: a phonological/motor system and a semantic/conceptual-intentional system. While the syntactic core of the language faculty is thought to be a maximally minimal operation "Merge," universal to all languages, the external varieties of languages are accounted for by different lexicons and different inferface constraints (see Figure 1).

In classic terms, some languages may realized different values for different "parameters" such as headedness or a wh- feature. These parametric differences, which are only superficial, will cause the language faculty to externalize different output for each natural language.

The ontological question of the parametric differences still remain. *Why should languages vary?* and *What motivates specific parametric values?* In Minimalism, particularly in the context of the Strong Minimalist Thesis, the priority has been to describe these differences as legibility conditions of "the interfaces" (phonological and semantic). That is, a certain instance of internal Merge must occur to satisfy some need of the conceptual-intentional system, etc. Theoretically, this is highly desirable, as the language faculty has not

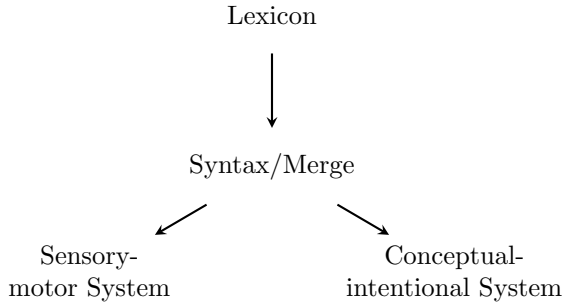

Figure 1: The Typical Model of Grammar

inexplicable or unmotivated parts in its production, and its only special trait is the mechanism of Merge.

In the specific way Minimalism is implemented, however this is somewhat of a problem. In a way similar to early transformational grammar, the Minimalist model of language is usually presented as a linear and modular system where, as previously stated, an isolated syntax engine sends off output to the interfaces, an output which is somehow already made legible for systems that the syntax knows nothing about.

Minimalism, as practiced, especially by those who vie for the Strong Minimalist Thesis, assumes that the syntactic engine is motivated by lexical features and properties which, strangely enough, have precisely those directions to make strings which are consistent with the systems downstream. For example, all grammatical sentences of a language can be validly grafted onto phonological structure, as they can be evaluated for meaning.[1]

Not only does this make every language extremely "lucky," but also inefficient. It means that the input to the language faculty, the lexicon, has all the answers written on the back of its hand and that, as a totally seperate entity, can optimize itself for a dual interpretation. This is actually a peculiar demand. In mathematics, there is no reliable algorithmic way of maximizing the output of a function with respect to two variables; as a general operation it is simply impossible.

What is possible is that the word-ordering engine of language, syntax is an epiphenomenon. The two interfaces of semantics and phonology come with their own constraints, and the syntactic system arranges a string which abides by the ranking of the particular phonological and semantic traits of the language in question. Instead of syntax being a seperate formal system, it can be viewed as a halfway point between a language's needed prosody and semantics.

This kind of model would imply that syntactic alternations should exist that are built tangibly from semantic and phonological constraints. On the semantics

[1] This is to say, even "colorless green ideas sleep furiously" type sentences can be evaluated for truth value, while ungrammatical sentences cannot.

side, certain enterprises in linguistics, such as the study of argument structure (Belleti and Rizzi, 1988; Baker, 1995) and cartographic structure (Rizzi, 1997; Cinque, 1999; Rizzi, 2004) and the entire methodology of distributed morphology have shown an enormous consistency and structure to the semantic structure built behind language which Merge apparently must follow.

Here I delve into the other side and look at a variety of syntactic alternations which stem from very specific phonological and prosodic traits of language which in the consensus model without revision, reek of counter-cyclicity.

2 The Phonological Data

As discussed in the course, there have been some situations where the phonological system has been evoked (by Chomsky) as a mere mechanism for dealing with otherwise unsuperable problems in syntax which would require inelegant explanations. Head-movement is a particular example of this. Head movement, be it of verbs or nouns or any other category yields no apparent semantic or hierarchical difference, and therefore can hardly be motivated on the grounds of the conceptual-intentional system. The particular phonological motivation remains to be uncovered, but there are many situations where the particular phonological necessities of a language motivate apparently backwards instruction into the syntactic system.

2.1 Extraposition

Extraposition is a phenomenon which is reasonless and arbitrary from a syntactic perspective, but obvious and elegantly-accounted-for from a phonological one. The phonological systems of human languages prefer to map particular syntactic constituents to particular phonolgical or intonational phrases. Across the worlds languages, for example, languages prefer to map CPs to intonational phrases. This is no problem in an SVO language like English.

(1) Billy has said that he wants to see it.

In English, (1) can easily be divided into two intonational phrases which match the linear boundaries between a new CP. Thus [Billy has said] and [that he wants to see it] form a well-formed sentence.

There is a problem, however, in SOV languages such as German, which usually yield the following canonical word order with a pre-verbal object.

(2) Ulli hat es gesagt.
Ulli has it said
"Ulli said it."

(3) * Ulli hat dass sie es sehen möchte gesagt.
Ulli has that she it see wants said
"Ulli said that she wants to see it."

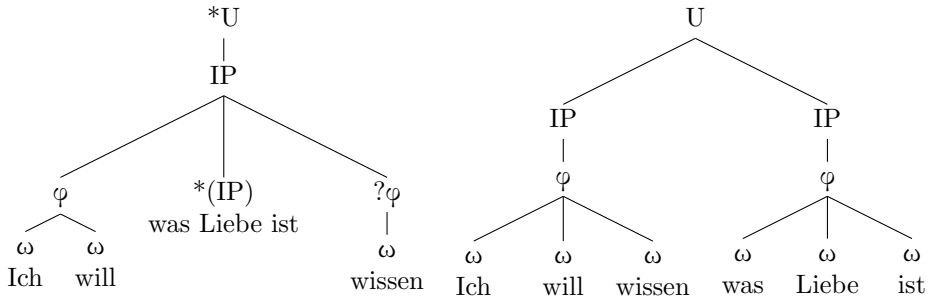

Figure 2: CP extraposition in German

(3), although formally the same as (2), is illicit as the the interior CP cannot project to a full intonational phrase. This is for two main reasons, one the one hand, a grammar that maps syntactic constituents into the phonological system could not project "Ulli hat dass sie..." into a single IP without the syntactically intervening *gesagt*. Additionally, if we map [Ulli hat] into one IP and the lower CP into another, *gesagt* must be either totally extrametrical or must somehow project to an entire intonational phrase itself, both options being highly dispreffered in human language.

German, as well as other SOV languages with similar prosodic structure (Persian, Basque, Quechua, Bengali, etc.), solve this problem by mapping the interior CP in the phonologically optimal position linearly after the verb.

(4) Ulli hat gesagt, dass sie es sehen möchte.
Ulli has said that she it see wants
"Ulli said that she wants to see it"

This doesn't just apply to *dass* clauses, but any CP that projects to an intonational phrase.

(5) a. Ich will **es** wissen.
I want it to know
"I want to know it."

b. Ich will wissen **was Liebe ist.**
I want to know what love is
"I want to know what love is."

We can see this graphically in Figure 2.

Extraposition only occurs in situations which optimize phonological structure. We can see less effectual, but no less common extraposition effects in English phrases, where extraposition ubiquitously occurs to optimize English DPs. While usually English adjectives are prenominal, adjectives modified by a prepositional phrase are mapped post-nominally with a prosodic break between.

(6) a. the tired student

b. * the tired of syntax student

c. the student tired of syntax

(7) a. the embarrassed man

b. * the embarrassed of his heritage man

c. the man embarrassed of his heritage

The only thing keep us from an elegant explanation of extraposition is the insistence on discrete submodules of the linguistic system, phonology and syntax, which are linearly array in time such that phonology cannot affect syntax.

2.2 Wh- Movement as phonology

One of the most elegant and daring statements of phonological causality in syntax is Richards (2010)'s account of wh- movement. Instead of an ambiguous parameter in the classic terms or contemporary "feature"-driven syntax, Richards suggests that the difference between a wh- *in situ* and a wh- moving language is merely a phonological one.

By this account, all languages simply try to optimally minimize the number of intonational boundaries between a wh- word and the complementizer position. There is no need to posit any independent wh- "parameter" or feature.

A variety of empirical data is explaned efficiently by this (Richards draws from English, Tagalog, Japanese, Spanish, Basque and many others). Firstly, no wh- fronting language (known to Richards or me) has final complemenntizers, in Richard's framework, this is because wh- movement would never improve constraint violation in a complementizer-final language. Secondly, wh- *in situ* languages, such as Japanese, will often begin a new intonational phrase at the start of a question word, ending in the C position (thereby containing the verb).

And more generally, the intonational requirements of each language are realized in other constructions aside from wh- clauses. That is, there is no need to posit new generalizations for determining what a language does with its wh-words. All the surveyed languages utilize their various phonological capacities, including movement to narrow the linear gap between C and the question word.

The differences in wh- questions generally can be construed as phonological. Tellingly, in particular dialects of Spanish (normally a wh- moving language) which have different intonation, wh- words *in situ* can be licensed utterance finally by sentence final intonation as in (8a) and (8b), but not when they do not receive final sentential stress (8c).

(8) a. Juan compró qué? (Uribe-Etxebarria, 2002)
John bought what
"What did John buy?"

b. Tú le diste la guitarra a quién?
you CL gave the guitar to who
"Who did you give the guitar to?"

c. * Tú le diste a quién la guitarra?
you CL gave to who the guitar

Additionally, dealing with wh- movement as a functional mechanism for phonological optimization gives an explanation of those few cases in natural languages where wh- words move rightwards. In Basque, for example, wh- words in subject position actually move *right* toward the complementizer position, such that there are no major inontational boundaries between C and the wh- word.

(9) a. Jon señek ikusi rau? (Arregi, 2002)
John who.ERG see AUX
"Who did John see?"

b. * Señek Jon ikusi rau?
who.ERG John see AUX

An account like this makes great strides in the acquisition problem. What was previously thought of as a problem of how a child "sets a parameter" totally vanishes in the wind. A child need only near where intonational boundaries and the complementizer position is, and the acquistion of whether its language is *in situ* or wh- moving comes for free. Wh- movement can accordingly be motivated from the desires of the phonological system.

2.3 *That-trace* effects and trochaism

That-trace effects used to be syntax-qua-syntax, a constraint unmotivateable on semantic grounds which exhibited all of the supposed traits of an emergent parameter of language. The syntactic account was more complicated than that. Noting the apparent assymetries between *that-trace* languages like English and (to some extent) French and *pro drop* languages like Spanish and Italian, there was some hope in the air that the two could be unified, but further typological realizations have show ample counter-evidence to any connection.

Recently, however, there have been a number of account for *that-trace* effects stemming from phonological constraints. The particular formalizations differ, but all generally state subject-initial languages cannot extract initial subjects at the begining of intonational phrase (Kandybowicz, 2006; Salzmann et al., 2011; Richards, 2012; McFadden and Sundaresan, 2015). *That-trace* clauses, by these accounts are illicit because intontational phrases must begin with some kind of stressed (non-verbal) element. These facts additionally account for why *that-trace* effects are alleviated with the topicalization of another clause pre-verbally.

(10) * Who did they say that would still want their car washed?

(11) Who did they say that after all this rain would still want their car washed?

This demand for a stressed element at the begining of an intonational phrase is very well motivated in other alternations. Many languages indicate so-called "prosodic inversion" with particles which are predicted to be clause initial. This

type of data simply falls out from assuming that some languages merely have a highly-ranked phonological constraint for trochaic (initial-stress) clauses, words or phrases.

Fitzgerald (1994), for example, presents evidence that the "second position" clitics of Tohono O'odham are underlyingly first position, and due the trochaic requirements of the language, must be relocated one word leftward so a more phonologically prominant word may receive stress. This kind of syntactic alternation is not typological rare either; so-called Wackernagelian phenomena are well-attested, where prosodically weak clitics and other homeless morphemes which "should" be sentence-initial occur in second position.

This demand for trochaic clauses can interface with other syntactic alternations. Well know in work in Mayan languages is the phenomenon of pied-piping causing prosodic inversion. In Mayan languages, where wh- words are "base generated" to the right of nominals they modify, a question word and a pied-piped nominal may invert with the question word taking the initial sentential stress.

(12) a. Cù'á Juààny x-pè'cw Màríí.
grab Juan p-dog Mary
"Juan grabbed Mary's dog."

b. ¿Túú x-pèh'cw cù'á Juààny?
who p-dog grab Juan
"Whose dog did Juan grab?"

As mere speculation I can suggest that pied-piping generally may be plausibly construed as being phonologically motivated as well. It makes sense that if a portion of a constituent be dislocated that its remaint may end up extrametrical or suboptimal in a way similar to the main verb in German (5b) or other extraposing SOV languages. This seems similarly good phonological motivation for movement.

2.4 Phonological effects on interpretation

One of the most telling facts about phonologically motivated syntactic alternations is that they can have subtle effects on sentence implicatures or other semantic factors. While the Chomsykan idea is that externalization, including linearization is totally ancillary, the linear ordering, whether canonical word order or motivated "movement" like extraposition can affect the semantic value of a string.

Much work already has been done attempting to reconcile not only the hierarchical, but the mere linear movement of constituents and there interface with the conceptual system (Bayer, 1996).

Fox and Nissenbaum (1999) note, for example, that while a general (low scope) *anything* is licensed in canonically ordered sentences like (13), when its modifiers are extraposed, as in (14), it cannot attain lower scope. This can be compared to (15) where the interpretation is intended to be wide scope.

(13) I looked very intensely for anything that would help me with my thesis.

(14) *I looked for anything very intensely that would help me with my thesis.

(15) I would buy anything without making a fuss that would help me with my thesis.

This is actually not too much of a surprise given some similar, but often unsung traits of languages. For example, languages of different canonical word order (particularly those of SOV and SVO) usually produce different typical scope orders in sentences which are hierarchically identical, the common denominator always being that more leftward elements are prefered to be interpreted as being of wider scope.

(16) Cookie monster didn't eat every cookie. ($\neg > \forall$; $??\forall > \neg$)

(17) Khwukhu Monste-ga motun khwukhi-lul mek-ci ani ha-yess-ta
Cookie Monster-NOM every cookie-ACC eat-CI not do-PAST-DECL
($\forall > \neg$; $??\neg > \forall$)

In English, the linearly first negation must scope over the quantified object. Thus, (16) means that Cookie Monster may have eaten between 0 and 99 of a set 100 cookies. The reading where the quantified object takes scope, that is "What Cookie Monster did to all of the cookies was not eat them" is extremely marked or unavailable to English speakers.

In the equivalent example in Korean (17), only the linear order changes, and the scope facts change as well (Han et al., 2006). Still, speakers want to interpret the linearly first element as having wide scope, thus (17) nearly invarialby means that Cookie Monster ate absolutely zero cookies. The English-like reading is marginal or unavailable to some speakers.

3 The problem of the data

These phonologically motivated phenomena are not abberational or marginal. Indeed we've discussed word-order, wh- movement, trace effects, extraposition and the EPP, which all together form an enormous chunk of what is generally thought to be narrow syntax. In the interests of brevity, I have omitted other syntactic alternations with phonological fingerprints all over them (the dative alternation, particle movement, resumptive pronouns, multiple exponence).

Of course, none of this is revolutionary. One of the assumptions of the Minimalist Program has been that language, at its core, is common throughout the human species, varying only at the interfaces, one being phonological. Correctly understood, this is a statement that the differences between the surface forms of language should be accounted for based on differing constraints for externalization.

However, the consensus model of Minimalism, has a very staunch diseconomy given these facts. We assume that the narrow system, *Merge* in essense, feeds strings to the phonological system which, in an unelaborated way, depending on the analyst, can perform "post-syntactic" changes on the string for its own good.

There is of course, some reference to the phonological or motor system in the positing of features which motivate these alternations in the narrow system, but this is fairly haphazard and redundant as model. In Minimalism, this means that suprasegmental phonological and prosodic detail that will give us strings that obey *that-trace*, extraposition and EPP limiations, must be a part of the lexical entries for all relevant words in a language. This is a formal solution that only consists in totally doubling the constraints of the phonology not only in the lexicon, but on every lexical entry which can undergo a phonological alternation.

To arrive at an optimal answer to the ordered constraints of both sound and meaning, the entire hierarhical system must be available to the phonology, and vice versa. The syntactic engine cannot feed a mere string to the phonology, as nearly all phonological traits refer to syntactic phrases, words and lexical categories. Similarly, the phonological constraints of a language must be available to the system that determines word-word, adjunction even movement.

The data presented here and elsewhere are part of a long and entrenched aggregation of counter-cyclic cancer that cannot be dealt with without reasonably radical rebrandings of classical generative grammar. Indeed, ironically, if the Strong Minimalist Thesis is "true" then all of the alternations of language *must* be motivated by the interfaces, which for historical reasons are thought of as being temporaly *after* narrow syntax.

A more complete vantage point, and a maximally minimal language faculty would be one which is not even a formal generative one, but one that merely finds optimal mappings between semantic and phonological structure, abding by whatever constraint settings are learned. This way, the semantics, phonology and syntax of language are simultaneously resolved, solving for their mutual effects and avoiding eternally the problems of counter-cyclicity.

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