



Variation in form versus variation in meaning

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Abstract

The aim of this introductory article is to provide a background to the articles contained in this special issue of *Lingua* that centers around variation in form, variation in meaning, and markedness. Theoretical and empirical considerations are brought together in this special issue in which the linguistic disciplines that are covered diverge. The different contributions deal with language processing, first language acquisition, language contact, functional-typology and generative morphology and syntax. Several papers in this special issue argue in favour of an Optimality Theoretic analysis of the data under discussion. This is not a coincidence, given that Optimality Theory is claimed to *be* a formal theory of markedness (cf. [Gilbers and De Hoop, 1998](#), *Lingua*, 104, 1 for an introduction to OT).

In [Section 1](#), we present two hypotheses dealing with the relation between variation in form and variation in meaning. We discuss several dimensions along which markedness of forms and meanings can be measured in [Section 2](#). In the final section we discuss the possibility that the concept of bidirectional optimization accounts for markedness as well as variation in form versus variation in meaning. © 2003 Elsevier B.V. All rights reserved.

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1. Two hypotheses

Imagine a language in which one can say *He saw him* as well as *I saw him*, but not *He saw me*. That is, **He saw me* is completely ungrammatical. Imagine you are a speaker of this language, and at a certain point you want to express the fact that a certain person you're already talking about, say Harry, actually saw you, that is, the speaker. In other words, you

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- (5) HYPOTHESIS I. When there is no variation in form (or, variation in form decreases), there is variation in meaning (or, variation in meaning increases).

A language that provides us with many examples that may serve as illustrations of this hypothesis, is Riau Indonesian, as pointed out by Gil (2003). For example, a form such as *Ayam makan* ‘chicken eat’ has many different meanings, varying from “The chicken is eating” to “Someone is eating the chicken”. Ultimately, if we would have only one form at our disposal in a language, this one form should serve to express infinitely many meanings. In such a situation we expect an increase of the number of forms. The question is at what time such a process of formal disambiguation (i.e. by adding forms) would come to an end, and by what means? One factor that is of utmost importance in the mappings from meaning to form and *vice versa*, is context (see also Heine, 2002). Notoriously, information from the context can help to disambiguate a certain form. Context is quite often a decisive factor. But in general, languages differ considerably in to what extent context contributes to the interpretation of an expression.

For example, suppose a speaker witnessed the killing of Frank by Harry and wishes to report on that. Whether the speaker chooses to express this as *Harry killed Frank* or as *Frank killed Harry*, it seems important that a hearer will understand the chosen expression correctly. In particular, the hearer should be able to distinguish between an interpretation such that Harry is the killer and Frank the victim and an interpretation according to which Frank would be the killer and Harry the victim. In English, the distinction is made with the help of word order. That is, *Harry killed Frank* only means that Harry is the agent and Frank the patient in the killing event. The speaker would have chosen *Frank killed Harry* otherwise. In this example, word order reflects argument (agent–patient) structure. Most languages have some means to express the difference between the two meanings, e.g. through word order, morphological case, agreement, intonation, or a combination of several of the possible markers. In German, morphological case overrules the effect of word order. Hence, *Den Harry hat der Frank getötet* can only mean that Frank killed Harry. In Japanese, we find a relatively free order of case marked nominal constituents even outside their own clause (cf. Bouchard, 2001). The traditional view is that covariation between morphological case and restrictions on argument order is expected since they have the same function of encoding grammatical relations (cf. a.o., Keenan, 1978).

Strikingly, in Tohono O’odham (a language formerly known as Papago, spoken in southern Arizona and northern Mexico), described by Miyashita et al. (in press), there is no grammatical strategy available at all to distinguish between *Harry killed Frank* and *Frank killed Harry*. Consider the following sentences:

- (6) Huan ’o g Husi ka: [Tohona O’odham]
 John 3rdsub-imp det Joe hear
 “John is hearing Joe” or “Joe is hearing John”
- (7) Husi ’o g Huan ka:
 Joe 3rdsub-imp det John hear
 “John is hearing Joe” or “Joe is hearing John”

Word order in Tohona O’odham is basically free. The sentences in (6) and (7) have the same meanings. Miyashita et al. (in press) further argue that no prosodic feature is sufficient to disambiguate sentences such as (6) and (7) with two third person arguments. Hence, in this language, the primary clue for establishing who killed who, or, as in (6) and (7), who is hearing who, must come from the context.

Not only do we find examples such as above where context is in fact necessary for disambiguation, we also find many instantiations of potential ambiguity, where word order or prosodic clues that give rise to certain default or preferred interpretations, may be overruled by context. Miyashita et al. (in press) discuss the Lummi sentence in (8).

- (8) leŋ-nə-s cə slənčɔʔəł ɔə swiqʔɔʔəł. [Lummi]
 see-nontrans-3rd det girl det boy
 “The girl sees the boy” or “The boy sees the girl”

The potential ambiguity in Lummi is usually resolved in favour of the first reading (VSO), which is the default interpretation that comes with the word order. However, context can overrule this preferred reading. A similar generalization is proposed by de Hoop (2000), who extensively argues that the relative word order between an adverb and a definite direct object is truly optional in Dutch (that is, there exist two forms). In principle, both orders can be used to refer to an anaphoric definite that is preceded by a linguistic antecedent, and both orders can be used to refer to a non-anaphoric definite (that is, there exist two meanings). Consider the following Dutch pair of subordinate sentences:

- (9) omdat ik zelden de kat aai. [Dutch]
 since I seldom the cat pet
 “since I seldom pet the cat”
- (10) omdat ik de kat zelden aai.
 since I the cat seldom pet
 “since I seldom pet the cat”

The sentences in (9) and (10) are both well-formed. Williams (1997) argues that when a language shows this kind of word order variation, there must be a difference in meaning between the two forms, due to a general *Blocking Principle*. At first sight, this difference does indeed exist: in (10) the cat is readily interpreted as an anaphor (the interpretation is that a certain cat has been introduced in the discourse before), while in (9) the most unmarked interpretation involves a non-anaphoric cat (here, *the cat* uniquely refers to an individual, for instance the speaker’s cat, but it is new in the discourse). But these interpretations crucially arise in the absence of any other, phonological or contextual, clues, just on the basis of word order. If a specific context is added, these default readings are easily overruled.

(11) *Linguistic context:*

Paul maakt de laatste tijd een gespannen indruk.

“Recently, Paul seems to be under stress.”

- a. Misschien komt dat omdat hij zelden de kat aait.
 maybe comes that because he seldom the cat pets
 “That’s maybe because he hardly ever pets the cat.”
- b. Misschien komt dat omdat hij de kat zelden aait.
 maybe comes that because he the cat seldom pets
 “That’s maybe because he hardly ever pets the cat.”

In the linguistic context provided by (11) no cat is introduced in the preceding discourse, hence no linguistic antecedent is available for an anaphoric interpretation of the cat. Accordingly, *the cat* is interpreted non-anaphorically in *both* (11a) and (11b), referring to a unique individual, for example Paul’s cat. Note that the word order variant (11b) is not excluded for this interpretation, nor does it force an anaphoric interpretation of *the cat*. In other words, in case of a conflict between a word order clue and a contextual clue, context wins.

Likewise in (12), where the context triggers the anaphoric reading in both (12a) and (12b), irrespective of the word order.

(12) *Linguistic context:*

Paul heeft een kat die de laatste tijd een gespannen indruk maakt.

“Paul has a cat that seems to be under stress, recently.”

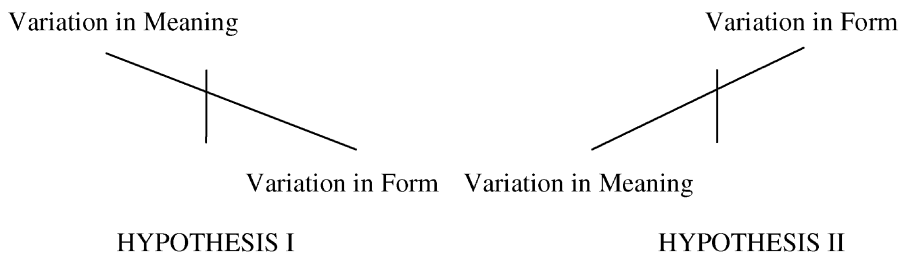
- a. Misschien komt dat omdat hij zelden de kat aait.
 maybe comes that because he seldom the cat pets
 “That’s maybe because he hardly ever pets the cat.”
- b. Misschien komt dat omdat hij de kat zelden aait.
 maybe comes that because he the cat seldom pets
 “That’s maybe because he hardly ever pets the cat.”

In (12) a potential antecedent is given by the indefinite noun phrase *a cat* that introduces a new referent in the discourse. The occurrences of the definite *the cat* are read as referring to the same discourse referent. That is, *the cat* gets anaphorically linked to *a cat*, irrespective of whether it shows up to the left or to the right of the sentential adverb. In other words, if one interpretation is preferred via a contextual clue, then the effect of word order becomes negligible. de Hoop (2000) discusses more examples where linguistic context, prosody, or world knowledge each are sufficient to overrule the assignment of preferred interpretations on the basis of word order in case of a definite object and an adverb. The conclusion that can be drawn is that when the number of possible interpretations is decreased via context, it becomes easier to use an alternative word order. This then leads us to our second hypothesis:

- (13) HYPOTHESIS II. When there is no variation in meaning (or, variation in meaning decreases), there is variation in form (or, variation in form increases).

One more illustration of this hypothesis is found in Dutch where we find numerous forms for the negative polarity construction *ergens geen* {*bal, fuck, snars, hout, reet, zier, zak, donder, sikkepit, fluit, ...*} *van begrijpen* that all mean the same thing, namely “to understand the least bit about something”. In accordance with Eckardt’s pragmatic approach, the alternative items in this construction can all be interpreted as “least valuable” objects (cf. Eckardt, 2003).

Taking the two hypotheses together, we may say that an increase of variation in one element of a form-meaning pair correlates with decrease of variation in the other, and the other way around. The figure in the following serves to illustrate this idea.



So, the sum hypothesis is that if variation in meaning decreases, variation in form increases, and if variation in form decreases, variation in meaning increases. Looking at the figures above, one might imagine a stage of balance in between these two endpoints, such that the degree of variation in form exactly corresponds to the degree of variation in meaning, in other words, we get one-to-one form/meaning matches. One-form-one-meaning patterns and regularities with respect to markedness will be under discussion in the next section.

2. Definitions of markedness

The two hypotheses presented in the previous section seem to be at odds with the more classical observation, that was already mentioned above, formulated by Williams (1997: 578) as involving a “hatred of synonymy”: “if two forms exist (in syntax or morphology), they must have different meanings; if two forms cannot be assigned different meanings, then one of them cannot exist.” This Blocking Principle as a strive after one form/one meaning matches is on a par with general economy principles in communication, and it is argued to function as a principle of language acquisition as well.

In this issue, an analysis along these lines is proposed by Eric Mathieu for the form-meaning matches of “optional” *wh*-movement in French. French has the possibility of fronting a *wh*-phrase or leaving it in situ. Mathieu (this issue) puts forward the hypothesis that the two forms correspond to a different meaning each. In particular, he argues that French *wh*-in-situ questions involve the stranding of an indefinite noun phrase which in that position must be interpreted as a predicative indefinite, or, a “lower-order topic”. On the

basis of his hypothesis, Mathieu argues that the optionality of *wh*-movement in French is not real. One form corresponds to one meaning.

If, in the ideal case, each form corresponds to exactly one meaning, then the question may be raised whether there is a systematic way of associating certain forms to certain meanings. One possibility is usually referred to as *iconicity*, the idea that formal (morphological) complexity reflects semantic complexity, or, to put it differently, marked forms are associated with marked meanings (cf. Aissen, 2000; Blutner, 2000). Before we pursue that line of reasoning, we need to discuss a number of different ways in which *markedness* of form or meaning can be defined. The list presented in the following is by no means exhaustive; for a more detailed discussion, the reader is referred to Battistella (1996), Croft (1990), and references cited therein.

2.1. Morphological markers

The unmarked value is defined as the one that does not have overt morphological marking, whereas the marked value does. Consider an example in the domain of case, an instantiation of the phenomenon known as *Differential Object Marking*.

(14) Ali kitap okudu. [Turkish]
 Ali book- \emptyset read
 ‘Ali read a book.’

(15) Ali kitabı okudu.
 Ali book-ACC read
 ‘Ali read the book.’

In these examples we observe two possible forms of the direct object, a morphologically unmarked one (the noun bears no case marking) and a morphologically marked one (the accusative case marker *-ı* is added to the noun). As can be seen from the translations, the two forms are associated with a different meaning each. Another example of morphological markedness is found in the verbal paradigm for present and past tense in Dutch. Present tense verb forms are morphologically less complex than their regular past tense counterparts, as the following paradigm illustrates: the past tense morpheme *-de* or *-te* (used when the final phoneme of the verb stem is voiced or unvoiced, respectively) is included in all forms of the past tense paradigm; the schwa of this suffix deletes (indicated by the parentheses) when the following morpheme starts with a schwa; the inflection for the second person singular present *-t* does not show up when inversion between subject and verb takes place.

(16) Indicative verbal paradigm of *wandelen* ‘to walk’

		Present	Past
Sg.	1	wandel	wandel-de
	2	wandel-(t)	wandel-de
	3	wandel-t	wandel-de
Pl.	1	wandel-en	wandel-d(e)-en
	2	wandel-en	wandel-d(e)-en
	3	wandel-en	wandel-d(e)-en

As this paradigm shows, the suffix *-en* is used both in the present and past tense, for all three persons; hence, it should be specified as [number: plural]. The suffix *-t* should be specified as [number: singular; person: not-1] in the context [tense: present]. The suffix *-de* can thus be specified as [tense: past] (cf. Booij, 2002).

2.2. The order of acquisition

The unmarked value is defined as the one that is acquired before the marked one (and its mirror image: the marked value is lost before the unmarked one in language breakdown). The present tense, for instance, is acquired before the past tense; simple past tense forms of lexical verbs occur very rarely before the age of four (de Houwer and Gillis, 1998: 34). Similarly, children acquiring Dutch initially use only singular nouns, even though they already have a concept of ‘more than one’; only later do plural nouns come in. There are two regular plural suffixes in Dutch: *-s* and *-en*. At first, plurals are used correctly with a limited number of nouns. Later, when the use of plurals is productively extended to a much larger group of nouns, children overgeneralize the *-s* suffix (Frijn and de Haan, 1994:145–146).

One may look at language acquisition as a process of blocking of unmarked forms by marked forms over time. These unmarked forms are often not even present in the adult input. Jacqueline van Kampen (this issue) raises the following important question: Once the unmarked forms are there, why should they ever disappear? Intuitively, unmarked forms are easier to acquire and more general in their usage. Van Kampen proposes that each more marked grammatical characteristic has an unmarked (default) alternative. They represent the same meaning, and in the process of acquisition the marked form blocks the unmarked form. Thus, there is a move from default licensing to marked licensing. Once the marked value has or has not been assigned to a category in the lexicon, the grammar must follow the instruction incorporated in the lexicon. Although the unmarked value gets blocked by the marked value of the parameter, it does not have to disappear. The unmarked values will surface again in language acquisition. The default value may also surface in adult language. This may happen when the marked value is added to a lexical item as an optional value. One example she discusses is optionality in stranding the noun phrase when the *wh*-element is fronted in (adult) Polish. This optionality is also found in child Dutch, but in Dutch it is followed by successful blocking in adult Dutch. Van Kampen argues that optionality in adult grammar can usually be explained as a blocking failure in acquisition.

Géraldine Legendre, Paul Hagstrom, Joan Chen-Main, Liang Tao, and Paul Smolensky (this issue) also investigate optionality in language acquisition, focusing on Mandarin aspectuo-temporal markers. The patterns of overgeneralization found in child Mandarin are explained in terms of partial rankings, which allow some constraints to float over part of the constraint hierarchy, before they are assigned a fixed position in the adult grammar. The authors account for the asymmetry between production and comprehension in terms of bidirectional optimization: production goes from a given interpretation to an optimal expression, comprehension goes from a given expression to an optimal interpretation, and these directions impose different boundary conditions on the process of optimization. The same constraint hierarchy, with a number of floating constraints, can account for the observed asymmetry, without taking recourse to multiple grammars or different processing restrictions for production and comprehension.

In aphasics, the more marked values become unavailable before the less marked values, the mirror image of the pattern found in children acquiring their native language. Dutch agrammatics, for instance, overuse the present tense form of verbs, also applying it in contexts where a past tense form is required; the opposite type of error—where they replace a present tense form with a past tense form—does not occur (Kolk et al., 2003). Similarly, there is a preference for singular forms over plural forms.

2.3. Language universals

One definition of markedness is that the more widespread a property is across the world's languages, the less marked it is. For example, the subject precedes the object (SO) in 96% of the languages in the sample of 402 languages used by Tomlin (1986). Thus, SO is the unmarked order as compared to OS. If a language has verbs that show overt person and number agreement, they have tense marking as well (Greenberg, 1963). The opposite is not necessarily the case: a language can have tense marking in the absence of agreement marking; the Kru languages are a case in point (Koopman, 1984; Haverkort, 1993).

2.4. Unmarked interpretation

The unmarked interpretation of a form is defined as the interpretation it receives in a neutral context; only if the sentential or discourse context provides evidence to the contrary, is the marked interpretation activated. In Chinese, an isolating language, lacking inflectional morphology altogether, the unmarked interpretation for tense is the present; only if an explicit marker, such as the adverbial modifier *zuótiān bādiǎn* 'yesterday at 8 o'clock' in the second example below, is added, the past interpretation is forced; when no such marker is present, as in the first example, the present interpretation is the only one available.¹

(17) Yángníng zài dú shū. [Chinese]
 Yangning PROGR read book
 "Yangning is reading a book."

(18) Yángníng zuótiān bādiǎn zài dú shū.
 Yangning yesterday 8 o'clock PROG read book
 "Yesterday at 8 o'clock, Yangning was reading a book."

Similarly, nouns in Chinese are not marked for number; if no indication of number is present, the unmarked number interpretation of the object is singular, as in the first example below; if an indication to the contrary is present, as the plural demonstrative pronoun *zhè xiē* 'these' in the second example, the plural interpretation is forced.

(19) W zài xiǎng wéntí.
 I PROGR think problem
 "I think of a problem."

¹ Thanks to Yang Ning for discussion of the Chinese examples.

- (20) W zài xiǎng zhè xiē wèntí.
 I PROGR think these problem
 “I think of these problems.”

2.5. Frequency

In a representative text sample, the unmarked option is defined as the one that occurs more often than the marked option. Another possibility is that the unmarked value is defined as the one that occurs in more grammatical contexts (construction types) than the marked one; in any case, the marked value has a more limited distribution. The distribution of the past tense in Dutch, for instance, is very limited. The simple past is disappearing from the language; in increasingly more contexts, a past event is expressed using the present perfect. The simple past is still used in a limited number of contexts, for instance with certain adverbs (*toen* ‘then’, *vroeger* ‘previously’, for instance) and to express habitual, recurring events, as in the following example.

- (21) Ik fiets-te iedere dag naar mijn werk.
 I bike-PAST every day to my work
 “I used to bike into work every day.”

2.6. Markedness hierarchies

Based on the convergence of these different morpho-syntactic and semantico-conceptual criteria, the following markedness hierarchies can be established for number and tense (where $X < Y$ indicates that X is less marked than Y) (Greenberg, 1966; Lapointe, 1985; Kurylowicz, 1964):

- (22) Number (in nouns, pronouns and verbs): singular < plural < dual < trial
 (23) Tense: present < past < future

These different markedness hierarchies have a cumulative effect: forms are more highly marked, as they have the marked value on more dimensions, e.g. number and tense, as opposed to just tense. In view of the above markedness hierarchies, for instance, a plural past tense verb form is more highly marked than its singular past or plural present counterpart, as it has the more highly marked value on two dimensions, instead of just one.

2.7. Differential object marking

Comrie (1989) proposes a markedness principle for argument properties: “the most natural kind of transitive construction is one where the subject is high in animacy and definiteness, and the object is lower in animacy and definiteness; and any deviation from this pattern leads to a more marked construction” (Comrie, 1989: 128).

objects are often not even treated formally as objects at all, that is, they are incorporated, or they receive oblique case, etc. Another problem is that the markedness reversal would predict that “what is unmarked for objects is marked for subjects”. Thus, this analysis would predict morphological case marking of lowly individuated (inanimate, indefinite) subjects, but this prediction is borne out only for a small subset of the languages that display *differential subject marking*. Næss (this issue) comes up with an alternative analysis which solves this inconsistency and in fact explains a broader range of phenomena, including differential subject marking.

At this point, let us consider the view that Matthias Schlesewsky and Ina Bornkessel (this issue) present regarding language comprehension. Language comprehension is often characterised as a process that involves mapping form onto meaning, and one of the most basic assumptions is that it proceeds incrementally, i.e. by seeking to maximise the degree of interpretation computed with each new word that is encountered. As Schlesewsky and Bornkessel show on the basis of a number of studies using event-related brain potentials (ERPs), the degree of meaning derived from a given form during online sentence comprehension differs as a function of the morphological informativeness of the sentential arguments. Unambiguously case marked sentences turn out to be processed in a qualitatively different manner to case ambiguous sentences. For example, the processing of an unambiguously identifiable object will give rise to the prediction of a subject. But, in the absence of contradicting evidence, an argument is always assumed to be hierarchically independent or highest ranked. From a syntactic perspective, this principle results in a preference for intransitive structures during online language comprehension, while thematically, it leads to a processing strategy that never assigns an argument a patient role, unless there is explicit evidence of some sort requiring this (see also Lamers, 2001). Schlesewsky and Bornkessel discuss two principles that govern the establishment of the thematic hierarchy itself, one stating that there must always be a hierarchical relationship between two arguments, the other that this hierarchical distance between the two must be maximized.

3. Bidirectional optimization

Above we already pointed out the cross-linguistic generalization that marked forms typically have concomitant marked meanings (cf., e.g. Bresnan, 2001; Wurzel, 1998). Levinson (2000) formulates this generalization as follows: “What is said in an abnormal way indicates an abnormal situation, or marked messages indicate marked situations” (Levinson, 2000: 136). Recent experimental support for this principle at the level of word meaning in Dutch and Kambera, is found in Klamer (2002).

An example of this generalization in Icelandic is discussed by Hans-Martin Gärtner (this issue). Indefinite noun phrases appear either to the right of a sentential adverb (the canonical or *unmarked* position), or to the left of it (the shifted or *marked* position). There are not only two positions but also two meanings for indefinites, i.e. the weak (existential) or *unmarked* one, and the strong (generic) or *marked* one. A one to one form/meaning match can be formulated as a constraint, dubbed *Unambiguous Encoding* by Gärtner. This constraint states that the weak indefinites stay in their canonical position, whereas the

strong indefinites shift to the marked position. In other words, the unmarked meaning corresponds to the unmarked form, the marked meaning to the marked form. The picture changes, however, in contexts when the marked position in Icelandic is not available, due to an interfering syntactic constraint. In such a situation when the unmarked form is the only form left, it turns out that this form becomes ambiguous between the unmarked and the marked meaning, in accordance with our Hypothesis I. In fact, Hypothesis I is addressed by Gärtner as the problem of *partial iconicity*, that is, when we are confronted with one form (the unmarked form) for two meanings (both the unmarked and the marked meaning). Gärtner examines different Optimality Theoretic systems to find out what hope they can offer for accounting for the generalization captured by our Hypothesis I.

The generalization that marked forms go with marked meanings is not necessarily stated as an independent principle of language. Within the recently developed bidirectional view on optimization (Blutner, 2000; Zeevat, 2000) the markedness principle turns out to be epiphenomenal, brought out by the interaction of general economy considerations. Blutner's framework takes the effects of the interaction of the speaker's and the hearer's perspective to a higher level of abstraction in the sense that he integrates optimal interpretation and optimal production. Within his approach, the notion of *super-optimality* is defined. Super-optimal pairs of meanings and forms are optimal in both directions of optimization. In principle, two types of super-optimal form-meaning pairs can be distinguished, the ones consisting of an unmarked form and an unmarked meaning, and the ones consisting of a marked form and a marked meaning. Both are super-optimal, because there are no alternative super-optimal pairs such that either the form is more economical with respect to that same meaning, or the meaning is more adequate with respect to that same form.

The pragmatic generalization that marked forms tend to be used for marked interpretations, is accounted for by Blutner's theory of bidirectional optimization. The structures that compete in one direction of optimization are constrained by the outcomes of the other direction and vice versa. Consider once again the phenomenon of Differential Object Marking in Turkish, repeated here for convenience.

- (25) Ali kitap okudu. [Turkish]
 Ali book_{NOM} read
 'Ali read a book.'
- (26) Ali kitabı okudu.
 Ali book_{ACC} read
 'Ali read the book.'

In these examples we observe two possible (hence optimal) forms, a morphologically unmarked one (nominative case) and a morphologically marked one (accusative case). Furthermore, we get two possible (hence optimal) interpretations, a semantically unmarked one (a weak object) and a semantically marked one (a strong object).

Suppose we want to interpret the nominative case, the unmarked form. The meanings that compete are the weak reading and the strong reading for the object. Since the weak reading is less 'expensive' (economy constraint), it follows that this is the optimal

interpretation for the nominative. An analogous argument shows that nominative case will be the optimal form for the weak object reading. Consequently, the pair <nominative-weak> is super-optimal.

Next, consider the interpretation of accusative case. The weak reading is blocked by the existence of the nominative case variant (which would be the optimal form for the weak reading). Similarly, starting with the strong reading, nominative case is blocked by virtue of the existence of a less marked reading (which would be the optimal meaning for nominative case). By lack of super-optimal pairs such as <accusative-weak> and <nominative-strong>, we end up with one other super-optimal form-meaning pair, namely <accusative-strong>. Thus, Blutner argues that the notion of super-optimality captures the essence of the principle of markedness. But there are some potential problems with this view, for example the occurrence of true optionality and true ambiguity in language. Beaver and Lee (in press) extensively show that all existing bidirectional OT systems suffer from serious problems in their treatment of form-meaning asymmetries.

In the paper by Arto Anttila and Vivienne Fong (this issue) an alternative theory of the relation between meaning and form is explored that derives optionality and ambiguity as well as preferences in expression and interpretation. They address in the following important question: Why do we only find certain patterns of optionality and ambiguity, but not others? The key to the answer lies in the assumption of a partially ordered Optimality Theoretic grammar that can be interpreted quantitatively. A fundamental property of their grammar is that the same ranking may yield both categorical and quantitative effects, depending on the input. In the empirical domain of genitive constructions in English, Anttila and Fong thus predict *my picture* to be preferred over *the picture of me* in 80% of the cases, while the same grammar (that is, the same partial ranking of constraints) accounts for the categorical contrast between the grammatical form *my cat* versus the ungrammatical expression **the cat of me*.

Another example of two forms for one meaning is found in Spanish, as described by Andrew Koontz-Garboden (this issue). Spanish has two verb forms that overlap in meaning, both being usable with progressive meaning. In English, there is a one-to-one relationship between form and meaning in that the analytic form of progressive aspect (e.g. 'is going out') expresses a progressive meaning, while the synthetic form (e.g. 'goes out') expresses a habitual meaning. In Spanish, on the other hand, the synthetic form (e.g. *sale* 'goes out') can be used with both meanings, while the analytic form (e.g. *está saliendo* 'is going-out') is only usable with the progressive meaning. Koontz-Garboden addresses the issue of optionality in a language contact situation. He looks at indirect transfer in English–Spanish bilinguals. In indirect transfer, there is a statistical deviation from the norm, not a qualitative one. English–Spanish bilinguals overuse the analytic form in Spanish, thus minimizing the difference between the two languages. Koontz-Garboden proposes an analysis of this phenomenon in terms of stochastic OT, which allows for constraints to have a particular range. If adjacent constraints have an overlapping range, their order can be reversed. The number of constraints with an overlapping range is larger for the Spanish monolinguals, allowing for both a synthetic and an analytic form to express a progressive aspect, but it is less extensive for the English–Spanish bilinguals, thus allowing less variation in the form-meaning mapping.

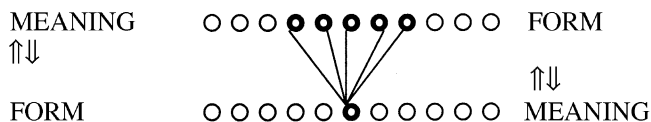
Another potential problem for [Blutner \(2000\)](#) lies in the *asymmetry* in markedness noted above, called *partial iconicity* by Gärtner (this issue). This asymmetry between form and meaning is also the core of the two hypotheses presented in [Section 1](#) above: we may say that a decrease of variation in one element of a form-meaning pair correlates with a possible increase of variation in the other, and the other way around. One additional example may serve to illustrate this point. [Malchukov \(in press\)](#) argues that three concessive conjunctions in Russian (three forms) are related to three semantic components (three meanings) but not as three one-to-one mappings, but rather as one three-to-one, one two-to-one, and one one-to-one mapping. This is illustrated by the following examples for concessive, adversative, and preventive meanings, respectively (that is, the conjunction in the (a)-sentences can have all three meanings, the one in the (b)-sentences the concessive and adversative meanings, and the one in the (c)-sentences only the concessive meaning):

- (27) a. Vanja prostudilsja, **no** poshel v shkolu. [Russian]
 Vanja caught.cold but went to school
 “Vanja caught cold, but went to school.”
- b. **Xotja** Vanja prostudilsja, on poshel v shkolu.
 although Vanja caught.cold he went to school
 “Although Vanja caught cold, he went to school.”
- c. **Nesmotrja na** to shto Vanja prostudilsja, on
 in.spite of this COMP Vanja caught.cold he
 poshel v shkolu.
 went to school
 “In spite of (the fact) that Vanja caught cold, he went to school.”
- (28) a. Vanja lenivyj, **no** umnyj.
 Vanja lazy but smart
 “Vanja is lazy, but smart.”
- b. Vanja umnyj, **xotj i** lenivyj.
 Vanja smart although INTENS lazy
 “Vanja is smart, albeit lazy.”
- c. ??Vanja umnyj, **nesmotrja na** to shto lenivyj.
 Vanja smart in.spite of this COMP lazy
 lit. “Vanja is smart, in spite of (the fact) that (he) is lazy.”
- (29) a. Vanja pobezhal, **no** upal.
 Vanja started.run but fell
 “Vanja started to run, but fell.”
- b. ??Vanja, **xotja** pobezhal, upal.
 Vanja although started.run fell
 lit. “Although Vanja started to run, he fell.”
- c. ??Vanja, **nesmotrja na** to shto pobezhal, upal.
 Vanja in.spite of this COMP started.run fell
 lit. “Vanja, in spite of (the fact) that (he) started to run, (he) fell.”

Blutner's (2000) approach captures cases of *total blocking* (a form does not exist because an alternative form already does) as well as *partial blocking* (a marked form is used for a marked meaning, and the other—unmarked—form takes up the other—unmarked—meaning), or *iconicity*. Blutner claims that his approach of bidirectionality can be considered as a principle of language change as well. But then he should predict that languages always change in the direction of one-to-one form/meaning mappings and that the Russian data exemplified above necessarily describe an intermediate stage towards one-to-one form/meaning matches. Clearly, Blutner's conception of bidirectionality is not appropriate to account for the variation in form versus variation in meaning patterns encountered in languages and introduced in the above first section. That is, Blutner would predict language evolution to stop as soon as the intermediate—balanced—level of one-form-one-meaning patterns is reached. We claim that there is more flexibility in language evolution, in accordance with the hypotheses put forward above: if variation in form decreases, variation in meaning increases, and if variation in meaning decreases, variation in form increases.

Nevertheless, we would like to argue that from a different perspective, bidirectionality of optimization can actually be used to explain these patterns. The problem with Blutner's approach is that it only evaluates form-meaning *pairs*, as was also pointed out by Legendre et al. (this issue), hence it cannot deal with the influence of (decrease of) variation in one element of the pair on the (increase of) variation in the other element. However, in general, bidirectionality guarantees a general process for (a) producing an optimal form given a certain meaning, *and* recovering that meaning given the optimal form, and (b) arriving at an optimal interpretation given a certain form, *and* reproducing that form given the optimal interpretation; hence the term *bidirectionality* as it involves more than just the sum of two unidirectional processes of optimization. Thus, bidirectionality accounts for the fact that if there is only one meaning brought about independently by some powerful (e.g. contextual or lexical) constraints, then it is not that important anymore which form is chosen, simply because in the other direction of optimization each of these forms will result in this one and only meaning and no confusion will arise. That is, the one and only meaning of the various forms is easily recoverable. The question arises why the speaker at that point does not continue the process of looking for the optimal form but may choose a form at random. We assume that this is because of a general principle of economy. Continuation of the process of expressive optimization after the point where the meaning has become recoverable for the hearer, would be unnecessary, hence uneconomical.

Of course, this also holds in the other direction. If there is only one form brought about independently by some powerful (e.g. syntactic) constraints, then we can understand that this form can be associated with more than one meaning, as each of these meanings will have to be expressed by that one form anyway. This idea of bidirectionality is illustrated in the following:



HYPOTHESIS I

HYPOTHESIS II

So, in our view, Blutner's (2000) evaluation procedure is not flexible enough as it only takes into consideration form-meaning *pairs*. We might even say that such a system runs into a problem similar to the *proportion problem* that is known from approaches of unselective quantification (cf. Partee, 1984). However, if we take a slightly different perspective on bidirectionality, allowing for selective evaluation of forms or meanings (or, as Legendre et al. in this issue put it, acknowledging the "crucial *directionality* of the form-meaning relation"), we can actually explain the language patterns that gave rise to the hypotheses put forward in the first section. In doing so, we may still preserve the results of Blutner with respect to partial blocking and the markedness principle.

4. Concluding remarks

The papers in this special issue share the goal to uncover the architecture of grammar relating form to meaning, meaning to form, and to account for patterns of variation in form and meaning, optionality, ambiguity, preferences and markedness. It is our hope that the papers collected in this special issue will function as a source of inspiration and future investigation for a broad audience of linguists.

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