

Birmingham Lectures, 2021 March 9

Explaining diverse language structures from convergent evolution of linguistic conventions

MARTIN HASPELMATH

Max Planck Institute for Evolutionary Anthropology (Leipzig)

I. Convergent evolution in biology and culture

Convergent evolution is the independent appearance of similar features in different lineages, creating analogous structures due to analogous functions.

biology e.g. insect-eating animals with a sticky tongue,
wings of insects, pterosaurs, birds and bats



culture e.g. houses with roofs, doors and windows,
drums with membranes and cylinders



languages e.g. numeral base systems,
accusative and ergative case-marking systems (Comrie 2005a; 2005b)

Structures can be explained by functions because of an earlier process of **adaptation**, familiar from biological evolution.

2. Convergent evolution: Vowel systems and differential object marking

vowel systems: languages overwhelmingly favour symmetric vowel systems

Vowel phonemes of Japanese

	Front	Central	Back
Close	i		u
Mid	e		o
Open		a	

explanation:

this is due to a universal preference for dispersed systems, which offer an efficient tradeoff between system complexity and clarity of perception (Liljencrants & Lindblöm 1972)

differential object marking:

when a language has differential patient flagging depending on **referential prominence** (animacy, definiteness, etc.), the **extra marking** is on the referentially prominent object

(1) Abruzzese (Italo-Romance variety; D'Alessandro 2017)

- a. *So vistə a mme / a tte.*
 be. I SG seen ACC me / ACC you
 'I have seen myself / you.'
- b. *Semə vistə a nnu / a vvu.*
 be. I PL seen ACC us / ACC you
 'We have seen us / you.'
- c. **So vistə a Marije / a jissə.*
 be. I SG seen ACC Maria / ACC them
 ('I have seen Maria / them.')

I/2nd person > 3rd person

(2) Moro (a Heiban language of Sudan)

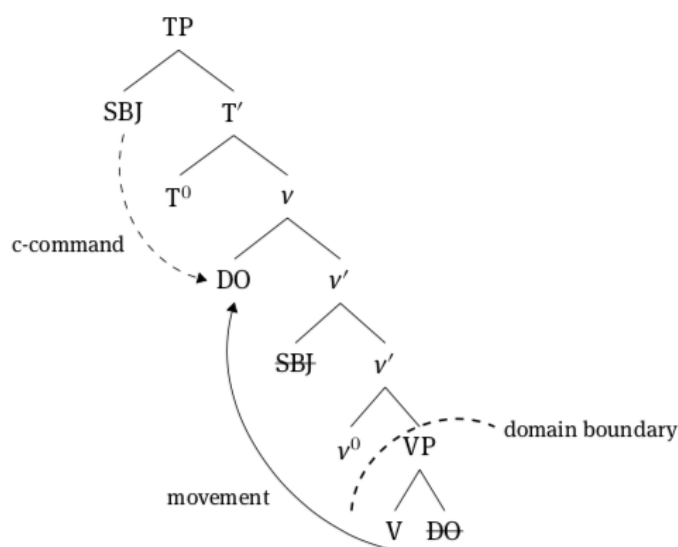
- a. *ŋal:o g-Λr:Λŋətf-ú kúku-ŋ*
 Ngallo SM-teach-PFV Kuku-ACC
 'Ngallo taught Kuku.' (Ackerman et al. 2017: 5) **person name > nonhuman**
- b. *ŋ^w-kúk:u-(*ŋ)=ki n=égé-bwáŋ-á*
 FOC-Kuku-(ACC)-REL COMP-I SG-like-IPFV
 'It's Kuku that I like.' (Jenks & Sande 2017: ex. (10)) **topical > focused**

explanation:

this is because patients are typically **non-prominent**,
 so an efficient tradeoff is provided by systems in which **only atypical patients**
 are marked (Moravcsik 1978; Bossong 1991; Haspelmath 2021a)

claim: many general features of languages are due to convergent evolution

if we ignore this, we may go wrong in a serious way, e.g. by proposing
 explanations that may be technically appealing, but are very unlikely to be true



(Bárány & Kalin 2020: 18, reviewing Baker 2015)

anticipated questions:

- language as culture? isn't language a biocognitive phenomenon? (§4)
- why evolution? don't languages *change* (rather than evolve)? (§5)
- is language change really adaptive? it mostly seems to be random (§6)
- how does this relate to “usage-based” approaches? (§7)

3. Connecting with the other Birmingham Lecture speakers**Ted Gibson**

Cross-linguistic tendencies can often be explained by information-processing factors.

BUT: In addition, the explanation requires an evolutionary dimension.

Adele Goldberg

Morphosyntactic structures are constructions, i.e. holistic form-meaning pairings.

BUT: Whether they are conventional matters more than whether they are learned.

David Adger

Morphosyntactic structures are abstract, and the capacity for structure-building must be innate.

BUT: It is unclear whether many general tendencies are due to domain-specific innate structures.

Dagmar Divjak

Linguistics should be usage-based.

BUT: Theories of learning do not necessarily help us understand language structures.

4. A language is a system of social (or cultural) conventions (or norms)

knowledge of a language = knowledge of the conventions plus the skill to apply the conventions fluently

Human groups have many social conventions, e.g.

- how to prepare breakfast
- how to give an academic lecture
- how to dress for a business meeting
- how to choose a political leader
- how to play a game (such as chess)

(all these **evolve** and differ across human groups)

Social conventions do not play an important role in the rhetoric of cognitive or generative linguistics:

cognitive linguistics:

“grammar [should] be thought of as the cognitive organization of **one’s experience** with language.” (Bybee 2010: 8)

generative linguistics:

“Languages are **properties of individuals**, and they take on their individual properties due to the effects of experience on some initial state of the human language faculty.” (Isac & Reiss 2008: 63)

Linguists have typically focused on **knowledge of (a) language**, and have downplayed conventions.

“Children are not taught the rules explicitly, but must extract the rules from the language they hear around them, in effect “reinventing” the grammar of mature speakers... The ... impoverished input leads many linguists to believe that children are equipped with an innate blueprint for language (UG)...” (Fromkin et al. 2017: 383)

But knowledge of language cannot be acquired without conventions.

Children must also understand the **conventionality** of linguistic behaviour, just as they must understand that breakfast obeys conventions, that board games obey conventions, etc.

This becomes particularly clear with children growing up in bilingual families, and even more so in the case of **bimodal bilingual** development (e.g. Lillo-Martin et al. 2014).

Chomsky and others have even denied the possibility of studying language from a non-mentalist perspective:

“E-language is an incoherent notion – the corpus is very often a collection of utterances produced by several speakers. Newspapers obviously represent the output of many individuals.” (Isac & Reiss 2008: 63)

“I-language” is not an incoherent notion (it’s a speaker’s knowledge of a language), but it is **secondary** – the primary phenomenon is the linguistic conventions of the community.

Language use is secondary, too – without conventions, there can be no language use, and there can be no corpora.

Conventions can exist **without a community of native users** (e.g. the conventions of Latin, or of Classical Chinese), and native users can arise from a community of non-native users (as seen with Modern Hebrew, or Nicaraguan Sign Language).

There are also native speakers of Esperanto, and maybe even of Klingon.

The very possibility of **language revitalization** efforts depends on the premise that a language is a set of conventions, and that languages can exist independently of speakers (instead of “extinct”, many people now say that a language with no current speakers is “dormant” or “sleeping”).

Conventions are primary,

knowledge of conventions and conventional language use are secondary.

Acceptability judgements are judgements about **social acceptability** – they don’t provide a way of “looking inside our minds” (introspectively).

(cf. Pullum 2017; blogpost <https://dlc.hypotheses.org/2433>).

The social-convention view of language systems also solves the problem of **analytical indeterminacy** (e.g. Chao 1934):

If several different analyses are possible, then all of them may be correct (for different speakers).

Cultural-evolution explanations are unaffected by this problem:

Which procedures we use to construct our outputs does not matter.

Some speakers may opt for rule application,
others for retrieval from memory.

A concrete example (again involving differential object marking):

(3) Spanish

- | | |
|--|-----------------------------|
| a. <i>Vi Ø la casa.</i> | ‘I saw the house.’ |
| b. <i>Vi a la niña.</i> | ‘I saw the girl.’ |
| c. <i>Le di dinero a la niña.</i> | ‘I gave money to the girl.’ |

Is there a “macro-construction” covering both animate patients and ditransitive recipients?

The answer does not matter for the cultural-evolution explanation – it may be different for different speakers anyway.

5. “Evolution” or “change”?

The parallel with biological evolution promises us a true understanding of adaptation (cf. Nettle 1999).

Linguists have often noted that language structures often **look as if they are “optimal”** (e.g. in Optimality Theory), but the innateness perspective offers no good explanation of adaptedness.

But doesn’t “language evolution” refer to something else? – to the evolution of the **biological capacity for language?**

No: Evolution happens at several levels:

Fitch (2008)	glossogenetic evolution phylogenetic evolution	evolution of languages evolution of linguisticality
--------------	---	--

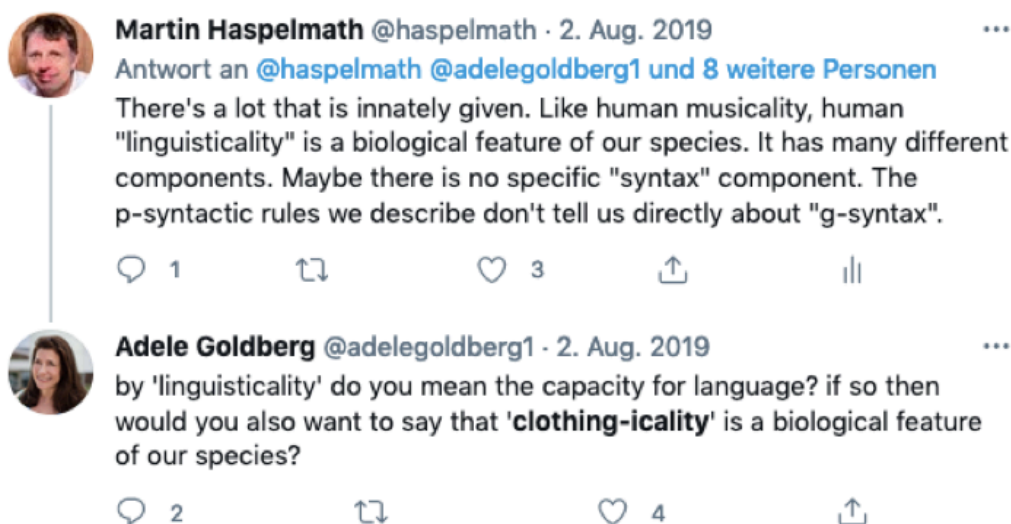
linguisticality: the biological capacity for language (Haspelmath 2020)
(on the analogy of musicality: the biological capacity for music)

Human Language is “an instinct to acquire an art” (Pinker 1994)

“... language is an art, like brewing or baking... It certainly is not a true instinct, for every language has to be learnt. It differs, however, widely from all ordinary arts, for **man has an instinctive tendency to speak**, as we see in the babble of our young children; whilst no child has an instinctive tendency to brew, bake, or write.”
(Darwin 1871: Ch. III)

Is this controversial?

(<https://twitter.com/adelegoldberg1/status/1157373123798405121>)



Of course, like musicality, linguisticality consists of a range of components (recursive pattern formation, sound/sign recognition, communicative inferences, etc), and the precise roles of these components are not always clear.

Goldberg (2008: 523): “Prerequisites for Natural Language”

But we need not disagree about the existence of a biological capacity for language. A good way to move us forward would be to be aware of the pitfalls of terminology:

Generative Grammar (GG) is the study of linguistic capacity as a component of human cognition.

The term *Universal Grammar* (UG) is a label for this striking difference in cognitive capacity between “us and them.” As such, UG is the research topic of GG: what is it, and how did it evolve in our species?

(Chomsky et al. 2019: §1)

So yes, language is a biocognitive phenomenon – but it is also a social phenomenon: a **bio-cultural hybrid** (Evans & Levinson 2009).

(However, I would say that “**language**” is a biological phenomenon, while **each language** is a cultural phenomenon. Cultural phenomena are group-specific.)

6. Is language change really adaptive? How does adaptation happen?

Most change is **random and non-adaptive** – this is true both for biological change and for cultural change, including language change.

Linguists are good at finding post-hoc “explanations” for changes that satisfy them, but they do not have a good way of distinguishing correct explanations from wrong explanations.

Evolutionary perspective:

Languages undergo **drift** (= non-adaptive change), and the selective pressures are not very high for most phenomena. So it’s hard to see the selection effects in all the random change.

But sometimes, selective pressure is high, e.g. when a long word increases its frequency in a short time period.

e.g. *Hippopotamus amphibius* > *hippo*

Let’s reverse the perspective:

How do adapted structures arise, e.g. symmetric vowel systems?

Old English	$\bar{i} > a\bar{i}$	$m\bar{i}n > mine$
	$\bar{u} > a\bar{u}$	$\bar{u}t > out$
	$u > \wedge$	$cutten > cut$

Did English lose [i] and [u]? No:

$\bar{e} > \bar{i}$	$f\bar{e}t > feet$
$\bar{\epsilon} > \bar{i}$	$b\bar{e}atan > beat$
$\bar{o} > u$	$m\bar{o}d > mood$

All linguists agree that symmetric vowel systems that include [i] and [u] are desirable, and there is virtually no doubt that there is a **selective pressure** favouring systems with these vowels.

But what exactly happened remains unclear, after studying the vowel changes for over a century – is it a **drag chain**? a **push chain**? Hard to say...

How does differential object marking arise?

Spanish <i>a</i>	<	Latin <i>ad</i> ‘to’/dative
Russian <i>-a</i>	<	<i>-a</i> (genitive)
Afrikaans <i>vir</i>	<	Dutch <i>voor</i> ‘for’
Batavia Creole <i>kung</i>	<	Portuguese <i>com</i> ‘with’ (Maurer 2004)
Persian <i>-râ</i>	<	Old Persian <i>râdi</i> ‘concerning’

Sri Lanka Malay *-yang* < Malay *yang* (relative marker) (Smith 2012)
 German *-n* < stem-forming element (Haspelmath 2002: §12.1.5)

In German, differential marking arose by **abandoning the distinction** in inanimates:

medieval German	NOM	<i>affe</i>	'ape'	<i>knote</i>	'knot'
	ACC	<i>affe-n</i>		<i>knote-n</i>	
Modern German	NOM	<i>Affe</i>		<i>Knoten</i>	
	ACC	<i>Affe-n</i>		<i>Knoten</i>	

Again: What exactly happened remains unclear – but the changes have yielded analogous results in many different languages, apparently due to the same selective pressure.

Evidence for functional adaptation is not found in the changes themselves – but the changeability of linguistic conventions makes it possible for selective pressures to take effect.

Multi-convergence is evidence for adaptation (Haspelmath 2019).

7. What are “functional” and “usage-based” analyses?

Not only terms like “universal grammar” are unclear, but the same applies to the terms “functional” and “usage-based”.

7.1.

“**Functional analysis**” was originally the same as “structural analysis”, and contrasted with “historical analysis” (e.g. Mathesius 1929, and related work from the Prague School)

– the idea was that linguistic elements are best understood **as part of a system** in which they **fulfill a function**

But this is different from **functional-adaptive** explanation – functional-structural analysis is possible outside of an evolutionary context, and it can occur in classical generative grammar:

“verb phrases can **function** as targets for wh-questions” (Haegeman 2006: 83)

“**Functional analysis**” can also mean “analysis of a construction that focuses on the communicative function(s) of the construction”, but again, this can be part of classical generative grammar.

The “structural-functional” frameworks (Functional Grammar, Role and Reference Grammar; cf. Butler 2003) are not crucially different from generative grammar, except that sociologically, their practitioners have tended to associate with non-generativists.

This is why I prefer **functional-adaptive explanation**, or **convergent-evolution explanation**, for the explanations of general trends.

7.2.

What are “**usage-based**” analyses?

Dagmar Divjak last week:

“Usage-based linguistics acknowledges that the language system **emerges from use** and is **shaped by use** with the influence of human cognitive abilities”

(1:17:20)

<https://www.youtube.com/watch?v=FeLPbpoqqHs>

But does this contrast with generative linguistics? Chomskians assume that we have **cognitive abilities** and that the language system arises **on the basis of the “input”**.

Diessel (2015: 295):

[In the usage-based approach], grammar is an “emergent phenomenon” ... shaped by general psychological mechanisms such as categorization, analogy, and entrenchment. [The approach] contrasts sharply with the generative theory of grammar in which the core of the language users’ grammatical knowledge ... is assigned to a particular faculty of the mind including **innate categories and constraints that are exclusively needed for language**.

It seems that this is the main distinguishing feature:

Usage-based linguists do not assume that there are innate categories and constraints
(= an **innate blueprint for grammar**).

In other words: There is no a priori assumption that the building blocks of grammar are **natural kinds** that exist in advance (Haspelmath 2020).

I used the expression “usage-based approach” myself (Haspelmath 2004)

– because at the time, I followed my mentor Joan Bybee.

Now I would distinguish three different but compatible concepts:

- **convergent-evolution** explanations of cross-linguistic generalizations (Gibson, Haspelmath)
- accounts of language acquisition and mental grammars that accord a central role to **exemplar memory** (Goldberg, Divjak; Bybee)
- accounts of language-particular constructions in which general **semantic and pragmatic** concepts are central (Gibson, Goldberg)

In my work on efficiency explanations of asymmetric coding in grammar, **frequency of use** has played a big role – but the role is quite different from its role in exemplar-memory accounts of mental grammars.

frequency → predictability → shortness of coding (Haspelmath 2021b)

8. Conclusion

I have argued

- that many properties of language systems can be understood as cultural adaptations
- that language systems are primarily systems of social conventions
- that cultural evolution of languages is an evolutionary process, but quite distinct from the evolution of the biological capacity for language
- that multi-convergence by different pathways is indicative of functional adaptation
- and that convergent-evolution explanations are quite different from exemplar-memory explanations, and from semantic-pragmatic explanations.

References

- Ackerman, Farrell & Malouf, Robert & Moore, John. 2017. Symmetrical objects in Moro: Challenges and solutions. *Journal of Linguistics* 53(1). 3–50. (doi:10.1017/S0022226715000353)
- Baker, Mark C. 2015. *Case: Its principles and parameters*. Cambridge: Cambridge University Press.
- Bárány, András & Kalin, Laura. 2020. Introduction. In Bárány, András & Kalin, Laura (eds.), *Case, agreement, and their interactions: New perspectives on differential argument marking*, 1–26. Berlin: De Gruyter Mouton. (<https://doi.org/10.1515/9783110666137-003>)
- Bossong, Georg. 1991. Differential object marking in Romance and beyond. In Kibbee, Douglas & Wanner, Dieter (eds.), *New analyses in Romance linguistics*, 143–170. Amsterdam: Benjamins.
- Butler, Christopher. 2003. *Structure and function: A guide to three major structural-functional theories*. Amsterdam: Benjamins.
- Bybee, Joan L. 2010. *Language, usage and cognition*. Cambridge: Cambridge University Press.
- Chao, Yuen Ren. 1934. The non-uniqueness of phonemic solutions of phonetic systems. *Bulletin of the Institute of History and Philology Academia Sinica* 4. 363–397.
- Chomsky, Noam & Gallego, Ángel J. & Ott, Dennis. 2019. Generative grammar and the faculty of language: Insights, questions, and challenges. *Catalan Journal of Linguistics* 2019. 229–261. (doi:10.5565/rev/catjl.288)
- Comrie, Bernard. 2005a. Alignment of case marking. In Haspelmath, Martin & Dryer, Matthew S. & Gil, David & Comrie, Bernard (eds.), *The world atlas of language structures*, 398–405. Oxford: Oxford University Press. (<http://wals.info/chapter/98>)
- Comrie, Bernard. 2005b. Numeral bases. In Haspelmath, Martin & Dryer, Matthew S. & Gil, David & Comrie, Bernard (eds.), *The world atlas of language structures*. Oxford: Oxford University Press. (<http://wals.info/chapter/131>)
- D'Alessandro, Roberta. 2017. When you have too many features: Auxiliaries, agreement and clitics in Italian varieties. *Glossa: A journal of general linguistics* 2(1). 1–36. (doi:10.5334/gjgl.102)
- Darwin, Charles. 1871. *The descent of man*. London: Murray.

- Diessel, Holger. 2015. Usage-based construction grammar. In Dağbrowska, Ewa & Divjak, Dagmar (eds.), *Handbook of cognitive linguistics*. Berlin: De Gruyter Mouton.
- Evans, Nicholas & Levinson, Stephen C. 2009. The myth of language universals: Language diversity and its importance for cognitive science. *Behavioral and Brain Sciences* 32(5). 429–448. (doi:10.1017/S0140525X0999094X)
- Fitch, W. Tecumseh. 2008. Co-evolution of phylogeny and glossogeny: There is no “logical problem of language evolution.” *Behaviour and Brain Sciences* 31(5). 521–522. (doi:10.1017/S0140525X08005128)
- Fromkin, Victoria & Rodman, Robert & Hyams, Nina. 2017. *An introduction to language: 11th edition*. Boston: Cengage.
- Goldberg, Adele E. 2008. Universal Grammar? Or prerequisites for natural language? *Behaviour and Brain Sciences* 31(5). 522–523. (doi:10.1017/S0140525X0800513X)
- Haegeman, Liliane M. V. 2006. *Thinking syntactically: A guide to argumentation and analysis*. Malden: Blackwell.
- Haspelmath, Martin. 2002. *Understanding morphology*. London: Arnold. (<https://zenodo.org/record/1236482>)
- Haspelmath, Martin. 2004. Explaining the Ditransitive Person-Role Constraint: A usage-based approach. *Constructions* 2. (doi:10.5281/zenodo.831408)
- Haspelmath, Martin. 2019. Can cross-linguistic regularities be explained by constraints on change? In Schmidtke-Bode, Karsten & Levshina, Natalia & Michaelis, Susanne Maria & Seržant, Ilja A. (eds.), *Competing explanations in linguistic typology*, 1–23. Berlin: Language Science Press. (<http://langsci-press.org/catalog/book/220>)
- Haspelmath, Martin. 2020. Human linguisticity and the building blocks of languages. *Frontiers in Psychology* 10(3056). 1–10. (doi:10.3389/fpsyg.2019.03056)
- Haspelmath, Martin. 2021a. Role-reference associations and the explanation of argument coding splits. *Linguistics* 59(1). 123–174. (doi:10.1515/ling-2020-0252)
- Haspelmath, Martin. 2021b. Explaining grammatical coding asymmetries: Form-frequency correspondences and predictability. *Journal of Linguistics*. (doi:10.1017/S0022226720000535)
- Isac, Daniela & Reiss, Charles. 2008. *I-language: An introduction to linguistics as cognitive science*. Oxford: Oxford University Press.
- Jenks, Peter & Sande, Hannah. 2017. Dependent accusative case and caselessness in Moro. *Proceedings of NELS*, vol. 47.
- Liljencrants, Johan & Lindblom, Björn. 1972. Numerical simulation of vowel quality systems: The role of perceptual contrast. *Language* 48(4). 839–862.
- Lillo-Martin, Diane & de Quadros, Ronice M. & Chen Pichler, Deborah & Fieldsteel, Zoe. 2014. Language choice in bimodal bilingual development. *Frontiers in Psychology* 5. (doi:10.3389/fpsyg.2014.01163)
- Mathesius, Vilém. 1929. Zur Satzperspektive im modernen Englisch. *Archiv für das Studium der neueren Sprachen und Literaturen* 155(29). 202–210.
- Maurer, Philippe. 2004. La marca de los objetos en los criollos de Batavia y Tugu. In Fernández, Mauro & Fernández-Ferreiro, Manuel & Vázquez Veiga, Nancy (eds.), *Los criollos de base ibérica: ACBLPE 2003*. Frankfurt/Main: Vervuert Verlagsgesellschaft.
- Moravcsik, Edith A. 1978. On the case marking of objects. In Greenberg, Joseph H. (ed.), *Universals of human language*, vol. 4: Syntax, 249–289. Stanford: Stanford University Press.
- Nettle, Daniel. 1999. Functionalism and its difficulties in biology and linguistics. In Darnell, Mike & Moravcsik, Edith A. & Newmeyer, Frederick J. & Noonan, Michael & Wheatley, Kathleen (eds.), *Functionalism and formalism in linguistics*, vol. 1, 445–467. Amsterdam: Benjamins.

- Pinker, Steven. 1994. *The language instinct: How the mind creates language*. New York: William Morrow.
- Pullum, Geoffrey K. 2017. Theory, data, and the epistemology of syntax. In Konopka, Marek & Wöllstein, Angelika (eds.), *Grammatische Variation: Empirische Zugänge und theoretische Modellierung* (Institut Für Deutsche Sprache, Jahrbuch 2016), 283–298. Berlin: De Gruyter Mouton.
- Smith, Ian R. 2012. Adstrate influence in Sri Lanka Malay: Definiteness, animacy and number in accusative case marking. *Journal of Language Contact*. Brill 5(1). 5–22.
(doi:10.1163/187740912X623389)