THE STATUS AND POSITION OF PHONOLOGY IN THE BIOLINGUISTIC LANDSCAPE

1. Mind-brain I

(1) uniform function, material diversity
   a. a basic insight in the mind-brain relationship:
      all humans have the same vision, audition etc. (phenotype), but no two brains are
      wired the same
   b. functionalism in psychology
      the essence of items is their function, not their material properties
      ex.: heart, indicator board, atom, neuron, letters of the alphabet, transistor etc.
      e.g. Fodor (1968), Putnam (1975)
   c. a basic pattern in cognitive science
      what is the essence of an algorithm? An algorithm
      1. can be expressed in dozens of distinct programming languages
      2. which themselves can be run on dozens of distinct machines

(2) position in linguistics reported: uniform phenotype ===> uniform genotype
   a. p.3 of the position paper, reporting the general position in linguistics that is argued to
      be wrong:
      "the linguistic brain (that is, the whole set of brain areas involved in language proc-
      essing) is expected to be equally organized and sharply defined in all individuals.
      Allegedly, these “language areas” only process specific features/ components/ opera-
      tions of language. Ultimately, the faculty of language is supposed to be equally im-
      plemented in all subjects as one of the modules encompassing their minds/brains."
   b. really?
      the *mind* is supposed to be identical in all individuals, but not the brain. Identical
      neurological structure (brain) does not follow from identical function (mind).
   c. does identical genetic coding follow?
      That's the standard assumption. Alternatives must come up with
      1. a good reason why the language function (FL) is identical in all humans
      2. a good reason why there are universals in language
   d. But the relationship between phenotype and genotype is dialectic and poorly under-
      stood, in any case not one-to-one.
2. Variable LF:
in the genes and in the brain, but not in the mind

(3) the LF is not uniform across individuals
   a. a central point made in the position paper (e.g. p.3)
   b. if different individuals have different LF's, how come the result is always the same?
      i.e. all humans and only humans develop a language.
   c. again, we are talking about the mind (LF is a property of the mind), not about the brain. Of course there can be variable material / biological / neural implementations of the LF.

(4) arguments for the non-uniformity of LF
Old arguments (p.3)
   a. bilinguals that master vocal and signed languages
      An old issue in the comparison of sign-vocal phonology: various approaches, but all exempt melodic content (i.e. what is below the skeleton) from LF:
      1. melodic primes are emergent, i.e. environment-driven
      2. melodic primes are part of UG, but colourless: alpha, beta etc. They acquire a content through the environment.
   b. psycholinguistic measures are varied across the normal population
      this is performance, isn't it (not sure I understand what is meant)?
   c. language disorders represent different breakdowns of the LF
      Possible interpretation: this means that LF is composite, but not that it is not uniform.
      ==> no convincing argument here.

(5) New arguments
   a. not a handful, but hundreds of genes are responsible for the neural substrate of language (p.3)
      Sure, but this is variation in the genes, not in the mind. Nothing withstands the existence of a uniform function based on material (neural, genetic) diversity.
   b. developmental trajectories in normal language acquisition are diverse
      Sure, but the result is a uniform adult grammar. Different acquisition paths are standard in the acquisition literature (e.g. Fikkert 2007).
   c. language development in pathological populations is even more diverse
      More of the same, inflected by whatever pieces of the machinery don't work.
      ==> none of the arguments really bites.

(6) conclusion
   a. "it seems that there can be different ways of implementing a (more or less) functional faculty of language." (p.4)
   b. phenotype (LF) uniformity, neurobiological and genetic diversity (p.6)

Right – but does the mainstream linguistic position really doubt that?
And if it is agreed that all this is true, we are again talking about *material* diversity (genes, neurons), not about the mind. There can still be a uniform LF in the mind that is invariable across individuals.
3. Modularity

(7) against modularity
a. description of the mainstream linguistic position:
"Allegedly, these “language areas” only process specific features/ components/ operations of language. Ultimately, the faculty of language is supposed to be equally implemented in all subjects as one of the modules encompassing their minds/brains. This module is further thought to be present ab initio." (p.3)
b. two properties of modules are called into question:
   1. domain-specificity
   2. innateness

(8) language: how many computational systems?
a. "Concerning the neural substrate of language, it seems that brain areas actually perform basic kinds of computations that are recruited for different, high level cognitive functions." (p.4)

"Consequently, cognitive capacities such as language are very probably cross-modular by nature; that is, they result from the interplay of these diverse brain areas performing specific, low-level activities (Griffiths, 2007). At the same time, it is only these structures that are the final output of genetically driven developmental processes. In fact, it seems that it is only their basic architecture that is genetically encoded, while their functional specificities are environmentally driven, plausibly via thalamic input (Zembrzycki et al. 2013). This is what ultimately supports the claim that modules are not born, but made." (p.4)
b. ==> 
   1. there is no monolithic language module
   2. language is the interplay of basic computational systems, none of which is language-specific (they all also serve other purposes)
   3. only the basic architecture of these basic units is genetically coded
   4. their function, however, is not genetically determined: it is environment-driven
c. this is the minimalist programme:
   1. emptying UG
   2. nothing in language is specifically linguistic: U perhaps, but not G.
really against modularity?
a. modularity does not hold that there is a monolithic language module. Language is broken down into a number of distinct computational units, since Aspects 1965 minimally the three endpoints of the inverted T:
   1. morpho-syntax
   2. phonology (PF)
   3. semantics (LF)
b. comparative biolinguistics
   "This bottom-up approach, seeking to establish cognitive phylogenies (see Fitch et al. 2010) focuses on the fundamental capacities underlying larger cognitive phenomena." (p.7)
   That's what modularity does as well: cut down complex cognitive functions into smaller computational units.
   The difference is domain-specificity: these smaller units are modules and hence domain-specific, but in the position paper do not use any specific vocabulary (they are not specifically linguistic).

against modularity
eliminate (or reduce?) domain-specificity
a. modules are
   1. domain-specific
      [which does not mean that they can't serve / input a number of other modules: e.g. audition]
   2. innate and genetically coded
   3. environment-insensitive
b. minimalist take:
   "reduce the amount of domain-specific information required of the genotype to reliably develop a language" (p.7)
   ==> reduce or eliminate?

what about universals?
[more on that below]
a. if the functional specificity of the component computational systems of language are environment-driven, what exactly is the range of variation that we expect? Don't we expect that grammar can be anything and its reverse, depending on the environment?
b. sure many things in language are variable and environment-driven. But some are not: this is what UG classically expresses.
   ==> where do universals come from when everything is environment-driven?
c. some examples for universals:
   binding, negation not expressed by word order, no closed syllable lengthening etc.
d. what about the fact that all these properties also emerge in children without *any* linguistic input?
   Kegl et al. (1999), Senghas et al. (2004)
against modularity for sure:

colourless computation is connectionism

a. domain-specificity and symbolic computation are cornerstones of modularity and
cognitive science (in competition since 1986).
b. if the basic computational units are not specifically linguistic, i.e. if they also input
non-linguistic cognitive functions, they cannot be symbolic.
Unless "labial", "person", "number" etc. are categories that are also relevant in other
cognitive functions.
c. if "the basic building blocks of cognition might be shared across a wide range of
species" (p.7), do animals then have symbolic computation and manage vocabulary
items such as "labial", "person", "number" etc.?
They probably don't, which means that the human computation of language cannot be
domain-specific either.
d. the perspective argued for comes down to colourless computation, which is a land-
mark of connectionism: (artificial) neurons are universal computing machines, they
can compute anything.
e. other consequences: buying into the "list-rule fallacy" (Langacker, Bybee), i.e. the
denial that storage and computation are distinct?

4. Disorders

(13) argument based on disorders I
a. "developmental disorders are better characterized by associations across domains
than by dissociations between them." (p.5)
b. so what about the well documented cases of double dissociation?
e.g. Curtiss (1981, 1988, 2012), Smith & Tsimpli (1995), Dehaene (1997), Karmiloff-
Smith et al. (1995).

(14) argument based on disorders II
a. claim
1. only some linguistic components are impacted by disorders (inflectional morph.)
2. while others are more robust and don't get damaged.

"In other words, some aspects of language processing seem to be particularly vulner-
able in all pathological conditions, while others seem to be preserved in all them. For
instance, inflectional morphology is problematic not just for people with SLI (specific
language impairment) (Marchman et al. 1999), but also for those suffering from SSD
(speech-sound disorder) (Mortimer and Rvachew 2010), Down’s syndrome (Eadie et
al. 2002), or (a subtype of) autism (Roberts et al., 2004)." (p.5)
b. is this a well-established empirical generalization?
The literature quoted under (13)b (also Ulfsbjorninn 2009) documents cases where
components other than just inflectional morphology are selectively (or especially)
impacted:
- the lexicon
- pragmatics
- semantics
- dissociation of binding and pragmatics Chien & Wexler (1990)
c. example: pragmatics (Christopher)
"In the present context informational encapsulation would mean that Christopher's linguistic ability was independent of his general cognition and could operate in the absence of 'central' control. His method of translating makes this extremely plausible. When asked to translate, he starts instantly and proceeds word by word rather like an automaton. If he is asked to slow down and mull over the meaning of the whole passage in an attempt to improve his performance, he shows visible signs of distress and professes himself incapable of doing any such thing. Moreover his equanimity at producing nonsensical translations indicates either that he is incapable of discerning such nonsense, or that his linguistic (morpho-syntactic) system operates in divorce from any semantic or pragmatic control." Smith & Tsimpi (1991:325)

5. Universals and variation

5.1. Universals

(15) universals have nothing to do with genes?
"we think that linguists err in taking the genotype to be the source of universality." (p.6)

(16) alternative argued for:
  a. source of non-universals, i.e. of variation: developmental disturbances
     "certain cognitive processes are more vulnerable per se than others to damage or developmental disturbances because they rely on less resilient neural networks and have thus less robust compensatory mechanisms." (p.6)
  b. one concludes, then, that universals are universals because the cognitive processes that underlie them are not vulnerable to damage or developmental disturbances, because their neural networks have robust compensatory mechanisms.
  c. so why are some neural networks fragile, but others robust?
     ==> because of their evolutionary age (p.6):
     - fragile networks (variation) are young
     - robust networks (universals) are old.

(17) that only shifts the question to another playground:
  a. why are binding, the absence of closed syllable lengthening or the absence of word order as the exponent of negation old?
  b. but exclusive 1st person plural, GEN case for negation or the number of vowels in a system young?
  c. is there any evidence?
     does that make the prediction that there was something like a proto-language that was void of any variation?
  d. correlating back to the earlier claim that only some language components are impacted by disorders, and that inflectional morphology is a case in point:
     does that mean that derivational morphology is older, evolutionarily speaking, than inflectional morphology?
     Hence that there was a stage in the emergence of language that had derivational, but no inflectional morphology?
     Is this really a picture we want to sustain?
5.2. Variation

(18) What about variation that has nothing to do with neural networks and its evolutionary age?
   a. standard scenario for the source of innovation, i.e. of variation in language (but see the phoneticians' take): social (Labov 1994 and following).
      1. group recognition
      2. groups of speakers pick a random characteristic in a pool of existing and/or possible variation in order to be different from other groups, and to identify themselves with their group.
   b. a fundamental property of innovation, and hence of variation, is that it cannot be predicted: there is no reason why language X starts to implement a palatalization rather than, say, a spirantization. No impact on reproductive success.
      ==> labovian explanation: the reason is that it does not matter how one is different, it only matters that one is.
   c. how could this converge with the idea that variation is related to the evolutionary age of some property?

(19) management of variation in linguistics
   a. traditional: parameters (p.8)
      1. on (syntactic) computation
      2. on lexical entries (Borer-Chomsky conjecture)
      3. on externalization: things that happen at PF (but before phonology)
   b. recently (Chomsky's "one route"): no parameters on semantics (clean and straight)
   c. what about phonology, which is different from PF?
      Traditionally, phonology also has
      - parameters on computation
      - parameters on the lexicon
   d. phonology does not have parameters on PF, since it is post-PF. But it also has an externalization system: phonetic interpretation.
      Where does that belong to?

(20) PF-induced variation
   a. much to be expected from for two reasons:
      reason 1:
      because it "holds the core generative capacity of the language faculty free from variation." (p.8)
      ==> the minimalist take: narrow syntax is clean and uncomplicated.
   b. what about lexical parameters?
      Don't they have the same effect?
c. what does culture have to do with PF?
   reason 2:
   PF-induced variation "confines variation to components of the language more readily
   subject to cultural influence." (p.8)
   In which way is PF (more) environment- or culture-driven? Are there any cases
documented where parametric variation – of PF-induced variation for that matter if
this can be isolated – correlate with culture?
   In any case, there are tons of cases documented where it does not correlate with any
environmental or cultural patterns.
   ==> Labov above: it matters that some variation occurs, but it does not matter which
variation is selected as the vehicle of social differentiation.

(21) bottom p.8
a. we expect that
   1. "[m]any universal properties of language depend on the cognitive machinery this
generative engine interfaces to. As a corollary, we expect as well that the phono-
logical and semantic components of language show a greater degree of evolution-
ary continuity."
   2. "[m]any grammatical properties result from social transmission and cultural evo-
lution, particularly, those related to morphophonology. Specifically, parameters
(viewed as morphophonological variants) result from cultural evolution or from
the externalization process."

b. as far as phonology is concerned, a1 seems to be a wrong prediction. All data avail-
able show that there is just as much variation in phonology as there is in syntax.

c. and again culture: I am unaware of any evidence that linguistic variation correlates
with cultural patterns (attempts to establish such patterns typically have apolitical
motivation: Sprachbund etc.).

   narrow syntax is not the only computational system that has a lower, i.e. externaliza-
tion interface: phonology does as well (phonetic interpretation).
   So do we expect analogous consequences, i.e. that phonology does not show much
variation, but phonetics do?
6. Not enough time for an adaptive emergence of language?

(22) biolinguistic scenario regarding the emergence of language
   a. 1. language came into being accidentally
       2. i.e. not by an adaptive change
       3. but rather as a by-product of the mutation of one or two genetic mutations
       Hauser et al. (2002), Hornstein (2009:4ff)

b. what is at stake:
   1. an old and central tenet of the chomskyan approach to language: language has no
      purpose; in particular, it is not made for communication.
   2. another old and important tenet, which however is less prominent in the literature
      and in the perception of the audience: some pieces of language and the mind are
      and will remain forever a mystery.
      [more on that in section 7 below.]

c. polemic exchange with Pinker-Jackendoff
   around the question whether the emergence of language follows the regular selec- 
   tional-adaptive scenario or was accidental, i.e. non-adaptive.
   Hauser et al. (2002), Pinker & Jackendoff (2005a,b), Fitch et al. (2005)

(23) argument against the adaptive scenario:
   there was not enough time
   "A common assumption is that language arose in humans in roughly the last 50,000 - 
   100,000 years. This is very rapid in evolutionary terms. […] On the assumption that 
   complexity requires natural selection and that natural selection requires time to work its 
   magic (and lots of it: say on the order of (at least) millions of years), the rapid rise of 
   language in humans does not allow for this kind of complexity to develop."
   Hornstein (2009:4f)

(24) what about the upper limit of the period in question?
   a. we know that there was language at about -50,000 years
   b. it seems that there was no language before about -100,000 years
   c. in which way does that allow us to conclude that the 50,000 years in between must 
      have accommodated the adaptive change?
      ==> the adaptive process may have begun way before that, at -500,000 or -1Mill.
      ==> the only thing we know is that the process was concluded at -50,000.

(25) is it an established fact in biology that adaptive changes take a long time, i.e. several 
   million years according to Hornstein?
   a. Hawks et al. (2007) report that
      1. the speed of adaptive change is correlated to the size of the population: the larger 
         the number of individuals the faster the adaptation.
      2. "The past 10,000 years have seen rapid skeletal and dental evolution in human 
         populations and the appearance of many new genetic responses to diets and dis-
         ease." (p.20753)
b. Laland *et al.* (2010)
lactose tolerance et al.: maybe 20,000 years?
"analyses of data from the human genome have revealed numerous genes that have experienced recent positive selection, many of which exhibit functions that imply that they are responses to human cultural practices. For instance, several lines of evidence show that dairy farming created the selective environment that favoured the spread of alleles for adult lactose tolerance. Estimates for the number of human genes that have been subject to recent rapid evolution range from a few hundred to two thousand: Williamson *et al.* 14 conclude that up to 10% of the human genome may be affected by linkage to targets of positive selection." (p.137)

(26) again: against modularity
a. causal chain used by Hornstein (2009:4):
   1. complex structures require natural selection
   2. selection needs a lot of time
   3. no sub-modules within language: too complex, not enough time
b. "On the assumption that complexity requires natural selection and that natural selection requires time to work its magic (and lots of it: say on the order of (at least) millions of years), the rapid rise of language in humans does not allow for this kind of complexity to develop. This suggests that the highly modular structure of GB style theories should be reconsidered." (p.4)
c. is it an established fact that complex structures require natural selection? What's the evidence?
d. again, the not-enough-time argument does not seem to go through.
e. so a side-effect of the not-enough-time scenario is that the modular structure of language is abandoned.
   1. the inverted T model is a core piece of generative thinking
      (history since LSLT: Scheer 2011:§622)
   2. there is massive evidence to the end that language is not just one computational system, but rather made of a number of computational systems. The most important gap is between phon(ology, -etics) and the rest (syntax, morphology, pragmatics etc.), and this is consensual.
      E.g. Jackendoff (1997:41 and following), or Chomsky:
      
      "The phonological component is generally assumed to be isolated in even stronger respects: there are true phonological features that are visible only to the phonological component and form a separate subsystem of FL [the Faculty of Language], with its own special properties." Chomsky (2000:118, emphasis in original)
   3. this is also true for the one-route model where semantics is re-united with morpho-syntax (Chomsky 2013).

7. How much of the mind is modular?

(27) back to (22)b2: something will remain a mystery, don't even try to decipher
a. Descartes, Fodor, Chomsky vs. Pinker, Plotkin, Sperber, evolutionary psychology
   [Scheer 2011: §606]
b. Gerrans (2002) provides an informed overview of the debate regarding the articulation of modules with central systems.
the mystery party: man will never know

a. Descartes
mind-body, I will never know about the former (because it is divine), so I concentrate on the latter.
b. Fodor (1983) is pessimistic about our ability to understand how central systems work: he assumes that they are resistant to scientific theorising and ultimately to human understanding because they cannot be appraised through the modular prism: "the more global […] a cognitive process is, the less anybody understands it" (Fodor 1983:107).
c. Chomsky
e.g. Chomsky (1984:6f, 23f), Chomsky (1995:2f), chapter 4 of Chomsky 1975 is called "Problems and mysteries in the study of human language"

the rationalist party
[Fodor (2000) calls the position at hand rationalist psychology]

a. massive modularity
central systems are modules (or clusters of modules) that are a little more complicated. Just as higher cognitive functions (social categories). They are out of reach today, but not forever – the standard scientific attitude towards things that are not understood.
1. evolutionary psychology: e.g. Pinker (1997), Plotkin (1998)
2. social categories: Cosmides & Tooby (1992a,b), Hirschfeld & Gelman (eds.) (1994)
3. massive modularity: Smith & Tsimpli (1999), Sperber (2001)
b. Fodor (1987:27) calls this the "modularity thesis gone mad":

roots of the biolinguistic idea that the emergence of language is not adaptive

a. evolutionary psychology holds that the mind, like the brain and all other properties of living beings, is the result of an adaptive evolution marshalled by selectional pressure over millions of years.
b. if all is the result of environment-driven adaptation, no part of the mind can stand aside. The mystery party must thus oppose this view: some pieces of the mind are not the result of Darwinian selection.
c. hence the one-or-two-mutations scenario and the ensuing too-little-time argument.

8. In a nutshell: what about third factor patterns?

purpose

a. to question the run on the third factor
b. is it a good thing for objects of scientific inquiry to become more and more global?
c. how come that these more global, not specifically linguistic properties of the (human or animal) cognitive system produce linguistic patterns that do not seem to surface outside of language?
(32) Third Factor & Cie
   a. chomskyan minimalism and biolinguistics
      Boeckx et al. (2012) etc.
   b. explain properties of grammar by extra-grammatical, "more general" properties of the
      cognitive system (of the species or beyond).
   c. 1. empty UG as much as you can
      2. shift the labour onto extra-grammatical and hence language-unspecific mechanisms
   d. ==> third factor: explain grammatical properties by extra-grammatical mechanisms.
      ==> the best explanations are third factor explanations because of Occam: the less
      language-specific mechanisms have to be invoked, the better.

(33) anti-chomskyan "Cognitive" Grammar
   a. argues against everything that is specifically linguistic: language is but a set of gen-
      eral cognitive processes put to use for a specific purpose.
      This is an application of hardcore connectionism to language: all is in all, nothing is
      specific to anything, all neurons can do all kinds of computation, there is no computa-
      tion specific to any particular cognitive function.
   b. "Cognitive linguistics views linguistic cognition as indistinguishable from general
cognition and thus seeks explanation of linguistic phenomena in terms of general
cognitive strategies, such as metaphor, metonymy, and blending. Grammar and lexicon
can be viewed as parts of a single continuum and thus expected to be subject to the
same cognitive strategies." Janda (2010: 1)

(34) phonology: Who has it?
   a. Samuels' (2011) conjecture:
      anybody / any being who has the full set of the individual performance and compet-
      ence items that phonology is made of.
   b. ==> animals don't have phonology because no animal species has the full set of abilities
      that characterize human phonology.
   c. if they did, they would have human phonology.
   d. so why didn't animals develop the full set of performance and competence abilities
      that define human phonology?
      They could (have), since all that is required is pre-human cognition.

(35) an answer
   a. because they have nothing to externalize.
   b. really?
      They actually do communicate and do externalize sound-meaning associations.
      Animals do have the linguistic Sign (association of sound and meaning, Martinet's
      first articulation). What they don't have is grammar, i.e. concatenation and resulting
      compositional meaning (Martinet's second articulation).
   c. so it's not because they don't have anything to externalize,
   d. but rather because they don't have the human-specific FLN to externalize.
   e. ==> the externalization mechanism was adapted to the specific (computational, concaten-
      tional) needs of the FLN system.
f. this is the reverse adaptational movement of what is promoted by minimalism, where a basic explanatory principle is the adaptation of the properties of FLN to the interfaces, i.e. to the demands of phonology.

==> this looks like a dialectic come and go, rather than as an adaptational one-way.

(36) humans have it all
a. humans for sure have the full set of performance and competence items to perform phonology
b. but the third factor in phonology (Samuels' 2009 article title) holds that no item in the performance and competence list is specific to language:

==> phonology is based exclusively on "more general cognitive abilities"
c. prediction:

the patterns that are observed in phonology must also surface elsewhere in the human cognitive system, i.e. in other cognitive functions.
d. this appears to be wrong.

Or at least there is no evidence in favour of it.
e. maybe because people have not searched hard enough for phonological patterns occurring in other cognitive functions.

==> the burden of proof lies on the proponents of Samuels' conjecture.

(37) a trivial example: the coda
[but any other pattern could be brought to bear]
a. the coda is a consonant that occurs in

— / {# __ C} —
in prose:

a consonant is a coda iff it occurs either string- (word-)finally, or before another consonant.

[further sonority-related intricacies left aside]
b. the coda is a pervasive property of human phonology
c. the coda is specific: its reverse does not exist, and it is easily transposable / detectable to other areas of cognition. What is needed is

1. a basic vocabulary of (at least) two items (A, B)
2. a linear order of these items.

We then expect to find the coda pattern. Hence:

1. given two sets of items A and B (A being consonants in phonology, B vowels),
2. some non-linguistic cognitive function needs to be able to naturally

- produce and/or
- extract from a linear stimulus

those A-tokens that occur before another A and string-finally

==> A_2 and A_5 in #A_1B_2A_3B_4A_5#
- to the exclusion of all other As.
d. if nothing is phonology-specific in phonology,

if phonology is exclusively made of "more general cognitive abilities"

==> then the coda pattern should also occur elsewhere in the human cognitive system.
References


Academy of Sciences of the USA 104: 20753-20758.

Hirschfeld, Lawrence & Susan Gelman (eds.) 1994. Mapping the mind: Domain specificity in
cognition and culture. Cambridge: CUP.


Conceptual and Empirical Issues, edited by Noel Burton-Roberts, Philip Carr &

Jackendoff, Ray 1997. The Architecture of the Language Faculty. Cambridge, Massachusetts:
MIT Press.


Karmiloff-Smith, Annette, Edward Klima, Ursula Bellugi, Julia Grant & Simon Baron-Cohen
1995. Is There a Social Module? Language, Face Processing, and Theory of Mind in

Kegl, J., A. Senghas & M. Coppola 1999. Creation through contact: Sign language emergence
and sign language change in Nicaragua. Language creation and language change,

Blackwell.

Laland, Kevin N., John Odling-Smee & Sean Myles 2010. How culture shaped the human
genome: bringing genetics and the human sciences together. NAture Reviews 11: 137-
148.

Morphology-Phonology Interface. Berlin: de Gruyter.


Pinker, Steven & Ray Jackendoff 2005a. The faculty of language: what's special about it ?
Cognition 95: 201-236.

Pinker, Steven & Ray Jackendoff 2005b. The nature of the language faculty and its
implications for the evolution of language (Reply to Fitch, Hauser and Chomsky).
Cognition 97: 211-225.


Phonological Information is Treated in Phonology since Trubetzkoy's Grenzsignale.
Berlin: Mouton de Gruyter.

Senghas, Ann, Sotaro Kita & Asli Özyürek 2004. Children Creating Core Properties of
Language: Evidence from an Emerging Sign Language in Nicaragua. Science 305:
1779-1782.

linguist. Lingua 84: 315-351.

Smith, Neil & Ianthi-Maria Tsimpli 1995. The mind of a savant. Language-learning and