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The consequences of talking to strangers: Evolutionary corollaries of socio-cultural influences on linguistic form

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Abstract

We explore the proposal that the linguistic forms and structures employed by our earliest language-using ancestors might have been significantly different from those observed in the languages we are most familiar with today, not because of a biological difference between them and us, but because the communicative context in which they operated was fundamentally different from that of most modern humans. Languages that are used predominantly for *esoteric* (intra-group) communication tend to have features that are semantically and grammatically 'complex', while those used also (or even exclusively) for *exoteric* (inter-group) communication become 'simplified' towards rule-based regularity and semantic transparency. Drawing on a range of contemporary data, we propose a psycholinguistic explanation for why esotericity would promote such complexity, and argue that this is the natural default setting for human language. This being so, it should be taken into account when modelling the evolution of language, for some of the features that are normally viewed as fundamental – including the notion of fully developed underlying rule-based systematicity – may, in fact, be cultural add-ons.

Keywords: Complexity; Formulaic language; Language evolution; Literacy; Esoteric; Language processing

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1. Introduction

In this paper we consider what we might term the 'nature and nurture' of languages.[1] By examining the relationship between the social and cultural contexts in which languages are variously used, and several lines of evidence to the effect that the metalinguistically untrained human brain does not deal with language as systematically as professional linguists do, we open the door on a new kind of potential discussion – though we do not develop it here – namely, that we can understand much about the evolution of *language* by looking at the fate of *languages*.

We propose that at the dawn of the human linguistic era certain 'universal' features that we are accustomed to see manifested in languages today were unrealised, and that this impacts on the role that such 'universals' can be deemed to have in accounting for the emergence of language.[2] Until the early 19th century, no one would have known – or cared – that humans possess the 'universal' capacity to ride a bicycle after a little practice. Should bicycles some day no longer be manufactured and used, this universal capability will cease to have significance, though there is no reason to anticipate that it would ever disappear. In the same way, we offer evidence suggesting that some of the language features that linguists are so interested in, while unquestionably things that we are capable of handling, may manifest themselves only for the duration of the particular social and cultural context that has spawned them.

There are important implications for this position, with regard to theories of language evolution. We may need to separate out from an account of how language got off the ground the explanation for the potential that humans undoubtedly carry for mental gymnastics with language. The account of how that potential becomes realised – that is, how social structure and cultural activity can augment psycholinguistic operations – needs to be kept separate again.

Modern linguistics draws in a particular place the line between what is 'natural' and what is a cultural add-on. It is taken for granted that human languages are essentially managed by means of the manipulation of atomic lexical and grammatical items, and rules for their combination. Furthermore, complex syntactical structures, such as embedding, are considered to be fundamental to normal linguistic processing, while, for example, the arcane engagement with language that preoccupies the cryptic crossword solver is viewed as a cultural add-on.

However, evidence suggests that structural embedding remains a hidden capability until certain cultural conditions apply. Furthermore, humans often operationalise their more general supposed linguistic knowledge in non-optimal ways, missing obvious patterns and tolerating, even creating, irregularities where, in theory, none should be necessary. Judgements about the grammaticality of key exemplars in syntactic theory seem more variable, and more contingent on education than they ought to be. Lecturers have done well if they get through a syntax class without someone questioning their allocation of asterisks, even when the grammaticality judgements are supposed to be universal. Linguists also know that it is not a good idea to ask members of the general public to judge complex sentences for grammaticality, because they find it difficult to come up with the responses predicted by the theory. Chipere (2000) found that

[1] We are grateful for many useful comments from two anonymous referees, Andrew Pawley and the editor.

[2] We follow here the general line of Newmeyer (2002) in differentiating between uniformity of state and uniformity of underlying potential, though our conclusions differ from Newmeyer's in some regards. See Wray (2005b) for some discussion of this.

relatively uneducated native speakers of English were very poor at making grammaticality judgements on complex sentences. Gleitman and Gleitman (1970) also found differences in the performance of a linguistic task (assigning meanings to three-word compounds such as 'black-house bird'), according to the educational experience of the subjects. This could be due to an association between education and the ability to analyse language (Grace, 1989).

In this paper, we offer an explanation for these phenomena, and suggest that care should be taken when using modern literate societies as the yardstick for determining what is truly fundamental to human language in its full range of cultural contexts.

1.1. What is fundamental to language?

According to Hauser et al. (2002), ''Roughly speaking, we can think of a particular human language as consisting of words and computational procedures (''rules'') for constructing expressions from them'' (p. 1576). This assumption underlies the modelling of human language as a combinatory system, and, naturally, has tended to determine the focus for work on the evolution of language (though it does not for Hauser et al. themselves). Effectively, the central quest of most researchers who want to know how language came about has been the quest to establish how a system of words and rules came about.

On the other hand, it has always been recognised that language consists of *more* than just its construction. Its complex function as a system of communication, and the curious shortcomings of performance as a reflection of competence have long been discussed. Opinion has differed about the extent to which surface realisations of language in interaction in any sense challenge the notion or detail of an underlying formal system.

A different kind of reservation regards the reliability of the word as a consistent combinatory unit (e.g. Becker, 1975; Bolinger, 1976). The difficulty pervades both speaker perceptions—many languages do not have a word for 'word' (Dixon and Aikhenvald, 2002b:2), and linguistic research, where it is procedurally impossible to achieve consensus regarding the criterial definition of the word (Matthews, 2002:266) and empirically difficult to ascertain just what status the word has in mental processing (Butterworth, 1983). Recently there has been an attempt to formalise within a processing model the possibility that languages might not, in fact, be *fully* characterisable in terms of words and rules at all (Wray, 2002a). The idea here is not that there are *no* words and *no* rules, but rather that words and rules are isolated and operationalised on the basis of observed variation only (Peters, 1983, 1985), rather than a principle of full systematicity. This results in a potential residue of underspecified forms that can operate as units of meaning without being pinned down as words or combinations of words. Drawing on a wide range of evidence from the language of adult native speakers, child and adult language learners, and aphasic people, Wray demonstrates how speakers' and hearers' behaviour is consistent with such underspecification, and she suggests mechanisms through which it could come about and be maintained.

Developing this theme, we shall propose that the capability that needs to be accounted for in the context of research into the evolution of language in our species is restricted to only a subpart of the capability that is customarily assumed to be universal. The rest of what we observe in the majority of languages today is a result of secondary influences such as interaction with strangers, language contact, and the stratification of society. Drawing on arguments first presented 30 years ago, and more recently developed in new ways by Grace (2002a,b,c, 2003) we shall argue that our modern world, by imposing particular cultural, social and political agendas, so strongly draws our attention to one of the several possible outward manifestations of effective linguistic

communication – rule-based compositionality[3] – that we are tempted to assume that it is the only one available.

1.2. An over-narrow perspective

In our view, making judgments about the human language faculty only on the basis of the languages most easily and most often studied today gives us too narrow a perspective. It is rather like trying to work out how humans jump over horizontal obstacles by watching the high jump event at the Olympic Games. Humans without specific athletics training will most naturally clear a bar using some form of scissor jump or hurdle jump, landing on the feet. However, an observer whose only source of evidence was the modern Olympic high jump event would be unaware that the scissor or hurdle jump was even possible, because the only technique to be seen there is the Fosbury Flop, in which the athlete leaps backwards over the bar and lands on his/her back. The reasons are clear:

1. The very existence of the Fosbury Flop has raised the stakes of the event: the bar is now placed too high for a scissor or hurdle jump to work.
2. Participants in the Games are intent on winning, so they cannot just choose whichever technique they like: only one is feasible in the world-class arena.
3. The Flop is the current fashion: others (such as the Western Roll and Straddle) have been previous favourites, and no doubt other effective techniques will be invented one day. But for the present, this one prevails.
4. The athletes who use the Flop are provided with a crash mat to land on, so they do not injure themselves.
5. The athletes are sponsored, and so are in a position to train for sufficient time to learn the technique.

[3] Compositionality can be a difficult notion for precisely the reasons that we shall discuss. The Fregean definition of compositionality is that the meaning of the whole is a direct reflection of the meaning of the parts. However, there are optimal and non-optimal ways of creating a whole. Mel'čuk (1998) defines as 'non-compositional' something that "cannot be constructed" (p. 24): that is, something for which the constitution of the parts, or their arrangement, is not rule-governed. In the present context, we need to tease apart semantic compositionality from structural compositionality. That is, we need to note the fact that some languages offer up the semantic secrets of their wordstrings in what can appear to be structurally non-optimal ways. Non-linear morphologies (e.g. template morphology) create difficulties where the patterns collapse distinctions (see, for instance, Laniado, 2001, on Totonac), or are not obviously predictable. Evans (2003) uses the word *unfamiliar* seven times in one sentence describing how Kayardild achieves agreement – that is, 'unfamiliar' relative to standard expectations in typology. Furthermore, he describes Kayardild as non-compositional "in the sense in which the ordering of inflectional affixes in certain stacked nominalization constructions is anti-iconic" (personal communication, April 2004). For as long as the components can be picked out, it is tempting to imagine that there is a rule there too, even if difficult to capture. Yet, while the word *children* is compositional in the sense that two morphemes are evident, the absence of any particularly useful or active rule regarding the practice of pluralizing *child* in this way compromises the notion of compositionality relative to that in regular paradigms. Here, in talking of a word or wordstring being compositional, we intend more than just that all the meaning bits are present. We also imply the assumption that some reasonable rule-based account is possible to predict and explain their arrangement. This is important, because it is central to our account that (a) native speakers may operate perfectly well without having identified all the potential moving parts of their language (see section 4), and (b) some of what appears to be an identification of pre-existing patterns may in fact be post hoc rationalisation (e.g. Wray, 1998, 2000, 2002b). Thus it may be seen that we are, in effect, chipping away at underlying assumptions of the Autonomy of Syntax thesis (see Tomasello, 1998:x for arguments about why this is a valid pursuit).

Significantly, we have only to alter any one of these circumstances, and some other technique may (re)appear. In short, the range of possible ways of jumping a bar has been reduced as a response to local conditions, and so effectively that the other options are not normally seen at all.

According to Kuhn (1996), ''Normal science ... is predicated on the assumption that the scientific community knows what the world is like'' (p. 5). He views research as ''a strenuous and devoted attempt to force nature into the conceptual boxes supplied by professional education'' (*ibid.*). Everett (2005) proposes, on the basis of his study of a Brazilian language, Pirahã, that ''smorgasbord studies, that is, studies which merely look for constructions to interact with a particular thesis by looking in a non-statistically sophisticated way at data from a variety of grammars, are fundamentally untrustworthy because they are too far removed from the original situation'' (ms.p. 5). In the same way, Grace (e.g. 2002c) fears that contemporary linguistic theory has become culture-centric to a disturbing degree, by failing to appreciate the extent to which our view of what language is can be influenced by a unrepresentative selection of languages for study, and an endemic difficulty with seeing languages outside that group for what they really are. In this he echoes both Trudgill (1989) – who warns against the ''too easy assumption that [high contact] koinés are more 'normal' in some absolute sense rather than simply normal in a particular social context with which we happen to be most familiar'' (p. 230) – and Thurston (1989): ''Since diachronic linguistics has developed within literate societies using primarily written materials for data, perhaps the discipline has been unduly biased'' (p. 559n). Thus, we urge caution against the prevailing assumption that language is intrinsically fully definable in terms of words and rules. As Olson (1977) observes, ''Chomsky's theory is not a theory of language generally but a theory of a particular specialized form of language ... It is a model for the structure of autonomous written prose'' (p. 272).[4,5] Similarly, Linell (1982) argues that ''our conception of language is deeply influenced by a long tradition of analyzing only written language'' (p. 1). Tomasello (2003:3ff), reviewing the 'new psychology of language' that focuses on cognitive and functional approaches, notes that ''there is very little in [spontaneous spoken speech] that corresponds to a 'sentence'", illustrating this with a list of utterance types that are viewed by theoretical linguists as common and prototypical but which are, in fact, rare outside of writing (compare the earlier, similar observations of Kay, 1977; Linell, 1982; Pawley and Syder, 1983b and others). Tomasello concludes: ''spontaneous spoken speech ... has properties of its own that are different, in some cases very different, from the intuitive model of language that literate, educated people carry around in their heads'' (p. 5). Recent work by Meyer and Tao (2004) confirms this. They looked for examples of gapping in the International Corpus of English, and found only 120 tokens in 17,629 examples of local coordination capable of supporting it (0.007%). We see here exemplified the opportunities for new corpora and the technology for searching them to revisit ideas that have been around for a good 30 years. Where Duranti and Ochs (1979), Pawley and Syder (1983b) and others (see, for instance, Givón's 1979b

[4] Although Chomskian analysis has been applied to many languages, the irrelevance of performance data will always entail that analyses are focussed on a version of the language that is tidied up to resemble the rational principles believed to underlie it. In languages that have a written form, much of that tidying up may have been done through the processes of education and literacy, perhaps influenced by the perceived structures of a recent colonial or otherwise dominant language. In unwritten languages the analyst must tidy the data him/herself and, if doing so in order to find particular patterns, is surely vulnerable to extrapolating from the spoken form what *ought* to be possible rather than what is actually done. Our contention is not that 'ought to be possible' has no value as a concept, only that a form that is possible but never encountered is different from one that is both possible and used.

[5] See also Pinker and Jackendoff (2005) who raise the non-optimality and imperfection of languages as evidence that, contra Chomsky, ''language is a complex adaptation for communication which evolved piecemeal'' (p. 2).

collection of papers) were largely constrained to explore small databases, we are now in a position to test their intuitions about the speech-writing divide much more systematically.

2. How different can languages be?

2.1. Are any present-day languages like the first human language(s)?

The views cited so far indicate that it may be precipitate to assume that the first languages ever spoken by anatomically modern humans (to whom we ascribe an equal linguistic *capacity* to our own—be it Universal Grammar or not) were necessarily all that similar to the languages most extensively researched today. If way of life is indeed relevant, then the contrasts are plain.

The modern world fosters huge communities of people who are surrounded by strangers, and often separated geographically from their family and from those who most closely share their interests and concerns. Modern complex society favours specialised professions and pastimes that furnish the individual with particular expertise in some areas to the exclusion of others. In contrast, the first language users presumably lived in fairly small groups of familiar, mostly closely genetically related, individuals, engaged in common purposes and activities, as a ''society of intimates ... where all generic information [was] shared'' (Givón, 1979a:297).

In the modern world, it is possible and necessary to communicate about a huge range of subjects, using many different media, whereas our prehistoric ancestors existed without recourse to writing, telephone, television, computers, etc., and, presumably, within a single, relatively stable socio-cultural space. The formative years of millions of present-day people are dedicated to the accretion of secondary knowledge, via teaching, books, etc., whereby their personal instincts and experiences of the world may come into conflict with values and information prized and imposed by others. Socialisation in modern society requires an engagement with material that is likely to be much more experientially remote from the learner, and even from the teacher, than would be possible in a hunter-gatherer community.

Might we then look to present-day hunter-gatherer communities for direct indications of some 'natural' realisation of language? Languages such as Pirahã (Everett, 2005) offer certain interesting opportunities. In line with our predictions, Everett observes that ''With respect to the UG proposal of Chomsky, the conclusion is severe—some of the components of so-called core grammar are subject to cultural constraints, something predicted not to occur by the universal-grammar model'' (p. 622). In addition, extrapolated rules over-estimate the variation: ''Verbs are a closed class in Pirahã and are combined to describe culturally recognized events. So not all logically possible (or semantically [and] morphosyntactically allowable) combinations are found—only those which describe culturally recognized events'' (personal communication). Everett considers this, and other unusual features about Pirahã, to be attributable to ''a single cultural constraint ... namely, the restrict communication to the immediate experience of the interlocutors'' (p. 622).

Tempting though it is to draw heavily on such examples for evidence of what language was once like for all humans, caution is needed, on two counts. Firstly, it must not be forgotten that the 'isolated' groups of modern times may not be typical. They are largely confined to marginal environments, and the circumstances of their lives have usually been deeply affected by contact with other, more powerful, societies. Pirahã itself has been subject to centuries of contact with outsiders, and it is difficult to judge whether its apparent resistance to these influences is typical or atypical of possible languages in man's early prehistory. Secondly, as we outline below, the structural features of languages may be correlated with socio-cultural factors, but these factors

are several and interact in ways that will spawn different outcomes in superficially similar environments. This being so, the evidence provided by single languages will tend to over-emphasise their particular realisation of what may be a rather more complicated underlying dynamic.

All the same, since we argue that languages realise their structures differently according to socio-cultural factors, we must necessarily take notice of evidence for these differences. Rather than assume a priori that such evidence is relevant to understanding what the first human languages were like, in what follows we use the evidence to develop a model of processing which, in its turn, offers a rationale for *concluding* that the first human languages might have shared certain features with particular 'exotic' languages today.

2.2. Linguistic corollaries of how we live

In what follows, we explore the proposal that languages vary in the extent to which they are fully represented in the minds of their speakers (implicitly or explicitly) in terms of rule-governed combinations of morphemes and/or words. The axis of this variability is the balance between two pressures: socio-cultural (described in section 3) and psycholinguistic (section 4). These pressures upon the individual speaker determine, through him/her, strong tendencies in the speech community. In defining the form of the language only in terms of the speaker's own knowledge and intuition, we divide off a third perspective on linguistic form, that of the visiting linguist, who might be able to spot regularities in the underspecified portions of a language that are additional to those known by its speakers. Some such regularities could be new, post hoc rationalisations (e.g. noticing, in English, that *carpet* is composed of *car* + *pet* and then looking for a reason why the word for a fabric floor-covering should combine units that mean 'small motorised vehicle' and 'domestic animal'), while others reflect genuine patterns no longer salient for the speakers (e.g. noticing that *court martial*, *director general* and *procurator fiscal* are examples of a small N + Adj set that can be characterised by a sub-rule, though in fact it probably is not so-characterised any more by native speakers of English).

3. Socio-cultural influences on language form

Our starting point is an observation made by Thurston (1987, 1989, 1994) that a community's communication can be predominantly esoteric (inward-facing) or exoteric (outward-facing). We develop this notion somewhat beyond Thurston's original scope, but in a way that seems to us consistent with a range of evidence that he and others have provided in relation to the nature of languages around the world.[6]

[6] For instance, we avoid Thurston's tendency to speak of *esoteric languages*, preferring instead to focus on *esoteric communication* and its potential effect on a language. This is useful because (a) a given speech community can use the same language for both esoteric and exoteric communication, and (b) different speech communities may employ the same language differently. In both cases, the communicative uses to which the language is put will, according to our model, certainly contribute to its formal characteristics, and it would be technically correct to equate the esoteric use with an esoteric version of the language, etc., so long as 'language' is only viewed as internal to the individual or, at most, like-minded members of a coherent speech community. However, such a narrow definition of 'language' is potentially misleading to the casual reader. In any case, our accretion model (section 3.3) easily accommodates the broader definition, and leaves us free to separate out the language per se from the use of the language by a particular individual or group of individuals on a particular occasion or during a characteristic communicative activity.

3.1. Esoteric communication

Esoteric communication operates in the domain of familiars, that is ''among people of the same social group'' (Thurston, 1989:556), who share a culture and environment, general knowledge of the community and its activities, and who have a unified identity. Within such a context, communication can take a lot for granted—that is, it need not be explicit with regard to generally known facts and practices. In addition, several highly significant, and inter-related, factors are likely to be associated with the context in which esoteric communication is possible (Fig. 1). Firstly, the homogeneity of the community, along with its cultural assumptions, will be likely to create a formidable barrier to communication with outsiders who do not share the group's knowledge (Thurston, 1987; Everett, 2005). This barrier will tend to perpetuate the integrity of the group, and repel prolonged engagement with outsiders. There will, therefore, be relatively few individuals in the group who were not born into it, and who did not acquire the language in infancy. The language, consequently, will be defined by features that are acquirable by babies, with rather few influences from adult learners. (This contrasts with the case of languages used for exoteric communication, see section 3.2.) For reasons that we shall explore later, languages that are under the control of the child's learning style appear not only to retain existing irregular features, but to become increasingly complex (e.g. Andersen, 1988), with regard to unusual sounds and difficult sound combinations and ''morphological irregularities, morphophonemic complexities, highly-specific lexical items, constraints on derivation leading to

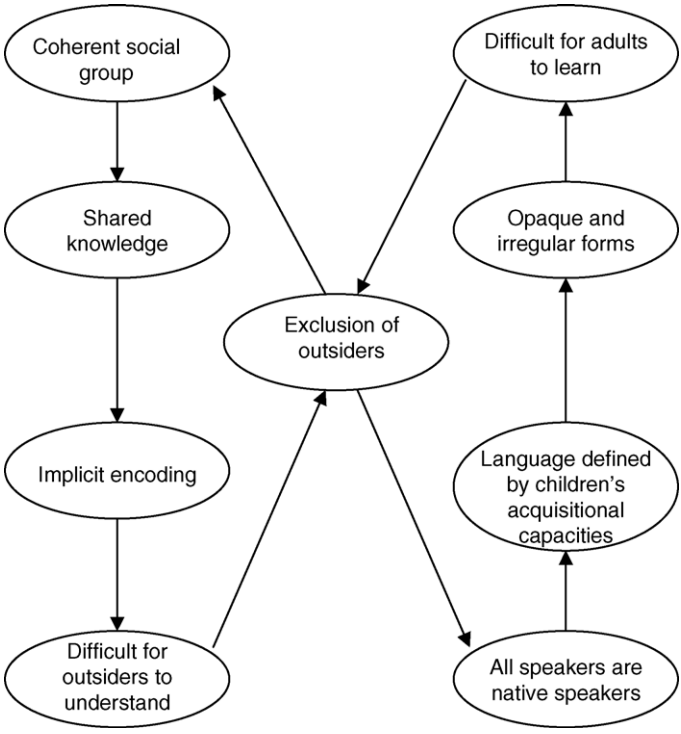

Fig. 1. The perpetuation of esoteric communication in a closed community.

suppletion, and opaque idioms'' (Thurston, 1994:580; see also Bailey, 1982:67 and Trudgill, 2002).

An isolated speech community may, thus, find that circumstances deliver to it a language that is not easily learned by outsiders (cf. Grace, 1998:71). This, in its own right, offers a level of protection from infiltrators (Thurston, 1989:558), for ''the . . . opacity of certain expressions can be used as a sort of verbal fence to include certain hearers who have the knowledge to decode the expressions and to exclude those others who lack that knowledge'' (Peters, 1983:81). We should also not forget the proposal of Milroy and Milroy (1985), in the context of language change, that inward-focussing languages or dialects are characterised by strong networks of speakers who know each other well.

3.2. *Exoteric communication*

Exoteric communication is outward-facing, and conducted with strangers—that is, members of other groups, or members of one's own group with whom one is unfamiliar in the sense of not sharing their knowledge of people, places, cultural practices, professional specialism, and so on. Insofar as information is not shared, there is a necessary assumption on the part of the speaker that the hearer may not understand the content of a message that is too implicitly expressed. More crucially, the speaker must encode the message in a form that makes it possible for the hearer to work out what is meant in some systematic way. This is a main reason why new terms are almost always composed of smaller units of meaning that guide hearers unfamiliar with them in recognizing their meaning.[7]

Thus, languages that are customarily used exoterically will tend to develop and maintain features that are logical, transparent, phonologically simple and, significantly, learnable by adults (Trudgill, 1989, 2002; Thurston, 1989). The meanings of expressions can be determined from their composition, because the system approximates a one-to-one relationship between forms and meanings, and because it eschews allomorphy, particularly morphologically-conditioned allomorphy. Fig. 2 offers a representation of how the relationship between use of the language and its form is perpetuated both across subgroups in the native speech community and outwards to other language groups. The dynamic here is the need to be explicit with regard to reference and structure, so as to reduce the likelihood of misunderstandings. Within the native-speaker context, this loosens the power of 'insider-knowledge', and thus supports general comprehensibility between strangers. With regard to contact with non-native speakers, the adult learning style (see section 3.4.3) and the conscious and unconscious attempts of native speaker adults to lessen the learning load of non-natives will draw the forms of the language towards greater regularity and transparency. In turn, this not only makes the language easier for outsiders to learn, but also furnishes the language with greater flexibility for general explicitness in the native context, including a wide-ranging capacity for constructing novel utterances. A language so equipped can come to serve as a *lingua franca* (Thurston, 1989:557), in which case, non-native speakers gain more influence over it, and may drive it into formal changes that reflect the absence of a native speaker anchor (where there is not one).[8]

[7] As noted later, English demonstrates the vying of esoteric and exoteric communication in a complex society of exclusive subgroups using micro-dialects within a globally accessible macrodialect. Thus, we see significant sub-sets of linguistic material (e.g. technical terms that are more accessible to those who know Latin and Greek), and cultural initiatives to reduce the exclusivity of such material (e.g. The Plain English Society).

[8] Since what is a *lingua franca* for some may not be for others (see later discussion) the result is likely to be diversification into different varieties with different characteristics on the esoteric-exoteric scale.

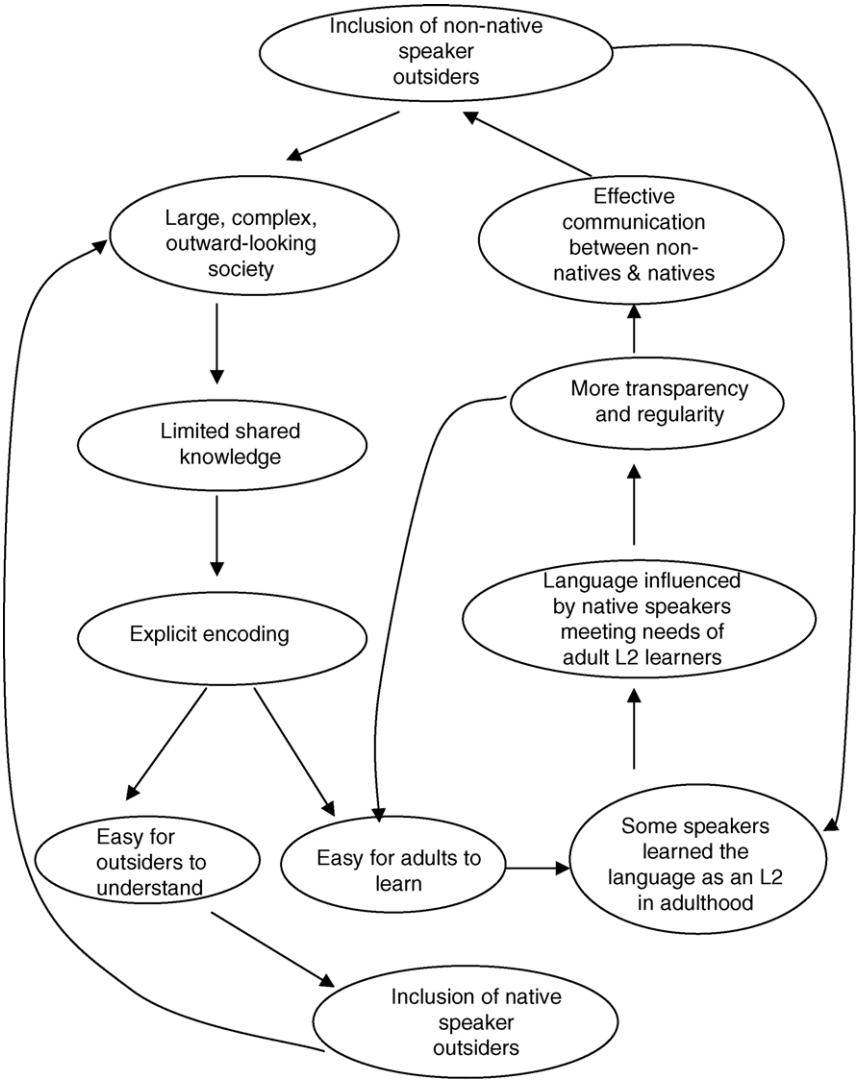

Fig. 2. The perpetuation of exoteric communication in an outward-looking community.

Amongst the features that we attribute to a language's extended range of use in the context of exoteric communication may be some that are normally taken for granted in linguistic modelling, and that are therefore usually assumed to be a default in human language. If they are, as we propose, in fact a product of particular social and cultural conditions, then while their realisation remains a universal human capability, they may not necessarily have been found in the first languages.

3.3. The relationship between esoteric and exoteric uses of language

On the basis of evidence and the theoretical model described in section 4, we propose that the pressures exerted on a language by exoteric communication are held in tension by

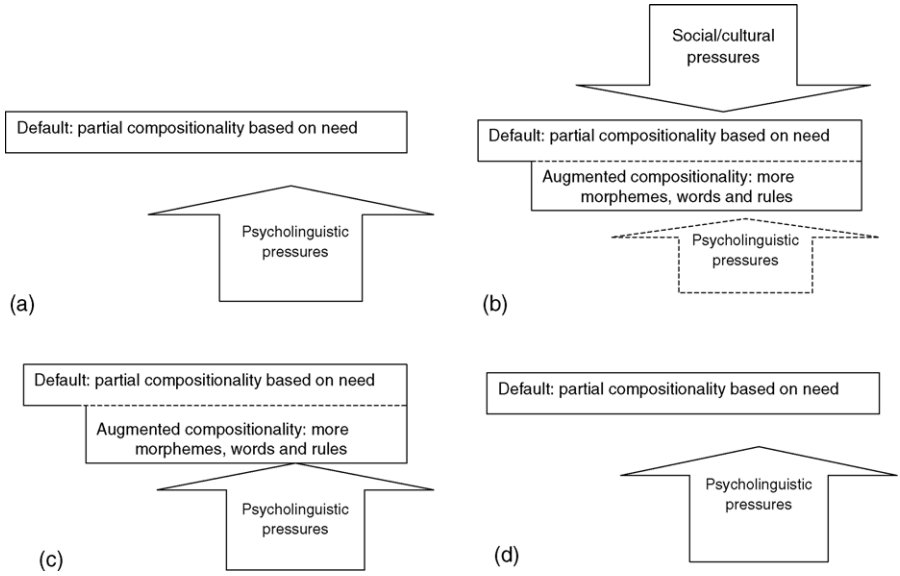

Fig. 3. (a) Psycholinguistic pressures determine the default level of partial compositionality. (b) Social and cultural pressures cause and sustain additional measures of compositionality, and may reduce the potency of the psycholinguistic pressures by providing supplementary processing support (e.g. through writing). (c) With the removal of the social and cultural pressures, the ever-present counteracting psycholinguistic pressures begin to act on the augmented system. (d) The result of the dominance of the psycholinguistic pressures is a return to the default.

psycholinguistic constraints on processing. Unless writing or other technology is available to support working memory, humans will naturally maintain a conservative approach to processing that eschews unnecessary explicitness. Fig. 3 illustrates the dynamic. The psycholinguistic pressures are essentially constant, being determined by working memory capacity and general cognitive limitations. These maintain the default of partial compositionality (Fig. 3a).

However, certain kinds of social and cultural pressures can counteract the psycholinguistic pressures, requiring and sustaining an augmented compositional engagement (Fig. 3b). Where literacy or certain kinds of oral tradition form part of the culture, these may even provide a platform for reducing the natural potency of the psycholinguistic pressures, by providing additional means for handling complex linguistic constructions (e.g. taking notes to remember more of one's input).

If there are social or cultural changes (e.g. if there is a general or local reduction in literacy or in particular cultural practices in relation to orality, or if the language is replaced by another as the means of intergroup communication) and the language reverts to esoteric usage, the socio-cultural pressures reduce and, according to our model, the underlying psycholinguistic pressures once more prevail (Fig. 3c), so that there is a reversion to the default (Fig. 3d).

Although an individual language would be expected to reflect the tendencies of its users towards esoteric or exoteric communication, it is not a case of either/or, but rather of positions on a continuum (Grace, 1997). Fig. 4 demonstrates what we view to be an accretive relationship between customary usage and the degree of transparency, regularity and productivity

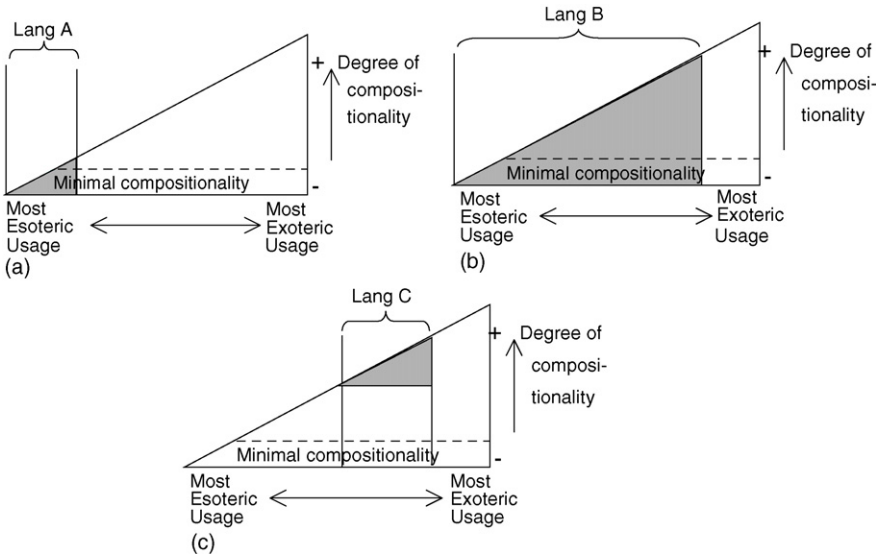

Fig. 4. (a) Language Type A: a language used for esoteric communication can sustain a low level of compositionality. (b) Language Type B: a language used for both esoteric and exoteric communication has a flexible level of compositionality. (c) Language Type C: a language used for only for exoteric communication has a high level of compositionality with little provision for exclusivity from outsiders.

in a language.[9] It is accretive because when a language shifts in its usage towards greater exotericity, it does not necessarily reduce its capacity to support esoteric communication, though it may (Fig. 4c). In Fig. 4a Language Type A[10] is used within a closed community, and rarely if ever with outsiders (that is, people who speak another language, or people who speak the same language but are not socially and culturally part of the community). Language Type A is therefore not challenged by much pressure for exoteric communication, and so barely crosses the level of minimal compositionality: much of what needs to be said can be said elliptically and formulaically, with huge reliance on shared knowledge, pragmatics and common practice. The minimum level of compositionality ensures that, nevertheless, novel messages can be produced and understood, but the flexibility of the system to support such activity may be somewhat limited, reflecting customary need (see the discussion of *needs only analysis* in section 4). Of course, Language Type A is, like all languages, capable of modification to support greater flexibility, should this become necessary, but for as long as it is employed for communication between familiars, its potential for doing this (i.e. for becoming more like Language Type B, below) is not exploited. Type A languages are now somewhat rare, but until the very recent past

[9] We differentiate here between 'Language Type' and the general term 'language' to describe English, Swahili, Mohawk, etc. This is important because a language in the latter sense can be realised as more than one Language Type (see, in particular, the description of Language Type C, for further explanation). In cases where a language can manifest as more than one Type, it would be reasonable to speak of 'Variety Types'. However, we resist doing so for two reasons. First, it might tend to build in the expectation that a language *will always* manifest in more than one Type, which is not in fact the case. Second, our primary interest here is not in the process of diversification.

[10] Talking of 'Language Type A' is a short-cut. In our model, it is a matter for each individual speaker to develop his/her own model of the way the language works, in response to input and usage. There will, of course, be commonalities between the mental models of individuals in the same speech community.

they may, in fact, have constituted a sizeable proportion of the languages spoken around the world (Grace, 2003:5).[11]

In Fig. 4b, Language Type B is used for both esoteric and exoteric communication, and so has, in addition to its idioms and irregularities, more options for expressing a message transparently. Most of our global languages today would count as Type B (Kay, 1977:24). Thus, in English, it is generally possible to express any message in a range of different ways, of which some require a great deal of existing contextual knowledge, while others are free-standing, requiring only a knowledge of the language's words and rules. Examples at the most explicit end would be Plain English (a form of English devised to be devoid of jargon and thus accessible to all) and the English version of Wierzbieka's (e.g. 1996, 2004) *natural semantic metalanguage* in which it is claimed to be possible to explain the meaning of any word with reference to specified grammatical combinations of a basic vocabulary of 60 'conceptual primes'. At the most implicit end come the elliptical messages used by close couples, parents to children, and so on, in routine situations—these are typically difficult for an outsider to make full sense of, and would be hard for them to predict the preferred form of. Bernstein's (e.g. 1961, 1964) restricted code is also brought to mind (see section 3.4.2).

In Fig. 4c, Language Type C is not challenged to achieve the full range of *esoteric* functions. This may be because it is, for a particular set of speakers, only used as a *lingua franca* with other groups, and never as the conduit for communication between familiars. (For communication between familiars these speakers may employ their own native language, which may, by virtue of the existence of the Type C language, be able to maintain a Type A status.) As a result, a Type C Language does not occupy the lower levels on the compositionality scale. That is, it does not possess as much irregularity and semantic opacity *for those speakers*. However, there may be other speakers of that language who do use it for esoteric functions, and for whom there are such features. For such speakers the language will be not be Type C, but Type A or B (depending on whether it is used *only* for esoteric or for both esoteric and exoteric functions).

It is important to stress that there is not a direct correlation between any single social, geographical or cultural factor and the Language Type—were this not the case, then languages (or varieties of a language) with forms associated with eso- and exotericity would not co-occur in similar environments. Rather, it is the users who, through their interactions, determine the extent to which their language needs to support exoteric communication (see Fig. 2). Laycock (1979) illustrates this with reference to contrasts between the levels of multilingualism amongst Australian aboriginals on the one hand and New Guineans on the other (p. 81).

3.4. The dynamics of exotericity

3.4.1. Departing from the default

A language used exoterically is driven to establish a greater level of transparent compositionality than its speakers will attribute to it by default. The default state is a product of the peculiar facility of the child to acquire language without recourse to full systematicity, and the pressure to minimise processing effort in production and comprehension by dealing with large units where possible and small units only where necessary.

[11] Retaining Type A status in the period of human expansion across the planet would require certain cultural, social and ecological conditions. Everett (2005) suggests that Pirahã is so differently structured linguistically to be effectively incompatible with Portuguese, with the result that Pirahã speakers have remained largely monolingual (pp. 633–634).

Full systematicity is neither necessary nor psycholinguistically desirable. Every language appears to have a large inventory of formulas—conventional ways of expressing common functional messages (Pawley and Syder, 1983a, 2000; see Wray, 2002a for a comprehensive survey). Formulas offer a quick and reliable route to the expression of predictable complex meanings. However, they are highly restricted, and of limited use with the unexpected. Furthermore, since they are often irregular in form and/or opaque in meaning, they can be impenetrable to an outsider. To accommodate the processing and communicative needs of its speakers, then, any language needs to establish an appropriate balance between formulaic and compositional material, supporting both low-effort routine communication and the expression and comprehension of novel messages (Wray, 2002a:11–18). The nature of this balance will be determined by the extent to which circumstances challenge the effectiveness of the closed, familiar system operated routinely by native speakers, and require the availability of the resources for transparent, compositional novel formulations. Several such circumstances can be identified, all of which revolve around the twin problems of expanding the basic expressive potential of the language, and attempting to bridge the gap between real or potential differences in the contextual or linguistic knowledge of speaker/writer and hearer/reader.

3.4.2. Talking to strangers: the need for autonomous expression

Kay (1977) hypothesises that ''the major mechanism underlying the process of language evolution is that social evolution produces speech communities in which situations calling for autonomous speech occur with increasingly frequency'' (p. 29). By 'autonomy' Kay means the capacity for an utterance to be interpreted in isolation, without recourse to implicit linguistic, cultural, contextual or cotextual knowledge. Non-autonomous expression combines linguistic signals with context, pragmatics, paralinguistic signals and the like. Individual utterances in any language will, of course, score differently on the autonomy scale, since it is part of the speaker's job to judge how much knowledge the hearer shares, and thus what it is appropriate to *not* mention in the interests of relevance and brevity. Kay's point, however, concerns the intrinsic mechanisms available for a speaker to alter the level of autonomy. He draws parallels with Bernstein's (1961, 1964) 'elaborated' and 'restricted' code, though he distances himself from aspects of Bernstein's approach and interpretation. Bernstein showed that, in description tasks, children from different socio-economic backgrounds varied in how explicitly they presented their account (i.e. how autonomous it was), because they made different assumptions about the role that shared information between tester and testee should play in the task.

Kay points to a number of critical factors that lead to more unshared knowledge and thereby enforce increased autonomy in the interests of maintaining comprehensibility between speaker and hearer. One is the division of labour that comes about as a result of social reorganisation. Creating specialists leads to the possession by those specialists of certain knowledge, skills and, hence, technical terms and ''ways of talking'' (Grace, 1987:92ff), that are not familiar to non-specialists (cf. also Pawley's 1991 ''subject matter codes''). Thus, for instance, there is both an increase in vocabulary over all (Berlin and Kay, 1969), and a decrease in the general assumption by the community that all vocabulary is necessarily *shared* vocabulary (Kay, 1977:29). Linked with this is a second factor, the development of occupational and stratificational distinctions that require sub-groups to communicate in particular ways (p. 29). In this manner, linguistic features begin to take on a role as explicit markers of exclusivity—that is, the circumstances that create the need for autonomous, explicit expression simultaneously offer the potential for eschewing it in the presence of outgroup members.

A third factor is an ''increase in the size of the political and economic unit [which] require[s] people to communicate increasingly often with strangers'' (Kay, 1977:29). Significant contact with strangers means that, in order to be understood, a speaker needs to be sensitive to differences between what is known and not known by different hearers in regard to, for instance, acquaintance with third parties, familiarity with local stories and recent events, and comprehension of local traditions and cultural practices. To accommodate all of these social changes, Kay proposes, the language grows in richness and flexibility of expression.

3.4.3. Adult language learning

A rather different pressure on a language, as it expands its social scope, is the impact of adult outsiders attempting to learn it. Kay (1977), Chafe (1985), Thurston (1989) and Trudgill (1989, 2002) are amongst those who propose that languages will have fundamentally different characteristics depending on whether they are commonly learned by adult outsiders (exoteric) or only by children (esoteric). A language that is customarily learned and used by adult non-native speakers will come under pressure to become more learnable by the adult mind, as contrasted with the child mind (Trudgill, 1989:232f; Wray, 2002a:199–213). Consistent engagement by adult learners with the language will lead to unconscious and/or conscious strategies on the parts of both learner and native speaker to effect the regularisation of irregularities, the rationalisation of partial patterns, the re-expression of impenetrable conventionalised expressions, and the introduction of new words, even new structures perhaps, that serve the needs of non-native to native, or non-native to non-native, communication.

The transition from esoteric to exoteric is thus a significant one with major consequences. It will be easier to translate into languages that are customarily used exoterically than into those only used esoterically, for the increased availability of analytic processing makes it easier for outsiders to encode ideas for which no nativelike encoding exists at all, ideas that may be quite exotic to the culture normally encoded in the particular language. In the course of translation, a language is likely to acquire additional words and thereby extend its own range as an expressive medium, challenging its native speakers to grasp ideas outside of their immediate culture and every day experience. It will gain ''richer resources for communicative subtlety'' (Kay, 1977:24). As a result, a language with features supporting exoteric communication is able to embrace contact more easily, and that contact can become a gateway to the world's arena.

3.4.4. Writing

Writing[12] is an isolatable medium that can be aimed at an invisible audience of potential strangers. It thus has the potential to transcend the temporal and physical limitations of speech, and, as such, must – to be effective when so used – be capable of interpretation without (much) surrounding context. In other words, writing, being potentially autonomous, exerts further pressure towards exotericity in a language:

> ''If and when writing appears, the effect upon the sociocultural evolutionary process is dramatic, and it would be surprising indeed if writing were not to affect the direction of language change as well. Writing is language unsupported by all the vocal and visual

[12] Although we focus here on writing, and mention elsewhere also education, these are not the only potential influences on the level of analytic engagement with language. Others might include word-play in song, poetry, and some types of story-telling. However, according to our view, the units that are isolated and made available for more creative use will be genre-specific, because the analysis is functionally determined.

> signals and the process involving immediate feedback from the addressee that all primates, including humans, share when engaged in ordinary vocal communication.'' (Kay, 1977:29)

In complementary fashion, a language's increased expressive autonomy will also make it more suitable for fully exploiting this ultimately decontextualised medium (Kalmár, 1985). In this regard, two major consequences of writing can be identified: the revision of patterns to match externally imposed norms or assumptions, and the capacity to introduce a new level of grammatical complexity.

Pattern revision: Pattern revision may first occur when writing is introduced, particularly if writing is used for the modern purposes of broadening education and recording the language forms. Where there are certain kinds of outside intervention (evangelism or political control, for instance), the written version of the language, including its recorded lexicon and grammatical rules, may display evidence of the non-native's attempt to rationalise the previously unrationalised features associated with esotericism. These rationalisations could then, themselves, accelerate the transition to exotericity, as described above. Specifically, the process of teaching the language back to its native speakers through the introduction of literacy may impose rules and standards that create uncertainty about the system that was acquired in childhood and encourage a sense that regularity is somehow better, rather than just more convenient to the grammar-book writer.

Irrespective of how or why writing first appears, in the long term it is likely to lead to standardisation. Speech is an ephemeral medium, and the main focus is on immediate comprehension. In contrast, written language is permanent and can be ''examined as a static object'' (Chafe, 1985:113). Thus, ''norms for written language become codified and taught. Nothing equivalent happens for speaking'' (*ibid.*:114). Chafe's comment notwithstanding, there can be effects on the spoken language too. The more wide-spread the literacy, and the more it is associated with general education, the more likely there is to appear a notion that speech, too, can be used autonomously on occasions, such that, in certain contexts, ''our speech tends to approximate [written] prose'' (Kay, 1977:29). In consequence, an expectation for explicitness in speech may develop and, in order to promote and regulate that, there may be a standardisation of the spoken language towards the written norms.

Introduction of grammatical complexity: The written medium acts like an extension to short term memory, providing the reader or writer with a means of constructing more complex expressions than could easily be remembered by phonological means alone (Chafe, 1985). Chafe speaks of 'idea units' as typical of speech: bursts of about 2 seconds, containing about seven words, featuring one verb plus its accoutrements, preceded and followed by a pause, and with a ''single, coherent intonation contour, ending in what is perceived as a clause-final intonation'' (p. 106). He hypothesises that ''an idea unit contains all the information a speaker can handle in a single focus of attention'' (p. 106). In similar vein, Pawley and Syder (2000), based on the patterns in spontaneous speech, conclude that processing constraints prevent us from constructing anything beyond the scope of a simple clause of six words or so without dysfluency. Writing, in contrast, is ''free of the constraints imposed by the limited temporal and informational capacity of focal consciousness'' (Chafe, 1985:107).

One syntactic feature that may be associated with the introduction of writing is grammatical subordination. Even if all humans have the *capacity* for the creation of embedded relative clauses (Hale, 1975:8f, 15f), it appears that not all languages actualise it. Kalmár (1985) reviews evidence to the effect that certain languages that he terms 'primitive' (by which he means, in effect, pre-literate), signal clause dependency in ways other than subordination, such as through

‘‘a bound morpheme, a word or a phrase’’ so that while the meaning is one of subordination, the form is not (pp. 157–158). This means that an apparently subordinate clause can also stand as a grammatically independent clause—it is only the presence of another clause that invites a semantic interpretation of dependency (Kalmár, 1985:158). Everett (2005) notes that Pirahã has no embedding, and Mithun (1984) observes:

> ‘‘Subordination is . . . not a universal constant. Languages and speakers vary considerably in the exploitation of this syntactic device. The exact nature of the device is a fuzzy one, more distinctive in some languages than in others. The causes of the variation and fuzziness are, furthermore, complex, in part a function of language-internal factors, such as polysynthesis, in part due to language-external factors, such as a literary tradition.’’ (p. 509)

Ong (1982) proposes that only writing is truly subordinative in its packaging of language, while speech is additive. In response to the question of whether languages actually do develop embedding as a result of being written, Kalmár (1985) offers possible evidence of the appearance of grammatical subordination in Inuktitut, apparently as a result of the introduction of decontextualised writing, and of translation from English (p. 160ff).

Thus is raised the question of whether an innate human capacity for processing embedded clauses is largely held in abeyance until writing makes possible the explicit presentation of the structure for the first time (Hale, 1975). More potently, as Newmeyer (2002:372) points out, a language without grammatical subordination cannot operate the Subjacency Principle, because the Principle applies across the boundaries of embedded clauses, and such boundaries will not exist.

Although all humans can be presumed to possess the linguistic mechanisms required for marshalling subordination and Subjacency, there is a logical problem with any evolutionary account entailing a *survival* advantage for those able to perform linguistic feats that could not be reliably achieved until writing was invented. But if there was no survival advantage, how did these capacities arise? It seems possible that the human’s universal predisposition to avoid such things as Subjacency violations, if and when the situation arises, is not part of a Universal Grammar but rather a natural consequence of general cognitive organisation. It would be this general cognitive organisation that was selected for, not its application to language. Thus, at least some patterns that appear to manifest as evidence of UG might, in fact, be spandrels. In all events, it is significant that current debate continues to emphasise the underlying linguistic equality of all anatomically modern humans (e.g. Newmeyer, 2002:369),[13] past and present, irrespective of what any particular language might invite or discourage in terms of grammatical manifestations of its speakers’ genetic inheritance.

3.5. The relationship between autonomy and socio-cultural ‘progress’

All in all, we have seen that the ‘‘world languages’’ (Kay, 1977) (that is, real world manifestations of our Language Type B) are operative under certain social and cultural conditions and are likely to display certain kinds of features associated with exoteric communication. These conditions include:

[13] ‘‘It is important to stress that nobody – at least one would hope nobody – has claimed that there exists a language for which subordination is literally *impossible*. That really would be a ‘primitive language.’ All languages seem to allow the possibility. In fact, as societies ‘modernize’, the use of subordination becomes more frequent’’ (Newmeyer, 2002:369).

- a socially complex community, including social stratification and professional specialisation,
- being learned by outsiders in adulthood,
- having a written system in general use for the creation of autonomous texts,
- subject to an imposed view of what is standard and correct.

Such languages are likely to have, relative to languages or varieties used only esoterically (Language Type A), a larger vocabulary, fewer irregularities, more points of semantic correspondence with their contact languages or contact varieties, and a greater capacity (and preference for) explicit expression (elaborated code). In addition, their speakers are likely to be less able to view the native speaker intuitions acquired in early childhood as sufficient for a command of the language. They will perceive there to be more to it—features that must be *learned*. Learned features – with literacy the most evident and most socially manipulable – lead to the imposition of standards that can act as gatekeepers between in-group and out-group status.[14] In short, the shift from esoteric to exoteric has the potential to create internal social hierarchies based on secondary linguistic knowledge to which access can be artificially restricted. On the other hand, the changes that the language undergoes will draw native speakers several steps nearer to viewing their own language as an outsider might, substantially closing the gap between the insider's and the outsider's model of the language's patterns, and providing a bridge to communication in the wider world.

As noted earlier, Kay (1977:29) views language evolution as contingent on natural social evolution, and driven by the increasing need for autonomous speech. However, we resist the notion that this evolution is inherently unidirectional. Any change in the social and cultural climate that results in a reduction in the demands for exoteric communication will naturally draw speakers back towards their psycholinguistically-determined default of minimal novel processing and maximum implicitness. Certain natural tendencies in relation to language processing tug towards the creation and protection of irregularity and opacity, while other factors tug towards regularity and transparency. In our present global community the pull towards transparent compositional regularity is stronger. But if the social and political circumstances for a particular language were to change sufficiently, then, we propose, there is no ratchet effect that would maintain the existing balance. Rather, the natural draw towards the accoutrements of esotericity might become as irresistible then, as the draw away from it was previously.

So far, however, we have taken for granted that, for reasons of processing, the default state for a language is indeed one in which the form of the language is only partially specified in compositional terms. We turn now to the reasons for this supposition.

[14] That is, while speakers of languages that are used esoterically may tend to "require a great deal of esoteric knowledge and experience to be able to use [them] elegantly" (Thurston, 1987:41), that knowledge is inherently part of the system that the learner is encountering and acquiring. In contrast, a language with externally imposed standards of correctness reflects the linguistic perceptions of others, perceptions that may be effectively inaccessible to the socially inferior, uneducated speaker who uses a dispreferred variety. A language used in the esoteric context may, certainly, also have its gatekeepers, the elders who know more of the pre-established forms and hence better understand "whether a made-up construction is already reserved for another meaning, or whether the form s/he wants is derivationally suppletive" (*ibid.*). However, in that case, mastery of the finer points of the community language is emblematic of full maturity within the group, whereas, in the more divided exoteric context, the externally imposed standards are used for exclusion, as a marker of elite membership.

4. Psycholinguistic explanations for esotericity and exotericity

The source of the tension between protecting complexity and irregularity on the one hand and rationalising language compositionally on the other has already been mentioned: the need to maintain the optimum balance between processing parsimony and the capacity to express any desired message. It is a need that seems to operate from the earliest years of life. Despite the traditional perception amongst linguists, that first language acquisition consists of the quest for a fully compositional system of morphemes and rules, there is considerable evidence to the contrary (see Wray, 2002a, chapters 6–9, 11 for an extensive account). A more plausible explanation for what children actually end up knowing is that they do not attempt to rationalise language forms beyond the level at which flexibility is evident and desirable. They do analyse input, certainly, but on a *needs only* basis (Wray, 2002a:130ff). Their approach can be characterised simply. They apply a pattern-recognition procedure to linguistic input, but are not naturally predisposed to select a consistent unit size (Peters, 1983). They home in on phonological forms associated with effects that they need to achieve, e.g. object-naming, expressing a feeling, manipulating someone, achieving a social outcome, conveying a nuance of meaning, narrating a traditional story. The units in their lexicons are, thus, variously, what the formal linguist would characterise as morpheme-, word-, phrase-, clause-, and text-sized (Wray, 2002a). This tolerance for large, internally complex units easily explains why child learners are capable of handling irregularities that vex the rule-fixated adult learner.

Whether the propensity to apply needs only analysis continues into adulthood or is lost at the end of some critical period, is unclear (Wray, 2002a:195–197). For reasons that may be partly biological, the older the individual becomes, the more likely he or she is to dissect language more than is strictly necessary for effective general communication. Irrespective of any biological trigger, cultural pressures[15] seem also to reside in two main functions of education: firstly, for developing the ability to manipulate facts and juxtapose them in different ways to gain insights about the world; secondly for learning to command one's language in a way that creates a broad and uncongested highway between new concepts and their expression.

Any biological influences on the balance between formulaicity and compositionality may be limited to the peripheral capacity to open up a form *before* there is a specific need to do so, thus maintaining a creative edge to one's engagement with language. Since such a capacity would simply need to exist, rather than achieve any specific goal (such as a complete analysis of the language into atomic particles and rules), we might anticipate finding that its effects are haphazard and idiosyncratic—and indeed we do.

One individual might suddenly wonder what it is that is 'done' in *how do you do?*, while another notices that *barking* seems to contain the morphemes *bar* and *king*. Such inappropriate analyses will capture attention whereas others, that turn out to be rational in terms of the shared perceptions of compositional structure in the language, are simply absorbed. The issue is not whether or not some such insights are developed – for they clearly are – but rather how extensive they are. Do they reflect a full analysis of the language, or just a cutting edge to needs only analysis? The inappropriate examples could suggest that the analysis is relentless and exhaustive, but we know that this is not the case,

[15] That the influence is at least partially cultural is evidenced by Laycock and Thurston, who independently report a formulaic approach to language teaching by adult speakers of New Guinean languages (see section 4.3).

for most adult native speakers can be surprised by the sudden, first time realisation that a particular word or expression they know well contains certain subcomponents.[16] Because of this, we infer that the analysis that children and adults undertake over and above that driven by communicative need is essentially serendipitous and thus idiosyncratic, unless and until it is specifically fuelled by some cultural impetus.

Thus, we predict variation in the adult population, in relation to the extent to which a native or later-acquired language is subjected to compositional analysis. At the conservative end will be the capacity to notice, or deliberately seek out, pattern (whether real or imagined) in existing linguistic material, for the purpose of humour, explanation or creativity. Such a relatively under-developed analytic ability would be true to the integrity of an esoteric system, without compromising the need to break new linguistic ground when required.

At the other end of the spectrum might come the tutored pattern-seeking of the modern day classroom learner of Latin, a language that cannot be used for genuine communication in its L1 milieu, and which, in the eyes of generations of schoolchildren, bears its irregularities like huge and unwelcome cankers on a fundamentally perfect system. The extreme capacity to divide up a language into ever smaller units, culminates in a fully fledged ability to dissect words and phrases in linguistically irrelevant ways, such as is required for solving cryptic crossword clues. This extreme level of control of the parts – extending, in the last case, to a deliberate disregard for the whole – marks the zenith of compositional command.

If education, literacy and fashion are responsible for all but that conservative, marginal ability to analyse beyond need, then the absence of such cultural factors in the lives of the first users of language must surely define the formal characteristics of the language to be those associated with esotericity. But is there really evidence for this cline in analytic ability? Is it, in fact, possible to observe different levels of compositional awareness in adults according to their education?

4.1. Top level analyticity in adults: can literate adult language learners resist analysing?

Our proposal is that individuals who are highly proficient readers and writers of their own language, who have studied its grammar in school and been taught that some forms are better than others, and who have additionally studied other languages through traditional classroom methods featuring word lists, grammatical rules and paradigms of morphological patterns, will be unable to suppress a compositional approach. But is this true? A recent study conducted by Alison Wray and Tess Fitzpatrick investigated whether, even in the context of not *needing* to analyse the input material, such language learners would be able to resist doing so.

The learners, who were Chinese and Japanese intermediate to advanced learners of English, studying in the UK on postgraduate courses, were asked to predict real transactional situations that they expected to find themselves in during the following

[16] Since each person will be surprised by different things, it is useless to attempt to provide examples that will convince all readers. However, we are aware of surprised exclamations from educated adult native speakers on first realising that: *kneel* contains the word *knee*; *thing* has no apparent meaning in *first thing in the morning*; *perfect* features in the phrase *a perfect stranger*; *suitcase* contains the word *suit*; *remove* is a morphological compound based on *move*.

week or two, and to work out what they would need to say in their half of the conversation.[17] Situations so identified included visiting the vet to get advice on why the subject's pet hamsters were not breeding, coaching someone in badminton, getting a film developed at a high street store, negotiating an extension to an essay deadline, and teaching someone to make an origami model. In a related investigation, a native English beginner learner of Welsh had five days to prepare a televised cookery demonstration for a live audience (Wray, 2004). In all cases, the learners were provided with verbatim texts to memorise—nativelike versions of the very messages that they had expressed the desire to produce. These texts were thus known by the learner to be correct, appropriate and maximally comprehensible to a listener. Since they had been practised and memorised, they were also easily retrievable. In such circumstances, it might seem to be the path of least resistance simply to reproduce a sentence as learned, if and when the appropriate occasion arose. However, none of the learners was wholly capable of doing so, even after they had gained experience in the process. Instead, they produced edited versions of the memorised originals, which featured introductions of their own typical interlanguage errors.[18]

We interpret this finding as indicative of an irresistible propensity on the part of educated, literate adults to analyse language material even when it is positively detrimental to their interactive aims to do so. This view is consistent with the proposal that adult learners exert influence on a language to develop characteristics amenable to the combination of small units by rule, in place of the use of internally puzzling (i.e. irregular, semi-irregular, collocationally restricted and/or semantically opaque) polymorphemic or multiword units. Even at the least potent end of the cline – associated above with non-literate, non-western educated individuals – the cutting edge of analytic engagement, once applied to assist with the mastery of irregular and opaque forms, might exercise pressure on a language to develop more transparency as it becomes increasingly adopted as a *lingua franca*.

4.2. Mid-level analyticity in adults: how analytically aware are semiliterate people?

Since we have proposed that analytic awareness of the language at the upper levels is contingent on education and literacy, it is useful to examine the level of analytic engagement found in semi-literate people. This might be done in various ways. Here, we briefly review findings from studies of spellings in letters written by native speakers of English and French with only the bare minimum of standard western-style education in literacy. Naturally, to be able to write at all, this education must at least entail a familiarity with the alphabet, and an awareness that the written language is divided on the page into sequences of letters separated by spaces.

[17] This method was based upon the one employed in TALK, a software program that enables non-speaking individuals to hold fluent conversations. The TALK user anticipates in advance what she expects to say in her half of a conversation (with necessarily limited regard for what may or may not be said in return) and pre-enters appropriate utterances, which can then be selected via icons during the conversation. Despite what may seem, intuitively, highly unlikely to work well as a means of supporting real conversation, extensive research on one particular user has shown her to be very adept at both anticipating and employing effectively her utterances (e.g. Wray, 2002c; Todman et al., 1999a,b).

[18] In fact, there was variation between subjects, which correlated with their performance on aptitude tests and their self-reports on learning style and attitude. The study concluded that a facility for suppressing analysis appears to reflect the combination of strong motivation to communicate but poor performance on traditional analytic language tasks. It follows that at least some of those normally written off as 'poor learners' may substantially benefit from more emphasis of holistic material directly linked to salient communicative functions.

However, the mastery of writing did not always extend much further than this in these poorly educated individuals, giving us a useful insight into underlying processes.

Fairman (2000, 2002, 2003, personal communication) has worked extensively on letters from 19th Century paupers to the local parish, requesting charity.[19] At a time when as much as 70% of the population of England was illiterate (Fairman, 2003:265) the petitioner usually had to ask a local person – normally someone with only very basic schooling themselves – to write on his or her behalf. Such 'scribes' had a paltry command of written English that did not extend beyond a very basic vocabulary:

> pupils started to read and write by learning words of one syllable, then two, then three and so on. Since the children of poor families did not stay long at school, nor go to the best schools, they learnt to read and write only ... [the] short Anglo-Saxon words. (Fairman, 2003:276)

The petition letters characteristically contain Latinate words that were evidently associated with the formal style perceived as appropriate to the task. The spelling of such words, not having been learned in school, had to be guessed. Fairman (2003) considers that the general impression with which poorer children left school was that ''English orthography was naturally irregular'' (p. 269). The effect was that ''[t]he least-schooled writers seem[ed] to be speaking on paper'' (Fairman, 2002:558).[20]

Fairman's material reveals many examples consistent with our hypothesis that full compositionality emerges for the individual only in response to (sufficient) literacy: *taket* for *take it*; *in form* for *inform*; *a quaint* for *acquaint*; *B four* for *before*; *or* for *are*; *a bleidge* for *obliged*; *a tome* for *at home*; *the Reckley* for *directly*; *a torll* for *at all*. Similar observations can be made in relation the writing of French semi-literates, reported by Guillaume (1927/1973): *aidi* for *ai dit* ('have said'); *cecerai* for *ce serait* ('this would be'); *semy* for *c'est mis* ('it is put'); *a bitant* for *habitant* ('living'); *trou vais* for *trouvais* ('found'); *a ses* for *assez* ('enough'*); ja prends* for *j'apprends* ('I learn'); *dé colle* for *d'école* ('of/from school').

It is important to note that it is not the presence of spelling errors themselves that is of significance, since one can hardly expect a poorly educated writer to know how to spell everything, particularly in languages with complicated spelling patterns like English and French. Rather, what is of interest is that these misspellings suggest a significant failure on the part of the writers to recognise the compositional structure of the words or phrases they are using. This is puzzling for any model of human linguistic knowledge that assumes all native speakers to have a fully developed compositional system. Of course, we can put these errors down to the writers' not realising that the written medium is supposed to reflect the compositional structure that they do, in fact, know. But the data as a whole is not really consistent with such an interpretation. Rather, it seems to us more likely that the writers are aware of some small units but not others. Certain phrases that they use every day, and others that they have, perhaps, heard used by others and that

[19] A sense of the nature of this data can be gained from the following extract, from Fairman (2000:71). It was sent (but not necessarily written – see main text) in 1821 by Stephen Wiles, a 19-year old apprentice: *Sir/i have never been so bad off for shoes Sir/the shoes that i have got now or not worth picking [up] in the Street Sir/I am a bleidge to borrow Shoes of people Sir.*

[20] The following observation by Fairman (2003) is relevant to our previous discussion (section 3.4) regarding the limitations on language processing above the clause level: ''Partly-schooled writers tended not to embed their information but to chain one item after another on the same syntactic level'' (p. 273). It remains possible, of course, that it is the process of writing that enforces this simplification, because it is laborious. Thanks to one of the *Lingua* referees for pointing this out.

they associate with learnèd language, appear to be taken for granted as single units with no particular expectation that they should be composed of internally meaningful constituents. They are then spelled haphazardly, without any heed for the reader's need to construe meaning from the positioning of the 'word' boundaries.

4.3. Lowest-level analyticity in adults: how analytically aware are speakers outside the westernised educational tradition?

Laycock (1979) arrived at a Papuan village with two polyglot locals, neither of whom knew Abau, the language of the village. They sat down by the fire with an elder and asked him to teach them. Laycock recounts how: ''Teaching proceeded by means of whole sentences and occasional individual lexical items, either volunteered ... or requested ...'' (p. 91). The conversation included, from the 'teacher': 'This is how we say: Give me some areca nut' and 'And this is how we say: Give me some tobacco'; from the learners: 'And how do you say: I have no fire'? (Laycock, 1979:91).

Laycock reports that only certain kinds of errors were corrected, and then by repeating the whole sentence, not dissecting it.[21] He adds: ''No attempt was made to explain any of the morphology ... or even to separate out individual words from sentences, except in the case of important nouns (sago, tobacco, areca nut, betel pepper, fire, water) which were often taught individually'' (p. 91). Furthermore, ''All the sentences taught related to friendly, but nonintimate, socializing: requests for food and relaxants (tobacco, areca), greetings and polite interest ('What village are you from?')'' (p. 92). Laycock concludes: ''it seems likely that this method of teaching by whole sentences of potential use – the phrase-book method – is the normal one in Papua New Guinea; my own informants commonly adopted this method during eliciting'' (p. 92).

Thurston (1987), independently of Laycock (Thurston, personal communication), reported something similar of the Austronesian speakers of New Britain, an island to the east of mainland New Guinea:

> The New Britain concept of language instruction is highly systematic in that the language taught follows the progression of social use parallel to the socialisation of the student into the linguistic group. The process begins with the formulae appropriate to the interactional needs of first greeting, leading eventually to the subtle insinuations needed to tease a friend. At all stages, the language taught is governed by its use in actual social situations. (pp. 72–73)

We cannot deduce from evidence such as that of Laycock and Thurston just how widespread this phrasal approach to language instruction might be. We should neither assume that it is the *only* way in which languages without a writing system and grammar books can be imparted, nor that it might not actually be the unmarked approach, from which our own highly analytical method of instruction departs. At least their observations do demonstrate the phrasal approach to teaching as an option that is available to those who have not been educated in the ways of compositionality for its own sake. Certainly, it seems possible that the reason why the Papua New

[21] Compare Dixon and Aikhenvald's (2002b) account of Greek and Latin: ''the Greeks and Romans ... used a 'word and paradigm' approach, setting out the various grammatical forms of a given lexeme in corresponding rows and columns, with no attempt to segment into morphemes (Robins, 1967:25). (In fact Greek and Latin are fusional languages where it is not an easy matter to segment words into morphemes without bringing in the impedimenta of underlying forms, morphophonological rules, and the like.)'' (p. 2).

Guineans were teaching their languages in complete sentences was because they really believe that it represents the basic principle on which languages are designed. That is, they were not necessarily simply taking a more concrete and example-led route to teaching a lexicon and grammar, but perhaps really did not perceive languages as primarily made up of a lexicon and grammar. This suggestion appears to receive further confirmation from the Kaluli of the Papua New Guinea highlands. Bambi Schiefflin (personal communication), speaking of the manner in which they went about teaching language to their children,[22] has observed: ''given that [the] Kaluli had no ideas about dictionaries or grammars, but ideas that language was social, they were teaching sociality''.

4.4. Analyticity in children

Finally, we can briefly consider a corollary of our proposal. If, in contrast with adults, children are *not* looking for compositional patterns other than where the demands of specific input and output require that their existing knowledge of forms be loosened up, should it not follow that if you expose children to a perfectly regular language, they might fail to see all of that regularity? Clearly, there is little scope for investigating this question, since no natural language is entirely regular and logical. However, one artificially created language, Esperanto, is spoken by sufficient people around the world for it to have been acquired by a small number of children as their first language. Bergen (2001), who estimates the total population of such children to be around 350, examined the linguistic output of eight of them. He found that several features of Standard Esperanto (SE), the official, fully regular language, were simply not found in the Native Esperanto (NE) of the children, even though their presence in the child's system would make it more logical and complete. He considers the depleted tense and aspect system of NE ''startling ... because it seems to contradict bioprogram and other universalist predictions about the structure of a language learned in abnormal circumstances'' (p. 580).

Bergen also reports how the children engaged in phonological reduction and omission, even though doing so suppressed morphological information that, when present, would contribute to the regularity and comprehensibility of their output. His explanation for this is that it is reduction born of fluency and ease of production. However, in the context of our own account it could equally reflect a failure to notice the regularity in the first place. This makes, of course, a quite different prediction about the underlying knowledge of the children in regard to the 'true' forms.[23]

In accusative case marking, Bergen found that the children, between them, used it in only half of the opportunities encountered (p. 586). Furthermore, of those uses, several were the same conventionalised greeting. One child used the accusative in a single sentence form that seems to have been holistically acquired—he did not extend the pattern to other sentences with the same construction (p. 587). Two others used it with definite (possessive) pronouns directly after a verb, but without the appropriate marking of the qualified noun. These children, then, were making a simple system more complex by applying only half of the rule some of the time. While one could,

[22] Unfortunately, ''Kaluli never had to really concern themselves with teaching outsiders their language'' (Schieffelin, personal communication), so we have no evidence on how they would have conceived that task.

[23] This may be likened to the matter of speakers of English who habitually say and write *I could of* + verb. Are they simply treating *of* as an allomorph of *have* (on the basis, of course, of their similarity in pronunciation in that context)? – that is, is *of* a verb form for them – or do they actually not know that the construction contains a verb in this position at all (until it is pointed out to them or they one day happen to notice)? It is immensely hard for those of us who do not use that form to judge, since we 'know' that the 'correct' word is *have* and have been long educated to believe that everyone else does too (deep down, if not in any way that they know they know!).

in theory, propose that they actually did have such a complex rule internalised, it seems far more likely that they were simply operating on the basis of fixed forms plus the flexibility that they had uncovered in their barely opened up lexicons of useful units.

Because of Bergen's assumption, in line with traditional syntactic theory, that the child brings a sort of purification filter to a language, he proposes that the features that they eschewed are superfluous in Esperanto, or else naturally amenable to reanalysis, even though, in fact, the patterns he reports are not in any way obviously the product of a systematic rationalisation. Our proposal is the opposite—a child's approach to language is so geared to needs only analysis that they are capable of failing to see even the most obvious regularities within an entirely regular language.

Bergen admits that, significant as this study is, the children were not unsullied specimens. All, of course, had another functioning language, and all had parents whose approach to, and knowledge of, Esperanto would be likely to instil in them the expectation of systematicity. This being the case, it is all the more significant that the children continued to display distinctive differences from those expected in SE, the standard form of the language.

4.5. Accounting for variation in complexity across languages

Trudgill (2002) explores diachronic increase and reduction in, amongst other things, phonological complexity and grammaticalization, as a function of either language isolation or one of two types of contact, entailing childhood bilingualism and adult L2 learning respectively. As described earlier, he concludes that isolated communities, sharing much common knowledge, can tolerate faster speech, which in turn reduces redundancy and supports the development of complex rules (p. 717).

Our model raises the possibility that some of the 'complex rules' may not be operating as complex rules in all the users, who accept the forms without unpacking a rule at all. The rule may or may not be there for them to discover should the need arise—in the extreme, it may be for the incoming linguist to spot, as he/she searches for a rationalisation for a pattern that, in fact, is not rationalised. In either case, an even temporary failure on the part of the language users to internalise a rule that relates two specific configurations or two sets of configurations, will free those configurations to drift along different developmental paths. For instance, in southern English, the expression *fancy VERB-ing*, as in *fancy buying something like that!* begins, for some speakers, not with/fansi/but [θansi]. It arises from the hypercorrection of the southern English pronunciation of /θ/ as [f], e.g. *thanks* as [faŋks]), displaying a doubt about which words begin with /f/ and which with /θ/. This doubt is usually dispelled in the course of learning to read and write. However, the expression *fancy VERB-ing* is somewhat unlikely to be written down, and so the individual's recognition that [θ ansi] in this expression is actually a version of *fancy* may not ever materialise. Where it does not, the word is open to being influenced by developments of / θ / rather than /f/. So much is well-recognised as a factor in language change. What is less often noted, however, is that the change does not need to be followed around by a complicated rule that can restore it to its original form. A single generation of speakers that have never needed to spot the relationship is sufficient to cut the link with that rule. In short, many of the complex rules may be complex because they have not always been rule-governed at all. Needs only analysis may, in response to a new situation, require that a subsequent generation of speakers find a rule to relate the items, and thus the complex rule may become a reality, capable of being operationalised to create new forms. In other cases, it may only be outsiders, such as linguists, who, believing that there must be rule-based continuity, devise a complex account to relate what are, in fact, independently learned and motivated items.

5. Formulaicity all the way down

We can now draw together the various themes of the discussion, and see how they impact on assumptions we might make about the first human language(s).

5.1. The nature of the first languages

Section 4 has provided a range of evidence that humans do not naturally require a fully compositional language in order to communicate, but that they are adept at extending their identification of patterns and at regularising forms, when taught how to do so, or when circumstances demand it. The conception of language as entirely (rather than just *partly*) reducible to words and rules seems to be a product of cultural preferences and practices which impose logical rationalisations beyond those that are naturally required for effective day-to-day communication at the mundane level. (On the other hand, these rationalisations provide a new opportunity for using language creatively and for conveying relatively uncontextualised information effectively to strangers. Since this is a desirable skill in literate westernised cultures, it becomes immensely important there to maintain the linguistic accoutrements of autonomous communication. Thus, within the context of such cultures, pinning down a language as a fully compositional system is an entirely reasonable intellectual challenge—just, perhaps, not a natural linguistic one.)

Without the cultural pressure to extend beyond the natural scope of compositionality in the linguistic system, native speakers can tolerate, and may even generate, irregularity and opacity. It follows that the characteristics associated with esoteric communication are the default state for a language. Furthermore, should there be a withdrawal of the various forms of instruction that instil in the child and adult a dissonance between what is known and what others say *ought* to be known, we would predict that the regularities and semantic clarity of an exoterically-influenced language will be subject to gradual occlusion. In short, a language will naturally accrete etymological relics unless learners are subjected to pedantic correction sufficient to make them separate large, perfectly functional units, into smaller parts.

It seems unlikely that the small hunter-gatherer communities in which language first emerged would have experienced much of the cultural pressure to extend the scope of compositionality that is commonly seen today. In particular, none of the conditions described by Kay (1977) as leading to increased autonomy in languages could have applied. The tool assemblies were minimal. No significant specialization of skills or knowledge other than by age and sex is likely to have been possible. Shared systems of knowledge or beliefs, dependent as these are on language for their development, could only have been rudimentary at best. The communities were surely small enough that most interactions would have been between people who knew each other quite intimately. In brief, none of the social and cultural factors that contribute to the development of autonomous expression would have been present. Even the potential effects of adult outsiders learning the language might, in the absence of the other factors, have had only minimal impact, if those first language users adopted the phrasal approach to teaching their language (section 4.3).

5.2. How 'modern' were the first languages?

A 21st century western-educated time-traveller confronted with the first ever human languages would – if our account is valid – find them to be examples from the extreme esoteric end of what is naturally possible for humans in a functional society. The languages would be

supported by an identical innate capability to our own, but would be circumstantially prevented from expressing certain features seen in many languages today, such as complex embedding. Our linguistically aware adult time-traveller would struggle to learn these languages, impeded by the proliferation of difficult sound combinations, wayward form-meaning pairings (perceived as irregularities), and the impenetrable semantic representations that are characteristic of languages used for esoteric communication. On the other hand, her intrepid two-year-old co-adventurer would achieve the task of acquisition with the natural aplomb of a human infant.

5.3. How did the first languages acquire their linguistic material?

If human language is, as we have proposed, subject to a default underspecification of forms in the mental processing of its users, then there are two possible origins for the inherited material. In one, words and morphemes were first developed, and then became, in the course of use, subject to a certain amount of gluing together—'fusion' in Peters' (1983) terms. This scenario is consistent with the model developed in this paper, if we allow the first users of full human language to have operated in 'turbo drive', that is, engaged with compositionality to a greater extent than their descendents customarily did. Since we are attributing to our species a uniform *capacity* for such engagement, there is no logical reason to discount this possibility, provided we can imagine the socio-cultural stimulus for it.

Equally compatible with our account, however, is another scenario, in which stable modern linguistic systems did not arise through a process of movement away from initial full compositionality at all, but rather emerged from totally non-compositional communication systems (Wray, 1998, 2000, 2002b). In other words, the raw material of the first fully human language(s) would have been pre-existing sound (or sign) sequences holistically associated with semantically complex messages.

A semantically complex message is one that, despite having no internal structural composition itself, would require several words and some grammar to translate into a language like English. Consider *abracadabra*, a single morpheme with a meaning something like 'I hereby cast a spell on this object/person, causing a desirable change'. These structurally non-compositional sequences would, as the result of a cognitive or biological trigger, have become subjected to needs only analysis (painfully imposed, since there would be no patterns to find other than chance ones), and thus gradually loosened and marginally regularised to the point of sufficient expressional flexibility for the needs of the speakers and hearers (Wray, 1998, 2000, 2002b; Arbib, 2005).[24] Support for this

[24] Wray (1998, 2000) suggests that segmentation might have occurred as a result of coincidences between form and meaning (e.g. the same CV pair happens to occur in two holistic strings that also share some meaning component such as reference to the speaker, leading to the association of that CV pair with the meaning 'me'). This proposal is consistent with what Peters (1983) describes for first language acquisition, but it does not, in itself, suggest what the nature of the initial catalyst might be. One possibility is natural emerging patterns in the phonology. The fluent pronunciation of a word or longer string requires the 'chunking' of sequences of movements of the speech organs, coordinated as a subroutine. In a holistic protolanguage, as the number of holistic signals grew beyond a certain point, it would have become impractical to maintain entirely unrelated subroutines for each signal. New signals would have had to feature already-mastered subroutines. In due course, there would be a situation where signal A began with the same subroutine as, say, signal D, whereas signals B and C began with a different one, etc. The similarities could remain unnoticed, but one naturally occurring phenomenon, the slip of the tongue, might have raised awareness of them. Production sequencing errors resulting in the swapping of sounds might easily suggest to listeners the idea that the signals could be partly alike and partly different, leading to the insight that the moving parts might be associated with changes in meaning. This scenario is useful, in that it forges a direct connection between increasing pressure on the sound system and the introduction of form-meaning compositionality. For further exploration of this idea, see Grace (2004a).

scenario is found in AI research. Kirby (2000) and Hurford (2000) demonstrate through computer simulations how it is possible for agents that are ''capable of cognitively representing complex meanings'' but have no way of expressing those meanings systematically (Hurford, 2000:324), to develop I-language schemata on the basis of observing and contributing to community E-language.[25]

Despite the differences between Hurford's assumptions and our own, some useful observations emerge from his and comparable simulations, such as Kirby's (2000, 2001). Firstly, initially random input can be the raw material for the emergence of a shared system. Secondly, unless compositionality is forced by the initial parameters, it will stop short of fully rationalising patterns in the input, leaving islands of non-compositional material (Kirby, 2001). Thirdly, it is possible for the E-language to look regular without the I-languages of the individual users being either identical to each other, or fully specified for the generation of that regularity (Hurford, 2000:342). For further explorations of computer simulation research in relation to needs only analysis, see Wray (2005b).

5.4. The relationship between those with language and those without it

Much as others have proposed, we must understand that what made the very first language users different from their parents was that they possessed the capacity to identify patterns inside their existing message units and extract (apparently) recurrent material for recombination. Unlike other theories, however, ours entails no fundamental impetus to identify *all* the components. If you want to change a tyre on your car, you don't need to dismantle the engine. A further advantage of the present proposal is that it accommodates the continuation of effective communication between those with and without the new linguistic skills. The first 'segmenters' need not have stood out all that much from those around them, for theirs would have been a marginal activity relative to the general use of holistic forms with agreed functions. Those who *could* segment out sections from holistic utterances for recombination could do so (Wray, 1998, 2000, 2002b), while the others carried on using what they already knew. The analysis, operating in direct response to interactional need, could thus be naturally very slow, and indeed would need to be, both because the analyticity of the modern speaker would be little challenged by the holistic usages of his pre-modern companions, and because, in the short term, his novel

Another phenomenon that might have favored segmentation is blending. Deliberate blends such as *smog* and *brunch* are familiar today. However, accidental blends also occur frequently (see, for example, Fromkin, 1973); in fact, they have been proposed as the source of a number of words in the history of English. Blends that could be interpreted as having something in common in both meaning and form with previously existing signals would naturally have suggested that parts of a form might contain clues as to its meaning (Grace, 2004b).

[25] In Hurford's simulations agents have the capacity to choose between mapping forms holistically onto complex meanings, or compositionally onto predicates and arguments. The latter prevails over time, resulting in a fully specified system of atomic units and ordering rules. However, in Hurford's design there is an opportunity for the agents to encounter atomic units in isolation as well as in propositions, whereas this is not guaranteed in real language. In his experiment 2, Hurford does find that certain propositions remain holistically expressed; however, it is a function of frequency of occurrence. Although there is undoubtedly a relationship between formulaicity and frequency, it is not a straightforward one (Wray, 2002a). Meanwhile in his experiment 3, he shows that additional formulaicity remains if agents generalise to rule with only 0.25 probability rather than 0.50. We contend, however, that formulaicity in natural languages is not a function of the overall level of predisposition to generalise, but rather of the threshold of need that triggers generalisation. Our scenario proposes that individuals will reliably generalise (probability of 1.0) once there is a need to generalise – that is, if comprehension or production will otherwise be hampered. The low level of generalisation is, therefore, a function of the subset of what individuals need to say – something that is not a parameter in the Hurford simulations.

expressions, while meaningful to him, would be impenetrable to the rest, unless they learned them whole.[26] But little by little, under the influence of even one analytic operator and his/her descendants over a number of generations, an initially immutable protolanguage could progressively transform into something more flexible, until a command of that flexibility became advantageous to survival and/or reproduction.

5.5. *Monogenesis and polygenesis*

While monogenesis remains in our view most likely, polygenesis is, in our scenario, at least a feasible alternative. Firstly, if the analytic capacity emerged independently more than once, then it would operate upon the holistic protolanguage of its own user group. However, secondly, even if only one, tiny, group of humans developed modern linguistic capabilities (monogenesis of *language*), we do not need to imagine that all of the linguistic material of all the past and present human languages derives from a single original. With the differences in communication being so subtle, fully modern humans could have lived with and interbred with successive groups of protolanguage users, producing children who, if they had the analytic capacity, would start to work on turning yet another set of complex sound-meaning material into something more systematic (polygenesis of *languages*).

6. Conclusion

In linguistic models much emphasis is naturally placed on the speaker, but the hearer also plays a crucial role in communication. Decisions made by the speaker are highly contingent on his or her assessment of what the hearer will successfully understand. Furthermore, it is normally in the interests of the speaker to take steps to ensure that the hearer has as little difficulty as possible with accessing the intended message (Wray, 2002a:99 – 100). Unproblematic decoding is dependent on the predictability of the content (how easily can the hearer guess what the speaker intended to convey) and of the form (how much of the utterance must be distinctly heard in order to correctly identify it). Sometimes the recognition is immediate—for example, in the case of a formulaic greeting pronounced intelligibly in appropriate circumstances. On other occasions, it will take more work before the meaning of the utterance clicks in the hearer's mind. In communities that operate esoterically, a greater proportion of what is said is likely to be predictable than in a situation of exoteric communication. This is not because a language used esoterically is unable to express novel ideas, but because esoteric communities are places where people share pretty much the same knowledge, and where relatively little novel goes on ('relatively' is, of course, a relative term!). Consequently, when someone in an esoteric community speaks to someone else, the amount of analysis that is typically required in order for the hearer to recognize what is being said is considerably less than the amount required for typical speech acts in exoteric communities.

There are two consequences to this. Firstly, in the process of acquisition, children will not need to push analysis as far in esoteric as in exoteric communities. That is, while all children apply needs only analysis, the need will vary and thus also will the extent of the analysis. In

[26] In our modern Western society it is perfectly possible for individuals to coexist with different capacities to analyse their language. For instance, a person with a Classical education can notice morphological material in English vocabulary that others are oblivious to. With a fellow Classicist, it might be appropriate to use these insights to create new nuances, puns, etc., but such activities will be pointless without such a companion.

western society, additional levels of analysis are introduced once literacy instruction begins, but in fact the process continues for many years as a response to the particular demands of the culture. Secondly, to the extent that utterances can be recognized without analysis, there will be a natural pressure toward compactness (contraction, for example) and ease of articulation (based on complex implicit patterns that would be difficult for an outsider to master). This in the long run would result in features that are genuinely impenetrable to the outsider, because the structure is not arranged in a way that serves analysis. If a community can maintain one language for its internal affairs, and use another – a *lingua franca* such as Tok Pisin in New Guinea – for external dealings, then there need not be any attempt to make the 'home' language accessible to outsiders, and its rather impenetrable forms can become an effective marker of group membership.

Our aim in this paper has been to explore the extent to which the esoteric use of language might represent a default, and thus might reflect the nature of the first human languages more accurately than do the languages of our modern, westernised society. The key feature of this proposal resides in the suggestion that the level of compositionality in an individual's internal representation of the language might be somewhat limited, and that if there is no one in the community that has full command of 'underlying structures' then the language is simply not anchored in full compositionality at all. In one possible scenario, the language floats above some original and underlying full structure, which has simply been by-passed now. In another, there has never been a full underlying structure to the language, only a post hoc rationalisation of holistic message forms, to pull out the parts that are necessary to achieve a sufficient level of flexibility. In either scenario, a greater level of logical structure can be (re)imposed if required. If there was structure originally, some parts of it may be re-discovered, others may not (language change is characterised by new analyses replacing old ones). If there was no structure originally, there is nothing to rediscover, only new forms to infer from the existing material.

6.1. Models of evolution revisited

In the introduction to this volume, Carstairs-McCarthy explores the question of how the starting state for language should be characterised—that is, what the human possesses in relation to linguistic capability in advance of encountering any linguistic input. Applying to language a three-way distinction made by Williams in relation to organisms, he considers whether our innate capabilities, which go on to shape our acquisition of language, are best construed in terms of:

(i) *Document*—An accumulation of other evolutionary developments has led, via a non-optimal route, to a combination of genes that will determine how linguistic input is acted on and how linguistic knowledge is developed. An important feature of this route would be that certain features of our linguistic capability might be maladaptive.
(ii) *Artifact*—Our linguistic capabilities are the result of specifically accumulated skills and approaches selected for to enhance either communication or some allied cognitive function that was easily accepted to communication.
(iii) *Crystal*—Language takes a universal form in humans not because of natural selection in the service of communication or thought, but because there are fundamental 'laws of form' that constrain it to manifest in certain ways.

As concerns language acquisition in the child, our proposal suggests that humans bring, at most, two things to the task: a strong drive to communicate, and the general cognitive insight that

meaning can be manipulated by manipulating form. But perhaps even less is entailed. Perhaps the infant, finding that certain behaviours elicit responses from the environment (most relevantly, from caregivers), experiments with behaviours to find out what kinds of manipulations are possible and how to accomplish them. Meanwhile, the caregivers, guided by their ideas about the importance of learning language, what has to be learned, and what language is used for, reward selected behaviours, reliably engendering a drive to communicate and fuelling the child's awareness that meaning changes as a function of form.

In either case, the child's engagement with the analysis of input is parsimonious, in the sense that communicative (and, in certain educational contexts, intellectual) need precisely defines the extent to which forms are examined for the potential of variation (needs-only analysis). We expressly do not believe that the child is pre-programmed to seek out all possible atomic forms and map them onto atomic meanings. Certainly, many morphemes will be identified, but many others will not be, nor will generalisations always made. Thus, the reason why people do not notice that the brand name *Palmolive* is constructed out of the words *palm* and *olive* (two of the oils the products contain) is the same as the reason why they don't notice that the name *Mildred* can be broken down into *mild* and *red*—neither has any communicative salience, and neither offers paradigmatic variation (**Palmcanola*; **Mildblue*) such that a contrast in form might be construed to match a contrast in meaning.

The proposal that humans bring to language acquisition something so simple as needs only analysis is most consistent with Williams' Artifact' option, for our ability to make sense of moving parts is something that can be envisaged to have a selectional advantage. Given its general nature, we would favour the proposal that needs only analysis developed out an existing cognitive capacity, rather than that a language-specific biological endowment was brought to bear on whatever communicative system existed previously.

However, the real focus of Carstairs-McCarthy's debate relates to key universal constraints that have been claimed to exist in human language—the understanding of structural relations in a way that ensures that empty nodes are represented, and of the apparent principles that determine how complex embeddings are correctly interpreted. Our paper does not take a position on whether or not humans are innately predisposed to apply universal constraints to language. However, we do note that such a view should not be adopted without attention to certain lines of evidence, of which one is that languages appear not to display complex structural embedding until they are written down, with the result that not all languages can actualise the universal constraints at all. This reduces the likelihood that any universal constraints that relate to the interpretation of complex structural embedding have been selected for as a function of language-related activity, though – because of the possibility of exaptation – they could still be a product of natural selection. Because of the caution we urge in relation to the imposition of 'culture-centric' expectations of language form, which might force square pegs into round holes, we consider it fundamentally difficult to check the extent to which a language without complex structural embedding will, if it once introduces it, naturally adopt the same constraints as other languages. We have proposed that the capacity for languages to be redefined in terms of 'universal' features does not of itself mean that they necessarily possessed them in the first place. It certainly remains possible that humans possess cognitive structures in relation to language that, while capable of remaining dormant, will always, when manifested, manifest in the same way. For some linguists, this is sufficient evidence that there is an innate language-specific faculty, though others will see only an indication that general cognitive mechanisms are obliged to operationalise language in certain ways.

Finally, our view of language as a two-tier arrangement – economy drive and turbo boost – enables us to ask three last questions of evolution: (a) how did we get our full linguistic potential? (b) why, since we have it, don't we normally use it? and (c) why have we not evolved out of the problem?

6.1.1. How did we get our full linguistic potential?

The general psychological insight that large things can be made up of small things in a predictable way could be a product of natural selection, favouring those able to identify patterns that arise as part of the natural world. This is likely to have emerged early, and is a necessary preadaptation for language. The secondary step, by which the communication system itself is subject to the same insight, may be linked to the development of other exclusively human insights, such as that a tool can be used to make a tool or, as suggested earlier, patterns falling naturally out of the phonological realisation of the existing strings, perhaps in relation to speech production errors (note 24). Beyond that, the aspects of language that are more complicated, such as some of the features associated with 'Universal Grammar', would need to be accounted for as a natural product of how the brain is obliged to operate, or else as an accidental by-product of the development of the species. The latter is more probable within our model, for reasons developed in the next section.

6.1.2. Why don't we use all of our linguistic potential?

Our not using all of the processing potential that language provides us with is easily explained by our shortage of processing space—working memory. Shortage of working memory is a huge obstacle to complex language use, though it can be overcome to some extent. We can stretch our capability for complex linguistic processing, both in the short term by concentrating very hard, writing things down, etc, and in the long term through practice. But, being a stretch, once we let the elastic go, it will spring back to the default. Pawley and Syder (1983a) demonstrate how, in informal chat, we tend to chain clauses rather than embed them, for instance.

Whichever of Williams' three mechanisms is responsible for our limitations in working memory, there seems to be a direct conflict with, and effective constraint on, our linguistic faculty. This suggests that human language did not gain its structural power through a process of increments based on natural selection, otherwise it would never have gained the most complex aspects.[27]

6.1.3. Why have we not evolved out of the problem?

There is one final piece to the puzzle—if we have the capacity to produce and understand highly complex linguistic constructions, and these furnish us with greater flexibility of expression, why has the species not progressively developed greater working memory in order better to accommodate this valuable capacity? The solution that our model proposes is that eloquence and the ability to express novel messages, whilst of some use, are not actually the most influential operators in natural selection, or indeed sexual selection. It is certainly important to

[27] Although this proposal appears to favour that of Hauser et al. (2002) over that of Pinker and Jackendoff (2005), the alignment is superficial only. We are expressly not proposing that a dedicated UG evolved, and we agree with Pinker and Jackendoff that language evolution has been driven by communicative need. However, in our proposal, many of the insights that educated people have about the structure of their language are a post hoc response to the pressure to scrutinise existing, effective communicatory units beyond what is strictly necessary for 'normal' language use. In short, we concur with Pinker and Jackendoff, other than in relation to how much of the language system needs accounting for in terms of ratcheted evolutionary development.

have *enough* capacity to express and understand novel messages, but the optimum level for human social interaction may simply not require constant innovation (Wray, 2005a). Saying the old, or a slightly modified version of the old that makes it new in only the one relevant regard (compare Kuiper, 1996 on auctioneers' language), may be much more helpful in maintaining social bonds and passing on information, than composing complex strings that stretch the attention and the memory to their extreme. Just as bonobos appear to have considerable capacity for understanding complex language but have never developed it for themselves (Savage-Rumbaugh et al., 1998; De Waal and Lanting, 1997), so we, too, appear to have 'spare' capacity that biological evolution has not chosen to build upon (though cultural evolution clearly does).

6.2. The way forward

If our scenario is right, then full compositionality is not a property that we have to account for at the dawn of language. More radically, we can no longer be entirely sure that we ourselves actually possess the natural capacity to achieve *without help* either full compositional analysis or all the features associated with Universal Grammar. Certainly, humans possess a genetic predisposition to identify patterns and associate them with useful functions, but we appear to be able to operate perfectly well outside of educated spheres without having a full grasp of each and every of the words and rules that a professional adult linguist is capable of identifying on the basis of intricate study. Thus, we propose that care must be taken before assuming that our goal, in searching out the essence of the original language(s) of human beings, is the characterisation of a full combinatorial system. Since children seem to be somewhat oblivious to aspects of the systematicity that we see in today's languages (Wray, 2002a; Bergen, 2001), we should keep our minds open to the possibility that humans are not, after all, naturally disposed to full compositionality, and that our modern day command of it may be something of a Fosbury Flop.

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