Is Analogy Economic?

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1. Introduction

Economy is claimed to play an important role in several (even strongly opposed) theoretical frameworks. In particular, I will distinguish two different views of economy, relating to two different ways of conceiving language as a human faculty. These different ways of conceptualizing economy are also representative of the two main theoretical frameworks which cut across linguistics as a scientific discipline, namely the so-called formal and functional paradigm (cf. Newmeyer, 1999).

A first view basically assumes for the language faculty an Architectural Economy: the latter is related to the competence and has to do with the way our inner language software is programmed. For instance, in the Minimalist Theory the derivational machinery is assumed to incorporate a principle of economy banning the use of superfluous constituents and operations (cf. Radford, 1997: 110). Recently, such an Architectural Economy has also been made responsible for the process of grammaticalization. Accordingly, the grammaticalization of for instance a verb as a conjunction takes place because "checking between two heads, also referred to as incorporation, is more economical than between a specifier and a head" (van Gelderen, 2004: 11). This is reconducted to a general economy principle, which explicitly prefers heads over phrases. In a similar way, the general Late Merge principle implies that "it is less economical to merge early and then move than to wait as long as possible before merging" (van Gelderen, 2004: 12). In other words, reanalysis, which *pace* Haspelmath (1998) crucially underlies grammaticalization (cf. Campbell, 2001), is in such a view the result of a general principle of economy which forces restructuring, i.e. loss of movement, when a moved lexical entry is felt to be base-generated in a functional phrase, as in the case of the English modals. In this view, economy as an underlying force is tightly related to markedness conceived in a technical sense: those representations are preferred which are more economic, i.e. less marked, either in featural or operational terms.

The opposite view refers to what I will call Behavioral Economy, which assumes the language architecture to be shaped on asymmetries contained in the world. In fact, we commonly use certain forms and structures more often than others, and this ultimately goes back to shared communicative needs and requirements. This amounts to behave economically because it turns out to strengthen some patterns, which are more frequent, to the detriment of other, less frequent ones. Notice that a radical view of Behavioral Economy has been recently defended by Haspelmath (2006), who explicitly argues in favor of the central role played by Behavioral Economy on shaping languages as they are. By doing so, he also denies any theoretical status to markedness, interpreting the latter as an epiphenomenon of, among others, the instantiation of G. Zipf's least effort principle.

It must be emphasized that in both approaches economy is taken to be either a central property of the language faculty or a basic force shaping it. Even with respect to traditional approaches which were explicitly based on economy principles like for instance the structuralist / functional view as popularized by A. Martinet (1955), economy has increased its interest for modern linguistics, having been promoted to a substantial property of language. In fact, it is not simply the economy resulting from the internal organization of a given structural system which is considered to be relevant, but also the usage-based economy resulting from the observation of real speakers' behavior. Or, in a Chomksian frame, it is the force labeled economy which requires certain derivational operations to take place or to crash.

In a similar vein, analogy seems to have increased its range of application with respect to the traditional neogrammarian view, in that analogical modeling of grammar attracts more and more interest from scholars of very different theoretical credos. The latter range again from more functionally-based

approaches like the one developed by Skousen (1989) to the recent developments of construction morphology (cf. Booij, 2005, Gaeta, 2006a), and of soft syntax (cf. Wanner, 2006). These approaches considerably extend the traditional concept of analogy as firstly recognized by H. Paul (1880), who in a neogrammarian framework considered analogy to be logically necessary in order to explain apparently irregular sound changes. Accordingly, analogy was claimed to militate against sound laws in order to enhance paradigmatic uniformity, permanently undermined by the blind action of sound laws. This is what has been called Paul's dualism (cf. Wurzel, 1988), and finds its deep motivation in a strive towards the "symmetry of the system".[1] Basically extending Paul's view of a local improvement due to a feeling of systemic symmetry, language can be viewed as resulting from the analogical generalization of very frequent and/or very salient patterns. In other words, analogy is considered to be an emergent force: language (and the process of language acquisition) can be seen as resulting from output-oriented generalizations on the basis of an entrenched model.

Taking as a starting point the two different conceptions of economy as a structuring force of the language faculty sketched above, this paper will investigate the relation between analogy and economy. In particular, I will focus on two opposite tendencies towards a certain epistemological reductionism: on the one hand, a tendency towards reducing Behavioral Economy to Architectural Economy can be observed, in which the attempt is made to incorporate basic findings resulting from a usage-based approach to language into the format of the language faculty. On the other hand, a similar, even though opposite, tendency can be observed towards reducing Architectural Economy to Behavioral Economy, in that systemic properties of the language faculty are explained in terms of low-level patterns emerging from the speakers' behavior. In order to illustrate the conflicting views of economy, in §2 and 3 two different theoretical frames will be discussed, which closely exemplify the opposite reductionistic tendencies. In §4 the Wurzelian model of system adequacy will be highlighted by means of an intriguing case of analogical extension and will be argued to show substantial advantages over the two reductionistic approaches. In §5 contaminations are discussed, which have always been considered sporadic cases of analogy. The final §6 draws the general conclusion.

2. Analogy in Radical Architectural Economy

A theoretical framework which can be used as a good exemplification of the first reductionistic tendency is Optimality Theory (cf. McCarhty, 2002): an OT-grammar directly incorporates markedness into the basic architecture of grammar, namely into the Markedness constraints, and is thereby able to account for analogical changes. Analogy does not exist *per se* as an autonomous force playing any role in language as well as in the cognitive endowment of human beings: it merely results from constraint interaction. There are no principles explicitly expressing the relevance of economy within grammar, as in the Chomskian Minimalism. Rather, the set of universal constraints is also responsible for the effect of economy throughout the grammar. Such a Radical Architectural Economy is allegedly supposed to deal with classical cases of analogical leveling by crucially referring to Output-Output correspondences. According to Martínez (2000), analogical leveling results when OO constraints are ranked above IO constraints, i.e. when it is more harmonic for a given output to be more like the members of its paradigm than like its input. To see how far OT is able to deal with traditional analogical leveling, let us briefly discuss the case of the extension of the suffix of the 2nd person singular to the preterite in Northern New Mexico-Southern Colorado Spanish:

(1)

	Present	Imperfect	Future	Preterite
1sg	*como*	*comía*	*comeré*	*comí*
2	*comes*	*comías*	*comerás*	(*comiste* > *comistes* >) ***comites***
3	*comes*	*comía*	*comerá*	*comió*

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[1] Cf. Paul [1880] (1995: 198): "Der Symmetrie des Formensystems ist also im Lautwandel ein unaufhaltsam arbeitender Feind und Zerstörer gegenüber gestellt ... Wo durch den Lautwandel eine unnötige und unzweckmässige Differenz enstanden ist, da kann dieselbe mit Hilfe der Analogie beseitigt werden".

Notice that the analogical extension at stake is accompanied by the deletion of -*s* in the syllable coda of the preterite. The Radical Architectural Economy lays down that the mechanism of change is simply expressed by Markedness constraints of the OO Correspondence Family being ranked over other Faithfulness constraints. Besides other current OT-constraints, Martínez (2000) assumes for this particular variety of Spanish three language-specific spell-out constraints requiring the morpheme -*s* for the 2nd ps.sg., a zero morpheme for the present and a further morpheme -*te*- for the preterite. Furthermore, OO IDENTITY(2sg) and ALIGNMENT (2sg, Right, ProsodicWord, Right) crucially warrant for the analogical extension, as can be gathered from the comparison between the two following tableaux:

(2)
a.

/come [pres] [2sg]/	OO_AFFIX-IDENT	2SG=S	PRES=Ø	IO-DEP	IO-MAX	IO-IDENT	ALIGN (2SG,R,PRWD,R)
comeΔ		*!			*	*	*
comse						*!	*
comesΔ				*!			*
☞ comes							

b.

/comi [2sg] [pret]/	OO_AFFIX-IDENT	2SG=S	PRET=TE	IO-MAX	IO-DEP	IO-IDENT	ALIGN (2SG,R,PRWD,R)
comiΔte	*!	*		*			*
comiste	*!						*
comistes					*!		
☞ comites						*	

The analogical extension in (2b) is accounted for by the high-ranked OO constraint requiring the occurrence of the final suffix -*s*, which bans the standard form *comiste, and by the Faithfulness constraint IO-DEP, which bans the hypercharacterized form *comistes, because it blocks insertions.[2]

In spite of the optimistic view of the author, who considers OT able to deal with the paradox traditionally represented by analogical leveling for the generative linguist, because it requires a notion of paradigmatic strength limiting the free action of rules, the solution offered by this non-serial approach suffers from serious theoretical and empirical problems. On the one hand, the theoretical viability of language-specific spell-out constraints as laid down by Martínez looks suspicious in the face of their lack of universality. Far from being explanatory, the assumption of a constraint like PRET=TE is little more than a descriptive stipulation. Even worse, such a constraint introduces into the evaluation procedure, which should be carried out by the constraints set, fully specified morphemes belonging to the lexicon, which usually provides the input for the evaluation procedure to start. This gives a flavor of circularity to the whole account.

On the other hand, the inputs assumed for the single derivations look unrealistic and suspiciously *ad hoc*. As laid down in the tableaux in (2), the main difference between the present and preterite consists in the different chaining of the morphological features to be implemented: /come [pres] [2sg]/ vs. /comi [2sg] [pret]/. However, no convincing explanation is provided for this crucial difference, which is even more suspicious in the light of the cross-linguistically markedness of the input assumed for the preterite, in which a tense marker is postulated to be ordered externally with respect to a person marker. This is typologically fairly rare (see Bybee *et al.*, 1990 for an evaluation), and clashes against the neat distinction of an inherent and a contextual inflection (cf. Booij, 1996), according to which the semantically more relevant inherent inflection such as tense for verbs is usually closer to the lexical stem than the contextual inflection represented by person agreement markers.

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[2] Actually, a mistake is contained in the tableau 2 of Martínez (2000: 91), because IO-MAX, which is dominated by IO-DEP, incorrectly bans the form *comistes. At any rate, the text does justice of the mistake, because the author, regardless of the tableau, claims that "*comistes* fails because it violates IO-DEP by inserting a new segment".

The origin of this apparently illogical distribution resides in a purely agglutinative analysis of *comi-s-te*, which attributes a morphematic status to the phonological sequence *-te-*, claimed to carry alone the preterite meaning. Again, this is fairly unrealistic by virtue of the slot-specific occurrence of this alleged morpheme, because the rest of the preterite sounds differently: 1st ps.sg.pret. *comí*, 3rd ps.sg. *comió*, 1st ps.pl. *comímos*, etc. (cf. Espinosa, 1912: 253). Either different preterite suffixes are postulated for the rest of the preterite paradigm, which increases tremendously the complexity of the input, or one has to give up this useless enterprise and be satisfied with the assumption of a portemanteau morph. Actually, this corresponds to the general assumption current in Spanish morphology (cf. Alcoba, 1999: 4926), with the possible addition of a zero marker for the singular, partially justified by the occurrence of substandard forms like *comistes* which will be discussed below.

Besides the empirical inadequacy of this analysis, a more general question has to be raised for any OT-attempt of accounting for analogical leveling as well as for any serious treatment of analogy: Where do OO correspondences come from? In other words, is every OO correspondence possible within a paradigm, or does the theory offer any cue for predicting which OO constraints are more plausible to emerge? In the absence of a satisfactory answer to this question, any account must be considered as purely stipulative.

This does not exclude that the idea of having OO correspondences cannot be made useful in order to account for analogical extensions like the one occurring in the preterite of this variety of Spanish. In fact, it is highly probable that the idea of having a uniform exponence for the 2nd ps.sg. throughout the whole verbal paradigm captures the essence of this morphological change. In a markedness-based approach such as Natural Morphology, one speaks for these cases of the extension of a superstable marker (cf. Wurzel, 1989), triggered by the general cognitive principle 'rich get richer'. However, what puzzles the analogical extension in this Spanish variety is the unexpected form *comites*, instead of the logical *comistes*, which is attested in other Spanish varieties (cf. Rosenblat, 1946: 222-225 for a survey), as also admitted by Martínez (2000: 92), who quite astonishingly treats this logical form *comistes* as problematic and in search of an explanation which would consist in "reshuffl[ing] the order of the IO-Faithfulness constraints making it better to insert new segments than to change features of corresponding segments". Far from being problematic, the form *comistes* is the simple result of the analogical extension.

The more opaque form *comites* is etymologically based on *comistes* and results from the deletion of *-s* in the syllable coda: as for the explanation of such a deletion, several suggestions have been made. On the one hand, "[t]here may be here a phonetic reason, namely dissimilation before *s*, a change which may have taken place in both the singular and the plural forms in the popular language long ago, but as plural it has practically died out in any form, everywhere" (Espinosa, 1912: 245). Notice that such forms must have been very old, as witnessed by their occurrence in Jewish Spanish: *cogites* < COGISTES (cf. Menéndez-Pidal, 1992: 280). Another explanation calls into play the morphematic status of *-s* as a superstable marker (cf. Rosenblat, 1946: 228, Alvar & Pottier, 1993: 205): a double occurrence of the marker *-s* for the 2nd ps. would have been redundant on the basis of its highly uniform function in the singular as well as in the plural.[3] This is not entirely satisfactory, because it does not explain why this Spanish variety behaves differently from others by dropping the internal *-s-*. At any rate, it looks more plausible than the rather *ad hoc* machinery worked out in Radical Architectural Economy.

3. Analogy in Radical Behavioral Economy

Let us turn to the epistemological counterpart of Radical Architectural Economy, namely to Radical Behavioral Economy. In this view, Behavioral Economy, which immediately results from language

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[3] Cf. Alvar & Pottier (1993: 205): "la *-s* era ya un denotador de segunda persona (del singular) y como tal se había extendido a la segunda persona (del plural), pero – dentro del español – no resulta difícil sentir la *-s* come indicador de plural, con lo que la posición débil de la primera *s* se debilitó más cuando la conciencia lingüística que añadió una *-s* no etimológica se encontró favorecida por la doble significación que la *-s* final tenía". A relation with the (also in Mexican Spanish) widespread reduction or deletion of *s* in syllable codas must be rejected, because this dissimilation is also attested in Jewish Spanish, in which that phonological process does not show up (cf. Rosenblat, 1946: 227, Alvar & Pottier, 1993: 206).

usage, is the only force playing a central role in the organization of grammar. Accordingly, a major role is attributed to frequency, which is claimed to shape in substantial terms the structure of morphemes and of morphological paradigms. When combined with G. Zipf's classical findings concerning the inverse correlation between frequency rates and lexeme length, this has dramatic effects on the high number of irregularizations occurring with very frequent morphemes. In fact, irregularization strongly correlates with high token frequency, which in its turn correlates with shortness of expression. Nübling (2000: 184-197, 2001) widely testifies for this irregularization of a reductive nature, which is mainly due to the effect of phonological change. On the other hand, irregularization is also increased by the action of further changes of an analogical origin, which can be treated as a consequence of reductive phonological changes. This is not surprising in the light of Paul's dualism sound laws / analogy mentioned above.

A further conceptual leap is undertaken by Nübling, when she claims that economy aims at reaching formal differentiation by increasing irregularization: "irregularity not only (passively) develops by the preservation of nonfunctional relics, but can also be 'created' actively by innovative processes" (Nübling, 2001: 54). The latter would run against Paul's dualism, which excludes the reduction of the systemic symmetry caused by an irregularization from being a possible morphological change, a sort of anti-analogical change. In Nübling's view, the increase of distinctivity would be the goal underlying such irregularizations, because it "has the advantage of protecting the forms which become increasingly shorter under the effects of high token frequency from homophony (syncretism)... [t]he more strongly and further forwards the word is differentiated, [...] the more strongly it can be reduced without the danger of homonymy" (Nübling, 2001: 69). In this view, analogy is at best treated as a procedure which occurs near to others producing opposite results, namely irregularizations, anti-analogical changes.

In order to verify this hypothesis, a crucial test bed is provided by non-reductive irregularizations, namely those cases of increase of irregularity, whose sole aim is to increase the formal differentiation of a morpheme. Reductive irregularizations are not a useful test, because a phonological motivation always lurks there.

Let us discuss now those cases of non-reductive irregularizations which are adduced by Nübling in support of her anti-analogical view. In Faroese and Icelandic, the verbs for HAVE, respectively *hava* and *hafa*, display a "stable instability", in that their paradigm of the present indicative swing between the original *ē*-class and the very productive *ja*-class of the Germanic weak verbs, as can be gathered from the following table (cf. Nübling, 2000: 48, 50):

(3)

			ē-class			*ja*-class	
Far.	pres.ind.	1sg	*havi*	[ˈhɛavɪ]	2-3sg	*hevur*	[ˈheːvʊr]
		1-3pl	*hava*	[ˈhɛava]			
Ic.	pres.ind.	1pl	*höfum*	[ˈhøvʏm]	1sg	*hef*	[heːf]
		2pl	*hafid*	[ˈhaːvɪð]	2-3sg	*hefur*	[ˈheːvʏr]
		3pl	*hafa*	[ˈhaːva]			

The increase of irregularity observed for these verbal paradigms would be amenable to the discussed anti-analogical principle of formal differentiation.

However, this line of argumentation suffers from a basic weakness, which casts severe doubts on its consistency. In fact, it is fairly well-known that the *ja*-class of the Germanic weak verbs used to be very productive (cf. Ramat, 1986: 193). In this light, it does not strike us as a surprise to observe that the more productive model expands its influence even on very frequent verbs. How far such an influence goes can only be ascertained on the basis of a thorough analysis of the system. The actual mixed paradigms are therefore highly irregular; one wonders, however, whether this irregularity (or overdifferentiation) is the anti-analogical goal of the change as maintained by Nübling, or rather results from the action of conflicting forces, namely the extension of a productive pattern and the lexical inertia typical of highly frequent words (cf. Gaeta, to appear), which are usually more reluctant to change by virtue of their high token frequency.

A second example of non-reductive irregularization is taken from Swedish, in which the verb for GIVE displays an increased irregularity, because "former versions of the verb containing *e* or *i* combined to a new and thus more strongly differentiated paradigm" (Nübling, 2001: 65):

(4) Swedish *ge* 'give'   pres. *ger*   pret. *gav ~ gedde*   sup. *givit ~ gett*

In fact, as more extensively discussed in Nübling (2000: 117-119), the stem *ge-* has given rise to other more "natural", in the sense of more iconic, forms (e.g., the preterite *gedde*), which presently compete with the oldest ones at different sociolinguistic levels. On the other hand, "[i]m Zuge der Standardisierung wurden diese Varianten [*scil.* forms retaining *i* or *e*] gemischt" (Nübling, 2000: 118). Therefore, the diachrony of this verb is fairly complex, and shows the interaction of grammatical as well as extra-grammatical factors. Clearly, a theory of language change based on grammatical, i.e. strictly systemic, factors cannot account for the latter (cf. Wurzel, 1994).

A final example of non-reductive irregularization is drawn from Frisian, in which a preterite *joech* 'gave' occurs instead of the expected **jef* analogically formed on the basis of the rhyming verb *slaan – sloech* 'hit' (cf. Nübling, 2000: 113):

(5) Frisian *jaan* 'give'   pret. **jef* / *joech*   ←   pret. *sloech* / *slaan* 'hit'.

As also conceded by the author, it would be misleading to speak of an anti-analogical teleology here, although the effect of this "extraordinary analogy" (cf. Nübling, 2000: 115) on the paradigm of *jaan* is an increase of irregularization, and thereby of formal differentiation. We will come back to this last example in the final section, when we will talk about the role played by paralogy as a non-proportional counterpart of analogy.

At any rate, the cases mentioned by Nübling don't go beyond Paul's dualism: although they are surely to be connected with a usage-based view of language, it does not seem to be justified to assume an anti-analogical force operating with the aim of increasing formal differentiation. The latter results from other types of change which indirectly produce this increased irregularization, a scenario typical of the well-known invisible-hand phenomena portrayed by Keller (1990).

4. Analogy and System Adequacy

Against these two radical approaches I will argue that analogy should be seen in relation to Wurzel's (1989) idea of system adequacy, which accounts for a particular morphological system on the basis of its own structural properties, in other words its 'by itself' nature.

System adequacy is spelled out by means of specific system-defining properties which express the normalcy of the system. A stable morphological system tends to be anchored at well-defined extra-morphological (i.e., phonological, semantic, syntactic) properties, which make the morphological relations among (nets of) words easily accessible and learnable. Analogy has a basic economic effect onto a morphological system in that it generally extends the domain of application of extra-morphological properties. By spelling out the conditions for system adequacy, the theory is able to predict (in a weak sense!) the conditions for analogical changes to set in. In this light, the role played by analogy is a central one in favoring the organization of paradigms, for instance as morphological gangs (cf. Fehringer, 2003). Given these theoretical premises, analogy really lies at the heart of the architectural design of the morphological module. In what follows I will basically profit from this framework in discussing an intriguing case, which runs against a simplistic view of economy, analogy and markedness (cf. also Gaeta, 2006b).

The German modal verb *wollen* 'will' goes back to an old optative of the old athematic class of the so-called *mi*-ending verbs (cf. Braune & Reiffenstein, 2004: 317). Accordingly, it originally displayed the same endings that used to appear in the preterite subjunctive of the other inflectional classes. This verb happened to be attracted in older stages of German by the inflectional family of preterite-presents. This latter group of verbs was formed by old preterite stems which had semantically evolved into presents. Therefore, they displayed the same endings in the present indicative which were common to the preterite of verbs belonging to other inflectional classes. This heterogeneous inflectional class was

rather unstable, and could only be preserved after it was reorganized around the extra-morphological property of containing modal verbs. In support of this view, the fact can be mentioned that verbs which did not display the property of being modals were condemned to inflectional class changes (e.g., OHG *tugan* 'to be suitable', *gi-unnan* 'to grant' have evolved into the modern German weak verbs *taugen*, *gönnen*, cf. Gaeta, 2002 for more details). On the other hand, if a verb happened to share the property of modality, it was likely to be attracted to this inflectional class, as testified by the case of *wollen*. To show this, we can briefly represent the particular bundle of inflectional features (= IFs) which were peculiar of this class with the help of the Old High German preterite-present *durfan* 'to need'; the IFs are then grouped by means of a Wurzelian paradigm-structure condition (= PSC):

(6)   a.

	durfan 'need'
1sg.	*darf*
2.	*darft*
3.	*darf*
1pl.	*durfun*
2.	*durft*
3.	*durfun*

b.   PSC: $\begin{bmatrix} V \\ + \text{modal} \end{bmatrix} \supset \begin{cases} \text{IF1: } - \varnothing \, / \, 1./3.\text{sg.pres.ind.} \\ \text{IF2: } - t \, / \, 2.\text{sg.pres.ind.} \\ \text{IF3: Vowel Alternation } / \, \text{sg./pl.pres.ind.} \\ \text{IF4: } - n \, / \, 1./3.\text{pl.pres.ind.} \end{cases}$

If its development since the oldest stages of German is considered and compared to other Germanic languages (such as Gothic), this verb reveals a triumphal march to come close to the modal family, as can be gathered from the following table, in which the Gothic *wiljan* is shown near to the Old and Middle High German *wellen*:

(7)

inf.		Goth. *wiljan*	OHG *wellen*	MHG *wellen*
pres.ind.	1.sg.	*wiljau*	*willu*	*wil*
	2.	*wileis*	*wili*	*wilt*
	3.	*wili*	*wili*	*wil*
	1.pl.	*wileima*	*wellemēs*	*wellen*
	2.	*wileiþ*	*wellet*	*wellet*
	3.	*wileina*	*wellent*	*wellen*

As recapitulated by the following table, *wellen* has fully entered the inflectional family of preterite-presents, at least in certain Upper German varieties (cf. Paul / Klein / Solms / Wegera, 2007: 273):

(8)

		OHG		MHG
IF1	Ø/1./3.ps.sg.pres.ind.	NO!: *willu* vs. *wili*	>	YES: *wil*
IF2	-t/2.ps.sg.pres.ind.	NO!: *wili*		YES: *wilt*
IF3	VA/sg.pres.ind.	YES: *will-* vs. *well-*		YES: *will-* vs. *well-*
IF4	-n/1./3.ps.pl.pres.ind	NO!: *wellemēs* vs. *wellent*		YES: *wellen*

In particular, the extension of the suffix *-t* to the 2nd ps.sg. and the extension of the zero marking to the 1st and 3rd ps.sg. are of relevance, because their co-occurrence is amenable neither to a phonology-

driven reductive irregularization nor to an anti-analogical increase of irregularity. Against Behavioral Economy, these changes show that also for frequent verbs like the ones considered here the inflectional system tends towards reducing structural markedness producing an increase of (locally evaluated) regularity.

The synchronically determined markedness evaluation of an inflectional system as carried out with the help of the PSCs is not only of fundamental importance in structuring the paradigms and the inflectional system as a whole, but it also helps one to make predictions as to which direction the paradigms of that system will evolve into (Wurzel, 2003: 207). Accordingly, the essence of this analogical change can be seen in reducing markedness, in the sense that the overload of a highly idiosyncratic and isolated paradigm has been reduced by removing those inflectional properties which did not fit the general schema, once that the extra-morphological property happened to occur.

If one views such a markedness reduction as an instantiation of the typical natural change in the sense of Vennemann's (1993) language change as language improvement, then one has to conclude that markedness reduction / naturalness increase is not simply due to an increase of iconicity because zero coding has been introduced here (*willu > wil*). This is particularly important in the light of the fact that at the opposite, if a verb does not share the core extra-morphological property, it tends to acquire the inflectional endings typical of the other classes, in particular *-e* for the 1st ps.sg.pres.ind.: OHG *ih toug* > NHG *taug-e* 'I am suitable'. Therefore, iconic marking is subordinated to the system adequacy of a certain morphological coding, which emphasizes the priority of system-dependent naturalness over the universal dimension of naturalness. This should not be forgotten, especially by those who attempt at radically dispensing with a concept of markedness by replacing it with other usage-based factors like frequency.[4] For instance, Haspelmath (2006: 60) argues against treating a similar case in terms of markedness reduction by referring to the decisive role played by type frequency in favoring inflectional class changes:

> "[I]n German the dative form *dem Bären* 'to the bear' is giving way to *dem Bär-Ø* in the colloquial language, although it runs counter to constructional iconicity. But the predominant pattern is the one without a suffix in the dative case (e.g. *dem Wolf* 'to the wolf'), and the minority paradigm of *Bär/Bären* simply joins the majority paradigm of *Wolf*. As Wurzel recognizes, the crucial factor here is type frequency (although he calls it "normalcy", as if it were not easily measurable) [...] one of the key factors determining morphological productivity, for well-understood psychological reasons"

The reason why system normalcy cannot simply be reduced to frequency is made explicit by cases such as the one discussed here. On the one hand, type frequency cannot be invoked to have played any role here because preterite-presents were a small nest of verbs, all displaying a highly idiosyncratic inflectional pattern. Being a dozen of types, they were unlikely to exert any attractive force against the other major inflectional classes. On the other, modals, including *wellen*, were likely to be all highly token-frequent verbs, which should speak in favor of a reluctance against any change, because token frequency enhances lexical storage.

Thus, Behavioral Economy is not enough: a general mechanism is required, which raises economy to an architectural property of a language system. This is made possible by incorporating the concept of markedness into the constitutive structure of the morphological module, which is then able to tell what sort of structural regularization will be selected and extended by means of analogy. Language change mirrors the markedness relations expressed by the system by operating economically, namely reducing the markedness degree of the system. This does not mean that the grammar has been simplified; in fact,

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[4] Fehringer is too severe with Natural Morphology, when she (2003: 249) claims that the analogical changes under review in her paper are "often 'unnatural' ... in that they promote or even create new allomorphy and therefore lead to a complication of the derivational process as a whole". If it is true that Natural Morphology lays quite a lot of emphasis on "the desire to highlight the relationship between form and meaning", the important perspective of system-related naturalness or normalcy cannot be forgotten, which has been shown by Wurzel (1989) to have priority over the system-independent naturalness.

we have seen that the morphological change has increased the degree of irregularization of *wellen* as such.

Finally, it does not come out as a surprise that the set of changes exemplified by *wollen* can be straightforwardly represented by means of Paul's proportional equation:

(9) IF1   *darf* : *kann* : ... :: X   (*wil*)
   IF2   *darft* : *kannt* : ... :: X   (*wilt*)

In fact, Wurzel (1988) has pointed out the debt paid by Natural Morphology to Paul's theory of analogy. Compared to Paul's approach, however, Natural Morphology is far more pretentious, because it aims at providing a clue for predicting the direction of analogical change by making reference to general principles such as the ones highlighted above. In particular, the prediction has been laid down here that if a lexical item is attracted into the domain covered by a certain extra-morphological property as is the case for the modal *wellen*, it should come closer and closer to the other members by acquiring the same morphological features.

5. Contaminations and paralogy

In this section, the attention will be addressed to the cases of morpheme reshuffling discussed by Joseph (2005) under the label of "lateral shifts", because they are not amenable to a unidirectional, funnel-shaped grammaticalization path. Actually, the sort of changes under review in this paper are all lateral with respect to the grammaticalization clines. To my mind, far from questioning the unidirectional character of that phenomenon, they rather emphasize the autonomous substance of morphology, which is usually subject to an inner remoulding, not necessarily resulting from the impact of external factors like grammaticalization. There may be a relation with grammaticalization as in Harris & Faarlund's (2006) 'trapped' morphology exemplified by the loss of inflectional markers which happened to occur internally with respect to a grammaticalized clitic. An example is Old Norse *hest-s=in-s* 'the horse (gen.)' > *hest-en-s*, in which the inflectional marker *-s* was 'trapped' in a dispreferred position and therefore eliminated. A similar case is provided by the externalization of inflection (cf. Haspelmath, 1993), in which as a consequence of the grammaticalization of a clitic an inflectional morpheme 'migrates' towards the end of a word, as in the Latin example *eum-pse* 'self (ACC.) > *ips-um*. Although the relation with grammaticalization is evident in both these cases, such a reshaping must be viewed as strictly internal to morphology, similar to the case of *wollen* discussed above. Thus, they testify for the autonomy and vitality of morphology, which is remoulded on the basis of inner structural principles of the kind depicted above.

The lateral shifts discussed by Joseph are quite puzzling because they are apparently not relatable to a watertight morphological dynamics as has been the case until now. One such example is provided by the Middle Greek dialectal suffix for the 3rd ps.pl. nonactive past *-ondusan*, which was apparently reshaped as *-ondustan* under the influence of the 1st and 2nd ps.pl. suffixes *-mastan* and *-sastan*:

(10)

| Middle Greek dialectal 3pl nonactive past (*-ondusan* >) *-ondustan* | ← | 1pl *-mastan* |
| | | 2pl *-sastan* |
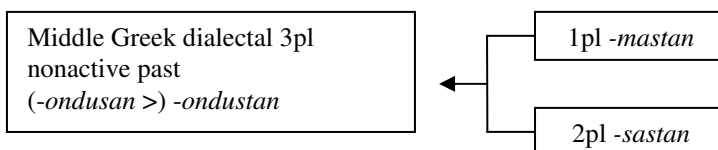
Such changes are generally referred to as contaminations. For instance, Hock (1991: 199) mentions a case from Ancient Greek, in which the nominative plural of the feminine *ā*-stems was reshaped on the basis of the nominative plural of the masculine *o*-stems **hoi lukoi* 'the wolf:NOM.PL' giving rise to **hai korwai* 'the maiden:NOM.PL' instead of the expected **hās korwās* on the basis of the parallel forms attested for the respective accusative plurals, cf. resp. **tans korwans* 'the maiden:ACC.PL' and **tons lukons*

'the wolf:ACC.PL'. Accordingly, a new morpheme *-ai* was created on the basis of its masculine counter-part instead of the expected *-ās.[5] This contamination parallels a four-part analogy:
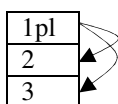
(11)   *tons lukons* : *tans korwans* :: *hoi lukoi* : X (*hai korwai*)

Although in the literature such cases are often referred to as sporadic or non-systematic analogy (cf. Hock & Joseph, 1996: 165), they actually share a lot of systematicity with four-part analogy and leveling. At any rate, one can fully subscribe to Hock & Joseph's (1996: 165) observation that far from being rare these cases are quite common, "[b]ut their effect usually is much more 'helter-skelter' than that of four-part analogy and leveling".

One might wonder whether there is a general principle which captures their helter-skelter effect. At a first sight, one might be tempted to treat them as a subtype of analogy, in which sequences of serially ordered words belonging to the same paradigm exert reciprocal influence. In this view, which is shared by most treatments of contamination, the economic effect of the analogy would have to be evaluated on the basis of the extension, even though partial, of an unmarked marker at the expenses of a more marked one. At any rate, the economic effect is counterbalanced by an increase of irregularity represented by the new marker which results from the fusion of the other two. In this case, we have indeed the increase of irregularity observed by Nübling. However, the rationale of the change does not seem to be connected with a principle of formal differentiation, but must be seen in the partial extension of a more general pattern, which again can be reconducted to a general principle of markedness reduction. Nonetheless, the reason of the partial extension remains obscure. Why should only a part of a certain morpheme be reshaped under the influence of another morpheme? If the proportion holds and the economic effect which lies behind it is the rationale of the change, such an anti-economic result is totally unexpected.

A different view might consider contamination a partially different phenomenon in which contiguity is the key factor, namely what might be called a paralogy. This might be connected with a particular type of leveling which is not relatable to Paul's proportional formula, but happens to affect paradigms as substantive units. As such, it is not completely unrelated to analogy, but needs a broader view of the phenomenon, which crucially refers to lexical nets of words. As already observed by many others, one of the major factors playing a role in analogical changes is paradigmatic strength (cf. Moder, 1992 among others). A paradigm can be viewed in a vertical as well as in a horizontal dimension. Corresponding to that, two different leveling processes can be observed:

(12)   Paradigmatic leveling
        Vertical leveling   Horizontal leveling
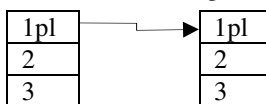
In the first type, a form is extended to other slots within the vertical dimension of a paradigm, as in in the Upper Rhine German, in which the ending *-ən* was generalized to the whole plural as shown below (cf. Schirmunski, 1962: 523):

(13)

	OHG Present Indicative	Upper Rhine German
1pl	*giloub-em(ēs)* 'we believe' >	[ˈglaw-ən]
2	*giloub-et* 'you believe'	[ˈglaw-ən]
3	*giloub-ent* 'they believe'	[ˈglaw-ən]

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[5] The morpheme of the nominative plural of the masculine *o*-stems is supposed to have been carried on from the pronominal declension replacing the expected suffix *-ōs* (cf. Szemerényi, 1996: 185).

Actually, morphological leveling was probably favored in this case by a syncretism due to the parallel reduction of the 1ˢᵗ and 3ʳᵈ ps.pl., cf. respectively *-em > -ən* and *-ent > -ən*, as has also been the case in other Germanic varieties, for instance in the Old English forms of the 1ˢᵗ/2ⁿᵈ/3ʳᵈ ps.pl. pres. ind. *-aþ* (cf. Hock, 1991: 184). Perhaps, a clear-cut case of extension of a morpheme to its neighbor slots within a paradigm is provided by Swabian, in which the suffix *-əd* for the three persons of the plural present indicative occurs. The latter goes back to the extension of the 3ʳᵈ ps.pl. suffix *-ent*, which underwent nasal deletion in front of dentals (cf. Schirmunski, 1962: 521).

The second type entails that leveling takes place across two forms lying at the corresponding horizontal slot within a paradigm. A case of horizontal leveling is provided by the Italian suffix *-iamo* of the 1ˢᵗ ps.pl.pres.ind., which is the result of the extension of the original ending of the Latin subjunctive *-eāmus* (cf. Maiden, 1998: 138-139):

(14)

	Italian Present Subjunctive	Present Indicative
1pl	(*AMEĀMUS >*) *amiamo* 'let us love' →	*amiamo* (older *amamo < AMĀMUS*)
2		*amate*
3		*amano*

Horizontal leveling seems to be more frequent, as it is easy to multiply the examples and to reduce them to a proportional analogy. For instance, Lehmann (1992: 220) mentions the extension of the 3ʳᵈ ps.sg. zero marker from the imperfect to the present in Ancient Greek, in which the form *phérei* 'she brings' occurs instead of the expected **phéresi* from IE **bhéreti* on the basis of the imperfect *éphere*. The proportional formula is supposed to have been triggered by the similar endings of the 2ⁿᵈ ps.sg. of the present and the imperfect indicative: *épheres* : *éphere* :: *phéreis* : X (*phérei*). However, such a formula is not available for the Italian case, whose explanation is still "obscure" (cf. Maiden, 1998: 138). Furthermore, both the Ancient Greek and the Italian leveling present a similar difficulty, because the leveling goes from what is usually held to be a marked category to an unmarked one (cf. Vincent, 1980: 396). In the absence of any convincing motivation of those changes, one can only be speculative here.[6]
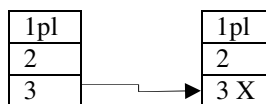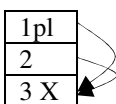
At any rate, these general schemas of leveling couch fairly well cases of contaminations like the ones discussed above:

(15)   Paradigmatic contamination
        Vertical contamination   Horizontal contamination

A vertical contamination took place in the case of the Middle Greek suffix discussed by Joseph, and a further similar case is provided by the Homeric Greek 1ˢᵗ ps.pl. suffix of the middle-passive present indicative *-mestha* instead of the also attested *-metha*, which seems to have been influenced by the 2ⁿᵈ ps.pl. suffix of the middle-passive present indicative *-sthe* (cf. Chantraine, 2002: 299, Schwyzer, 1990: 670). On the other hand, horizontal contaminations can be considered the remoulding of the Frisian preterite form *joech* on the basis of its horizontal companion *sloech* in (5) above, as well as the reshaping of the nominative suffix *-ai* in Ancient Greek in (11).

As they stand, contamination and leveling seem to be fairly similar, and accordingly cry for a unitary explanation. Although I have been using the traditional terms to refer to these cases, it is all but obvious that the traditional conception of analogical leveling be the right one here. As pointed out by Hock (1991: 184), "[d]evelopments of this sort [i.e., the extension of the Old English suffix *-aþ*, LG] are difficult to reconcile even with the revised version of leveling. For the different inflectional affixes

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[6] For a discussion of different proposals, cf. respectively Chantraine (2002: 292, 296-297), Schwyzer (1990: 660-661) for Ancient Greek, and Tekavčić (1980: 281-284) for Italian.

within a paradigm are distinct, different morphemes, not variants of a single morpheme or stem". In other words, Hock questions that analogical leveling, traditionally conceived as a mean for reducing chaotic allomorphy resulting from the blind action of the sound laws, might have taken place here. Since the morphemes at stake cannot be treated as allomorphic variants, it is not possible to speak of leveling *stricto sensu*.

However, his solution, which emphasizes the redundant status acquired by the verbal suffixes in the subject-obligatory Old English, combined with the reduced functionality brought about by syncretism, is of little help too. On the one hand, such a solution is language-specific, and we would like to have a general answer for the other cases mentioned above, in particular those drawn from the German dialects. Furthermore, a conception of the morpheme lurks here, which actually underestimates the role of the paradigm as a privileged vantage point from which to look at the single morphemes. Accordingly, little place is conceded to the concrete representation of words as wholes.

If, on the other hand, one firmly believes in the paradigm conceived as a complex network of "local" relations occurring among the single words, a possible scenario for these changes can be outlined. In fact, changes like the ones discussed in this section highlight the possible interconnections arising between two words because of their contiguity within a morphological paradigm or across two close paradigms, as for the rhyming Frisian verbs *jaan* and *slaan*. In other words, analogical modeling might be the key for interpreting these facts: paradigms are structured according to a number of parameters, which assign them a prioritary role in our mental lexicon (cf. Skousen, 1989). A crucial notion in this perspective is provided by the term contiguity, i.e. whether two words happen to be located in a contiguous space because of their similarity degree. This approach is gaining more and more attention, especially when formalized in computer-based learning algorhythms like the Self-Organizing Maps, which is based on a very concrete idea of mental space (cf. Pirrelli & Herreros, 2005). In these computational models, contaminations are one of the possible outcomes produced by the machine during the learning process. This latter fact has also been emphasized as a straightforward advantage of analogical modeling over rule-based approaches (cf. Skousen, 1989: 15-18).

6. Conclusion

In this paper, different views on economy and analogy have been discussed: both issues are of considerable relevance for any theory of grammar. It has been shown that reductionistic approaches cannot be pursued, because they either sweep under the carpet basic questions of analogical changes, which therefore remain unanswered, or disregard the role of markedness, which cannot be simply dismissed as a side effect of frequency. On the other hand, a view of morphology from the perspective of its inner structural consistency is able to capture the role of paradigms as structured entities, while at the same time it helps one to establish the 'temperature' of the whole morphological system measured in terms of markedness. This is not in contradiction with a general design of morphology as a network of analogical relations. After all, the fact that specific models or templates influence the organization of paradigms is another way to spell out the PSCs, namely the specificity of morphology 'by itself'.

At any rate, all this does not go beyond Paul's dualism: no active strategy for irregularization exists. As shown by contaminations, analogy, which points to a better organization of a paradigm, or of paradigm nets, operates at a local level for highly 'cohesive' words (especially when serially ordered, e.g. numerals and kinship terms, cf. Winter, 1969) introducing local optimization, which has the effect of increasing the local similarity of two items. The latter basically follows the same strategy of more general PSCs, namely to save energy costs of lexical storage by generalizing morphological types. Accordingly, their aim is not to increase distinctivity, but rather to reduce formal differentiation. Paul's dualism still resists; it is only applied at a more local level.

Further research is needed to understand whether analogy and contiguity (or paralogy) are only different in terms of generality, or whether there are other and for the moment less foreseeable forces at play here.

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