Language as Synesthesia

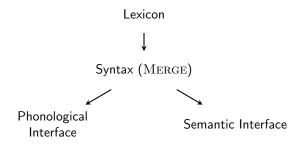Luke Smith

University of Arizona

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The Movement from Narrow UG to Minimalism

- Classical Generative Grammar began as a quasi-Post System, formal grammars with PS rules (Chomsky 1957, 1965).

- Modular view of language. Separate "Universal Grammar" from other mental components needed for language (still present in Hauser, Chomsky, and Fitch (2002)'s FLN/FLB).

- This UG became exceptionally complex in the 1970s-1980s, making the biolinguic/evolutionary problem of language problem difficult.

- Thus came the Minimalist Program (Chomsky 1995), which sought to derive the superficial traits of language from external or conceptually necessary Third Factor principles (Chomsky 2005). UG should be conceptually miniscule.

The Movement to Optimization (in Phonology)

- Phonology started out on much of the same foot: rule-based grammars (Chomsky and Halle 1968), independent formal systems.

- But this gave way to Optimality Theory (Prince and Smolensky 1993), which replaced the independent formal rules with cognitively general neural-net operations (Prince and Smolensky 1997).

- By some, the idea was that phonological "constraints" are still a part of UG, but the most recent quasi-Minimalist accounts seek to totally model constraints as being emergent/extralinguistic (Martins 2016; Samuels 2011).

- **Goal:** Phonology doesn't exist.

This Minimalism is Not Possible in Traditional GG

Lexicon

$\downarrow$

Syntax (MERGE)

Phonological
Interface

Semantic Interface

- The continued assumption is that the syntactic engine is prior to the "interfaces," and is blind to their properties.

- Result: MERGE has to have all the answers written on the back of its hand.

Minimalist Ideal in Syntax

- A theory where the FLN is small (or nothing?).

- The language faculty can see all the interface constraints simultaneously (removes the counter-cyclicity problem).

- The actual mechanism of the FLN is at home in general cognitive architecture.

- Has to be interesting.

Synesthesia

- **Synesthesia**: Mental condition where different cognitive faculties or sense intermix, forcing subjects to say, see numbers as colors, smell shapes, etc.

- In extreme situations, whole mental faculties seem to merge onto each other. Take the case of Daniel Tammet:

- Able to perform enormous calculations instantly.
- Reports the process as seeing numbers as phsical and colored objects that recombine to produce a new number object.
- Spacial reasoning coopted

Language as Synesthesia

- Language results, not from a new operation, but *synesthesia* between the two interfaces:

    - The motor system (yielding prosodic constraints).

    - A conceptual-intentional system.

- While in other animals, these are distinct systems, humans have a distinct ability to apply categories of one system to another.

- While most of the CI system is *non-conscious*, the motor system, if mixed with the CI system in this way, can externalize otherwise non-conscious thoughts into the conscious mind.
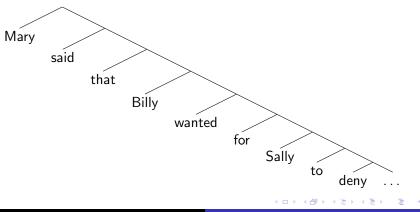
Claim

- Humans are high-functioning autistic savant apes. Instead of smelling colors, our motor system spills out and interprets ideas in any sensory-motor medium.

- There is no need for FLN *per se*. No MERGE. This isn't so much Minimalism, but Nihilism.

- **Synesthesia's affair:** The motor system and the CI system are formally different, and their formal differences are mediated by general optimization schemes (analogous to Optimality Theory in phonology).

Synesthesia
Optimization
Closing
References

Fingerprints of Optimization
Structure mapping
Parameters

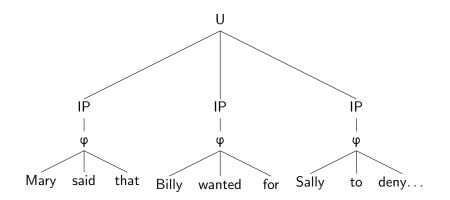## Fingerprints of Optimization I

- Semantic structure tends to be binary, while phonological structure is "bushy."

Synesthesia
Optimization
Closing
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Fingerprints of Optimization
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Parameters

Fingerprints of Optimization II
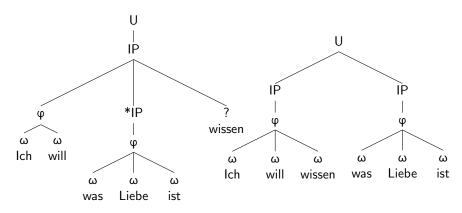
Synesthesia
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Fingerprints of Optimization
Structure mapping
Parameters

Grafting

- Linear order varies to produce prosodically optimal structure.

Synesthesia
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Fingerprints of Optimization
Structure mapping
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Similar Facts in English

(1) the exicted man

(2) excited for the future

(3)   * the excited for the future man

(4) the man excited for the future

Syntactic movement for prosodic optimization.

Synesthesia
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Parameters: Variation at the interfaces

- Traditionally, children were thought to learn syntactic "parameters" (points of variance) as they acquired languages.

- But if the traits of syntax fall out from prosody, what look like syntactic parameters should really only be prosodic in nature.

Synesthesia
Optimization
Closing
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Fingerprints of Optimization
Structure mapping
Parameters

wh- Parameter

(5) **What** did John buy ~~what~~?

(6) John-wa   nani-o   katta?
    John-TOP what-ACC bought

- Richards (2010) notices English and Japanese are actually doing the same thing: minimizing prosodic distance between the *wh-* word and the C where it takes scope.

- Both languages project focal prosodic phrases to the left of the question word. In Japanese, this phrase can extend to the end where the C is, but the English C is actually initial, and must *move* the *wh-* word to accomplish this.

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Word order parameters

- As noted by Kahnemuyipour (2005), classical rule-based derivations of sentential stress (à la Halle and Vergnaud (1987)) drastically over-generate the number of possible languages.

- Specifically, all languages succeed in giving the object sentential stress, the subject secondary, etc. Classical theories can't limit their possible grammars to this, because the phonology would have to be syntax-sensitive.

- But removing the linearity, the problem evaporates, languages have stress in particular places due to idiosyncratic prosodic rules, and then place constituents in those places where they will receive appropriate stress.

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Parameters

Constraint analysis of Word Order

SOV	Cont	Const	Top1$^{\text{ST}}$	Troc	$*\phi$	Finϕ	Iam
☞ a. [S][VO]					$**$		$*$
b. [S][OV]					$**$	$*!$	
c. [SVO]	$*!$				$*$		$*$
d. [SV][O]		$*!$			$**$	$*$	$*$
e. [OV][S]			$*!$	$*$	$**$	$*$	$*$
f. [SVO]	$*!$				$*$		$*$
g. [VSO]	$*!$			$*$	$*$		

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Reorientation
Some Q's
Conclusions

Reorientation

- **Theoretical program:** Linguistic alternations should be (1) motivatable by interface constraints and should (2) be accounted for with general, not UG-specific cognitive architecture.

- Data like the previous are examples of both, and a truly Minimalist (Nihilist) program should invite more of them.

- We've described language as synesthesia, but what does this mean for human cognitive life?

Synesthesia
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Reorientation
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Making the Un-conscious Conscious

- By spilling the conceptual system into the motor system, the *conscious* portion of our minds suddenly becomes aware of otherwise non-conscious processes, enabling:

    - Introspection

    - Second-guessing

    - Dwelling on a thought, memorization

- We have multiple levels of cognitive processes, and this kind of synesthesia enable them to interplay.

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Some Why's answered (?) I

- Why is our conscious percept of thought *in language*?

  - Because most of that thought is not bubbling directly from internal logic into the mind, *then* being externalized in language; it is coming directly into the motor system in format the motor system can understand.

- Why are humans so cognitively distinct from our non-human relatives?

  - We have similar abilities, but a large portion of our general reasoning abilities are malleable to our higher-level cognition.

- Why do humans acquire language so easily?

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Some Why's answered (?) II

- Firstly, they acquire the syntax of language as early as they gather the prosodic traits: knowing about where sentences place stress or how they place phonological phrases communicates syntactic facts (word order, *wh-* habits, etc.).

  Secondly, **languages are local maxima of prosodic optimization.** This allows convergence on actually-existing languages much easier.

- Why do we not perceive the realtime mysteries in language processing (re: Tom's comments on Natasha's work)?

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Conclusions I

- Language arose in humans not as a new discrete neural operation, but as an overspilling of one mental faculty (general reasoning) onto another (the motor system). A kind of synesthesia.

- Consistent with Minimalist principles, language variation occurs at the interfaces. Different learned prosodic priorities produce different syntactic "parameters." There is no necessary syntactic derivation that produces utterances, simply optimization.

- The huge cognitive good of language is that it spills non-conscious thoughts onto the realm of consciousness. Allowing:

Synesthesia
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Reorientation
Some Q's
Conclusions

Conclusions II

- higher and lower cognitive function to intermingle,

- more introspection, second-guessing, contemplation

- and easier memorization, etc.

- The idea of MERGE, and the FLN generally is not necessary. There's also nothing ruling out MERGE-like cognitive operations in non-humans similar to Gallistel (2011).

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