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GAPS IN GRAMMAR AND CULTURE¹

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I

The Walbiri language, of Central Australia, has a set of four indefinite determiners:

/tjinta/ 'singular, one'
/tjirama/ dual, two'
/wirkaḍu, maṅkurpa/ 'paucal, several'
/panu/ 'plural, many'.

These correspond exactly to the four grammatical numbers distinguished in definite determiners, as exemplified by the following: /njampu/ 'this, singular'; /njamputjara/ 'these, dual'; /njampupatu/ 'these, paucal'; and /njampura/ 'these, plural'. The indefinite paradigm functions in the language as a system of determiners – it is not a system of numerals, contrary to what one might be led to believe from the literature on Australia which sometimes identifies languages as having the 'numerals' *one, two, three, and many*. The fact is, the indefinite determiner paradigm, as a whole, is not used in counting in Walbiri, any more than are the various definite determiner paradigms. What is true of Walbiri in this regard is, so far as I can tell, true of the other Australian languages which I have any knowledge of. Furthermore, in the Walbiri case at least, I believe that it would be correct to say that there is no single linguistic convention which is employed in situations in which the activity of counting, or exact enumeration, is a practical necessity (although there is a Walbiri-based method of exact enumeration which is highly favored, quite apart from the recent and not universally known, English-derived system of numerals /wani, tuwu, tjiriyi, puwa, payipi, tjikitji, tjipini, yayiti, ṅayini, ṅini, ṅipini, .../). While it would be essentially correct to say that Walbiri lacks conventionalized numerals, it would be incorrect to say that Walbiri speakers, irrespective of their knowledge of

Anglo-European culture, lack methods of exact enumeration. The indefinite determiner paradigm includes two members referring to exact numbers: /tjinta/ 'singular' and /tjirama/ 'dual'. Using these together with the principle of addition, it is possible to refer, with precision, to numbers higher than two: /tjiramakaři-tjinta/ 'three', /tjiramakaři-tjiramakaři/ 'four', /tjiramakaři-tjiramakaři-tjinta/ 'five', and so on. In principle, there is no upper limit to this, although as the numbers get higher, the corresponding names for them become longer and more impractical; and in some Australian languages (like Gunwinjgu of Western Arnhem Land, for instance), where counting is of greater practical importance than it is for the Walbiri, short-cuts have been adopted, and to some extent conventionalized, to convert the higher numerals into a more manageable form (e.g., the use of *hand* for *five*, *hand+hand* for *ten*, *hand+hand+foot* for *fifteen*, and so on).

I think that the correct way to understand the Australian counting systems is as follows: conventionalized counting systems, i.e., numerals, are for the most part lacking, but *counting* itself is not lacking, in the sense that the principle of addition which underlies the activity of exact enumeration is everywhere present. In fact, I would like to argue that counting, in this sense, is universal, and whether or not a conventionalized inventory of numerals exists in a given language depends upon the extent to which exact enumeration is of practical use or necessity to the people who speak the language.³ One might look upon the Walbiri lack of conventionalized numerals as a gap in the inventory of cultural items – since the principle which underlies counting is present, filling the gap is a rather trivial matter. This view is entirely compatible with the observation that the English counting system is almost instantaneously mastered by Walbiris who enter into situations where the use of money is important (quite independently of formal Western-style education, incidentally).

What I am suggesting here is that certain cultural items can be said to be universal even though they may not be included in the inventory of cultural items for particular communities. This is not a contradiction if one bears in mind that what is universal is the concept, not some conventionalized manifestation of it. The latter is specific to particular cultures – some cultures have it, while others have a gap in its place. I do not know the extent to which this line of thought is appropriate to spheres of culture other than counting, but I suspect that it is rather widely appropriate; and I will suggest below that it is applicable in interesting ways to considerations of substantive universals in language.

Before beginning a discussion of linguistic examples, however, I would like to consider, in connection with the admittedly tentative proposal made above, the findings of Berlin and Kay in their study of basic color terms.⁸ For the present purposes, I will assume that their facts are for the most part correct.⁴

II

Of great importance in the work of Berlin and Kay is their discovery of semantic universals in color terminology. They have found that the foci of color terms are by and large the same across languages. From this it necessarily follows that if languages differ with respect to how many basic color terms they have, the number of universal basic perceptual color categories exceeds the lowest number of basic color terms found in any language. In fact, Berlin and Kay suggest that there are eleven universal categories even though there are said to exist languages whose color terminologies include no more than two terms which can be called basic (according to the criteria used by Berlin and Kay). If this is so, then the domain of color provides another example of a universal – i.e., the system of eleven (or so) basic colors – which may or may not be fully represented by conventionalized labels in a particular culture.

Using the criteria of Berlin and Kay for deciding the basicness of color terms, I conclude that Walbiri has two terms which are unambiguously basic:

/mařu/ 'black, dark'
/kađiri/ 'white, light'⁵

However, this does not exhaust the Walbiri inventory of color terms. If the basic color categories are universal, then it is reasonable to expect that a language like Walbiri with only two unambiguously basic terms, would have ways of referring to the basic color categories for which no basic color terms exist. Walbiri has a rather rich variety of terms referring to color and to other aspects of outward appearance. There is a fairly productive morphological process for forming attributes, consisting in the reduplication of substantives for which particular attributes are characteristic; and among the attributives formed in this way are color terms which correspond closely (in some cases, exactly) to certain of the remaining basic color categories: /yalřuyalřu/ 'red' (cp. /yalřu/ 'blood'), /yulřayulřpa/ 'red' (cp. /yulřpa/ 'red ochre'); /kařawarakañawara/

'yellow' (cp. /kaŋɬawara/ 'yellow ochre'); /yukuɾiyukuɾi, watjirkiwatjirki/ 'green' (cp. /yukuɾi, watjirki/ 'grass, greens'); /waljawalja/ 'brown, earth-colored' (cp. /walja/ 'ground'); /yuljuɬuyuljuɬu, kunjtuɾukunjtjuɾu/ 'grey, light blue, light purple' (cp. /yuljuɬu, kunjtuɾu/ 'smoke'). The salience of the terms for red, yellow and green, together with the fact that the terms are applicable to a wide range of objects, would provide grounds for arguing that these are basic color terms in Walbiri, were it not for the fact that they are obviously derivative morphologically.

It is possible to think of the Walbiri color nomenclature in the same way as was suggested above for Walbiri counting – the basic colors are universal, but Walbiri has a gap in its terminology which can be filled by derivative terms. But I suspect that Walbiri exhibits even greater reflection of color universals than this. Notice that the basic terms are black and white. In this, Walbiri conforms to another expectation which emerges from the work of Berlin and Kay; they have found that there is a significant correlation between the *number* of basic color terms in a language and the *particular* basic color terms the language has – if two, then *black* and *white*; if three, then *black*, *white* and *red*; if four, then *black*, *white*, *red*, and *yellow* or *green*; if five, then *black*, *white*, *red*, *yellow*, and *green*, and so on. In other words, there is a structure inherent in the system of universal color categories which operates to constrain the basic color terminology for any language – the gap in the Walbiri color terminology reflects part of this structure in that its two basic terms are precisely the ones predicted by the universal constraints on possible basic color terminologies. But, if my understanding of Walbiri color terms is correct, there is a sense in which the gap itself has an internal structure of the type which reflects the universal constraints. Among the Walbiri color terms which, by strict application of the criteria, are identified as nonbasic, three are highly salient and of general applicability; in fact, they fail fully to satisfy the criteria of basicness solely because they are morphologically derivative. If this latter criterion were relaxed, then Walbiri could be classed as a language with five basic color terms; and if this were the case, it would again conform to the universal constraints – i.e., it fulfills the prediction that a five-term basic color nomenclature will have *black*, *white*, *red*, *yellow* and *green*.⁶ I doubt very seriously that Walbiri is alone in this respect, and I imagine that a great deal of evidence in support of the claims for the universality of the basic color categories could be garnered from a study of nonbasic color terms in languages whose fully basic terms number less than the eleven or so universal categories.

III

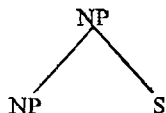
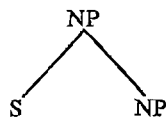
Counting and color nomenclature provide examples of cultural items which are arguably universal for all peoples despite their frequent absence (in concrete, conventionalized manifestation) in particular cultures. They provide examples of what I have referred to as 'gaps' in particular cultures. I would like now to turn to the analogue in grammar.

Recent work in the study of linguistic change has suggested that an impressive body of phenomena observed in the historical development of a language can be explained in terms of formal properties of the rules which make up its grammar.⁷ Specifically, the suggestion has been that an important class of linguistic changes is to be accounted for under the view that the language acquisition device, which children bring to bear in learning the language of the community in which they grow up, is constrained by principles of linguistic simplicity. In other words, in creating the optimal grammar for the language which they learn, children may effect formal improvements in the system of grammatical rules. While it seems to be unquestionably true that a great many linguistic changes are compatible with this type of explanation, to the extent that linguistic simplicity is understood, it is also true that a considerable number are not. Of this residue it must of course be admitted that many observed changes are of little linguistic interest, in the sense that their explanation is basically trivial – e.g., neologisms and lexical borrowings for introduced cultural items. But a substantial portion of the residue is of undeniable linguistic interest. Bever and Langendoen, for example, have pointed out that the evolution of the relative clause in the history of English cannot be properly understood without taking into consideration certain aspects of linguistic performance – certain changes in the development of English relatives can be explained in a reasonable way only if one assumes that perceptual constraints, as distinct from constraints relating to the principles of formal simplicity, are also operative in language acquisition.⁸ I would like to suggest here that there exists another type of language change which is also not obviously amenable to explanation in terms of formal simplicity – namely, change which amounts to the acquisition of a new linguistic structure.

If one looks at a variety of languages in the world, one is struck by the observation that certain grammatical devices are found, in virtually identical form and function, in many distinct languages regardless of genetic relationship or historical contact. I am not referring here to the various formal universals which have been identified in recent years,⁹

but rather to certain specific highly recurrent grammatical devices – for instance: relative clauses; the passive; negation with variable sentence internal scope; topicalization; and others. The overall impression one gains through such an examination of a variety of the world's languages is that these devices are universal. Nonetheless, it is a fact that a great many languages lack specific ones.¹⁰ I would like to explore the possibility that certain of these highly recurrent grammatical devices are in fact universal (in the same sense as that in which the basic color terms and counting can be said to be universal), and that their absence in particular languages is merely a gap in formal manifestation. The grammatical device which I will discuss in this regard is relativization.

In a great many languages of the world, the relative clause can be said to consist, at some point in derivation at least, of a sentence embedded in a noun phrase either before or after a head noun phrase:



More often than not, verb-final languages have relative clauses of the first type (e.g., Japanese, Navajo), while verb-initial and verb-medial languages have relative clauses of the second type (e.g., Maori, English). In either case, in order for the relative clause to be well-formed, the embedded sentence must contain a noun phrase (called the 'shared NP') which is identical to the head. Languages differ in the way in which these embedded relative structures are mapped onto surface structures – thus, in some languages, the shared NP in the embedded sentence is replaced by a relative pronoun, and the latter is shifted to initial position within the embedding (e.g., English); in some, the shared NP is apparently simply deleted (e.g., Japanese); in others, it is pronominalized (e.g., Maori non-subject shared NPs) and in still others, the *head* NP, rather than the shared NP, is deleted (e.g., Navajo – this is the preferred

surface structure, although deletion of the embedded NP and retention of the head is an alternative). Despite this diversity of surface structure realizations, the two types of relative clause structures are identical in the essential respects,¹¹ and they can reasonably be said to belong to a single general type, which might be termed the *embedded relative*.

Although the embedded relative is extremely wide-spread among the languages of the world, there are languages which lack it – or, perhaps one should rather say, there are languages for which no truly convincing evidence can be adduced in support of underlying structures of the embedded relative sort. Walbiri is a language of this latter type. In Walbiri, the linguistic structure which serves in discourse as a relative is similar, perhaps identical, in its overall syntactic form and transformational behavior to those structures which function as conditionals (of both temporal, when ... then, and consequential, if ... then, types). The Walbiri relative, like the 'antecedent' of a conditional, is adjoined to the main clause, rather than being embedded within one of its constituents. Furthermore, relatives and conditionals share an identical pair of subordinators – /katji-/ for future and irrealis, and /kutja-/ for non-future realis; these attach to the auxiliary of the subordinate clause. And both relatives and conditionals may either follow or precede the main clause.

Although I cannot go into great detail here, I suspect that the correct way to handle this aspect of Walbiri grammar is to say that there is a generalized relative structure, identified morphologically by the subordinators /katji- ~ kutja-/ (the choice being determined by tense and mood), which is introduced into underlying structures by phrase structure rules of roughly the following form:

$$\begin{array}{l} \text{S} \rightarrow \text{S (Relative)} \\ \text{Relative} \rightarrow \text{Rel S} \end{array}$$

(where Rel will be later spelled out as /katji- ~ kutja-/ rather than a rule of the form:

$$\text{NP} \rightarrow \text{NP S}$$

or of the form:

$$\text{NP} \rightarrow \text{S NP.}$$

In other words, the Walbiri relative is adjoined to a sentence, rather than to a noun phrase. The Walbiri rule provides simultaneously for those structures which are interpreted as relative clauses in the usual sense

(the NP-relative sense) and for those which are interpreted as conditionals (what we might term the T-relative sense). The precise interpretation of a Walbiri relative depends upon the interaction of a number of factors.

The NP-relative interpretation is appropriate where the main clause and the subordinate clause share an identical noun phrase – the circumstance of NP-identity can be reflected morphologically by the use of the referential determiners /yaŋka/ 'the (first clause)' and /ŋula/ 'the (second clause)', although this is optional. Typically, though not obligatorily, the shared noun phrase is deleted by forward pronominalization, and since the relative clause may optionally be moved to precede the main clause, and since pronominalization applies after the movement, the shared noun phrase which remains undeleted may be in the main clause or in the relative clause:

ŋatjulu-ŋu ŋa waŋa (yaŋka₁) pu-ŋu, kutja-tju yaŋku-ŋu
 (ŋula₁-ŋku).
 (I-erg I snake (the₁) kill-past, rel-me bite-past (the₁-erg))
 waŋa (yaŋka₁)-ŋku kutja-tju yaŋku-ŋu, ŋula₁ ŋa pu-ŋu
 ŋatjulu-ŋu.
 (snake (the₁)-erg rel-me bite-past, the₁ I kill-past I-erg)¹²
 'I killed the snake that bit me.'

The various T-relative interpretations depend upon the interaction of tense and mood between the relative clause and the main clause. The temporal conditional interpretation is appropriate under identity of tenses, and the consequential (future, 'future-less-vivid', and past counterfactual) interpretations are appropriate to certain combinations of tense and the irrealis mood. Since it is possible to have NP-identity across clauses, together with identity of tenses, it follows that some Walbiri complex sentences of the type under discussion here will allow either the NP-relative or the T-relative interpretation:

ŋatjulu-ŋu ŋa wawiri pantu-ŋu, kutja-lpa maŋa ŋa-ŋu.
 (I-erg I kangaroo spear-past, rel-past grass eat-past)
 'I speared the kangaroo that was eating grass (or) while
 it was eating grass.'

The NP-relative interpretation can be brought into prominence by the use of the referential determiners /yaŋka₁ ... ŋula₁/. And under identity of tenses, it is possible to delete the tense of the relative clause, turning it into an infinitive – this brings the T-relative interpretation into prominence:

ŋatjulu-ŋu ŋa wawiri pantu-ŋu, maŋa ŋa-ŋinŋtja-kura.¹³
 (I-erg I kangaroo spear-past, grass-eat-infinitive-rel).
 'I speared the kangaroo (while it was) eating grass.'

If this interpretation of the Walbiri relative clause is correct, then I think it is appropriate to say that Walbiri relatives are typologically distinct from those of English, Navajo, etc. The Walbiri type might be termed the *adjoined relative*. Furthermore, Walbiri might be said to lack the embedded relative. However, I would like to argue that the embedded relative is a universal and that its absence in Walbiri is in the nature of a gap in formal manifestation in the well-formed surface structures of Walbiri sentences.

Among Australian languages, some lack the embedded relative, while others possess it. Some of the languages which possess it (e.g., Pitjantjatjara) are closely related to Walbiri, and some which lack it are distant from Walbiri in genetic relationship. And there are some languages (e.g., Kaititj, and possibly others of the Arandic group) which appear to allow both embedded and adjoined relatives in well-formed surface structures. The fact that embedded and adjoined relatives (under the NP-relative interpretation) function identically in discourse, i.e., have the same semantic force, together with the fact that both types exist among closely related languages, encourages one to suspect that there is some derivational connection between the two. This suspicion is enhanced somewhat by the observation that the subordinating element found in the adjoined type is often historically related to the subordinating element found in the embedded type – in fact, in Kaititj, where both types exist side by side in the same language, the subordinating element (i.e., the relativizer /-ar/) is identical in both.

There is an obvious and (I feel deceptively) beguiling possible derivational connection between adjoined and embedded relatives which suggests itself immediately. One could propose that Walbiri in fact has the embedded relative at the deep structure representation of sentences, i.e., that it does in fact introduce relatives by some rule of the form

NP → NP S,

and that, in addition, it has an obligatory rule which extraposes relative clauses to the beginning or to the end of the sentence. This would account for the surface structures of Walbiri sentences and would, at the same time, allow us to claim that Walbiri has the embedded type of relative clause. It would also provide a reasonable explanation for the occasional

occurrence of relative clauses embedded in the main clause – these are sometimes produced by Walbiri in actual speech, but are rejected as not fully acceptable when resubmitted for grammatical judgement; under the extraposition hypothesis, embedded relatives could be accounted for as failures in the application of the obligatory rule of extraposition. If this proposal could be substantiated, then it would support, but only in a trivial and uninteresting way, the suggestion that the lack of the embedded relative is merely a gap in explicit formal manifestation.

I think that there are problems with the extraposition theory of Walbiri relatives which are sufficient to raise doubts about it. For one thing, it does not account in any obvious way for the substantial syntactic and morphological similarity which exists between relatives and conditionals – unless the latter are also embedded relatives, a proposal which cannot easily be defended for Walbiri; the similarity between relatives and conditionals can only be accidental. [The point of this line of argument can be made much more forcefully in the Uto-Aztecan language Papago. In Papago, co-relatives are adjoined to sentences, unlike their English counterparts (e.g., 'I'll buy whatever you produce.'), which are embedded. And in Papago there is a truly impressive total of morphological and syntactic similarities between co-relatives and conditionals which set them totally apart from the ordinary Papago NP-relative which is clearly embedded.] For another thing, the extraposition theory would, in principle, allow as many relative clauses per main clause as there are NPs in the main clause (cf., English 'The man I saw likes the horse I bought.'). But as far as I can tell for Walbiri only one NP in the main clause can be 'modified' by a relative clause. If this is correct, it follows automatically from the hypothesis that relative clauses and conditionals alike are introduced by a phrase structure rule of the form:

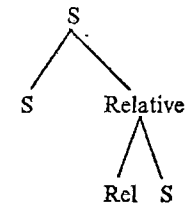
$$S \rightarrow S \text{ (Relative).}^{14}$$

To be sure, the evidence against the extraposition hypothesis is not very strong. On the other hand, I can think of no particularly convincing evidence in favor of it. Nothing is lost by assuming that Walbiri relatives are introduced in deep structure in the same way as conditionals, which are needed in any event; and moreover, otherwise unnecessary grammatical apparatus is needed if they are introduced as embeddings in noun phrases.

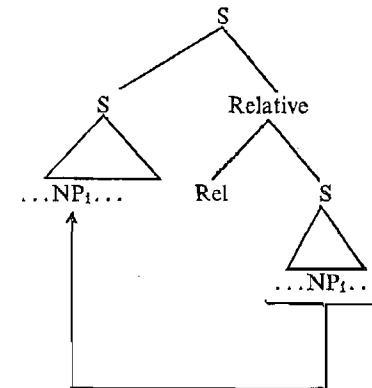
If it is correct to say that Walbiri does not have embedded relatives in deep structure, then in what sense can one say that the embedded relative is universal? As an approach to this question, I would like briefly to consider the proposal, due to Thompson, that the deep structures

of embedded relatives are in fact conjoined to the main clause and that the embedding is achieved by means of a transformational rule.¹⁵ The deep structure source for embedded relative clauses under this proposal is in all essential respects a structure very similar to the adjoined relative which I am assuming to be correct for Walbiri at both deep and surface levels of representation. I have serious questions about the correctness of such an analysis for the synchronic grammars of embedded relative languages like English, Navajo, Maori, etc., but the proposal is extremely suggestive and will probably turn out to have historical, if not synchronic validity. I suspect strongly that it is correct both historically and synchronically for the relative clause in Australian languages.

In line with Thompson's proposal (but with slight modifications which seem appropriate to the Australian case), one might describe the typological variety among relative clause structures in terms of a common deep structure of the adjoined type:



together with optional application, obligatory application, or no application at all, of an 'attraction' rule by means of which a relative clause is drawn into the main clause to 'modify' a noun phrase which is identical to a noun phrase appearing in the relative clause itself:



In a language like Walbiri, this rule does not apply, while in Kaititj it applies optionally.¹⁶

This proposal furnishes another way to view the gap which Walbiri exhibits in its relative clause apparatus – Walbiri lacks the relative clause attraction rule and, so, lacks embedded relatives. The gap in this case is quite different from the gap under the extraposition hypothesis – under the latter, Walbiri lacked embedded relatives at surface structure only; at deep structure, embedded relatives were present. Under the attraction hypothesis, on the other hand, embedded relatives are lacking both at deep structure and at surface structure. To continue to maintain that embedded relatives are universal under the attraction hypothesis is to maintain that the attraction rule is itself a universal, but one which may be missing in specific languages. This is what I propose – Walbiri has a gap in its relative clause system in that it lacks the attraction rule.

The reality of an attraction rule of the sort proposed above can, I think, be appreciated by considering the (perhaps marginal) possibility of conditional attraction in English. For my speech, at least, it is possible to attract a conditional into a noun phrase of the main clause provided it contains a pronoun which is co-referential to the attracting noun phrase. Thus, for me, a sentence like:

John₁ will get a big surprise if he₁ comes tomorrow.

can be converted into:

John₁ if he₁ comes tomorrow will get a big surprise.

But:

John will get wet if it rains tomorrow.

cannot be converted into:

*John if it rains tomorrow will get wet.

Moreover, it follows that the unattracted version of the first sentence allows a noncoreferential interpretation (John₁ ... if he_j) while the attracted version does not (*John₁ if he_j ...).

The possibility that attraction is only marginal in English does not render it useless for speculation. Notice that marginal occurrence of attraction must also be recognized in Walbiri, to account for the rare (and apparently unapproved) use there of embedded relatives. I would say that the lack of fully acceptable embedded relatives in Walbiri is a gap whose future is very uncertain – the likelihood that the universal relative

attraction rule will eventually gain acceptance in Walbiri is in all probability extremely great, particularly in view of the fact that Walbiri possesses other types of embeddings, including certain derived nominal modifiers.

IV

It does not seem to me to be unreasonable to speculate further along the lines suggested above and to imagine what the evolution of the embedded relative might be. One might propose, for example, that the adjoined relative, an attraction rule, and therefore an embedded relative, are available as linguistic universals. All languages presumably have a relative construction, but the attraction rule is not used by certain languages and they, therefore, lack the embedded relative in explicit manifestation. Languages which have only an embedded relative – i.e., languages for which there is no synchronic evidence in support of the adjoined relative in deep structure – may well have gone through an evolution which did in fact involve the adjoined relative as an ancestral stage. The evolution might conceivably have been as follows:

Initial Stage

Adjoined Relatives only.

First Intermediate Stage

Adjoined Relatives with optional attraction.

Second Intermediate Stage

Adjoined Relatives with obligatory attraction.

Final Stage

Reanalysis of the attracted relative as an embedded relative

Implicit in this scheme is that a language whose contemporary relative apparatus belongs to one of the first three stages introduces its relatives in deep structure as adjuncts to the main clause. The final stage, however, involves a reanalysis according to which relatives are introduced as adjuncts to noun phrases within the main clause. This reanalysis is probably triggered by the change in the third stage which made the attraction rule obligatory – indeed, it seems somewhat unlikely that the third stage could resist reanalysis for very long, since the obligatory attraction rule would tend to obliterate the evidence which the learning generation's language acquisition device requires in order to determine that the proper source of an embedded relative is an adjoined relative.

This proposed evolution of embedded relatives must be regarded as highly speculative – a great deal of research, both typological and historical, will have to be done in order to determine the extent to which it has any reality at all. At the moment, it is not at all clear that such an evolution could even be established in the history of any single language, much less for all those that have embedded relatives. However, to indulge even further in speculation, suppose it were possible to establish such an evolution. The question would then arise as to how it should be explained. Presumably, the *universal* aspects of relative clauses are to be explained in just those terms – i.e., they are among those linguistic elements which are universally available to humans as a part of their biological heritage. In this, the relative clause is similar to the universal basic color categories – they are universally available, and gaps in explicit instantiation are merely gaps in the conventionalized use of what is universally available. But this in itself leaves unexplained why a particular universal concept is conventionalized in one situation and not in another. In the case of relative clauses, it fails to explain why, if it is so, a language might change from one which has adjoined relatives in deep structure to one which has embedded relatives in deep structure. The question might be rephrased as follows: What forces are at work to encourage or to impel a language or culture to develop a conventionalized instantiation of a particular gap? In searching for an answer to this question, I suspect that the explanatory hypotheses for the evolution of strictly grammatical structures will be different in nature from those appropriate for the evolution of structures which are more properly identified as systematic lexical reflections of cultural items.

V

Let us assume for the sake of this discussion that the embedded relative is, in some instances at least, the result of a developmental trend of the type suggested in the previous section. It is possible, even quite likely, that the explanation for such a direction in grammatical change has to do with functional considerations. Thus, it does not seem unreasonable to imagine that the perceptual task of locating the main assertion in a complex declarative sentence, for example, is less demanding if semantically backgrounded material, such as the content of a restrictive relative clause, is embedded within the clause of the main assertion rather than adjoined to it.¹⁷ The function of a restrictive relative, whether embedded

or adjoined, is to provide the background which the speaker assumes to be necessary and sufficient to enable the hearer to understand the reference of a particular noun phrase in the main clause.¹⁸ In a complex declarative, then, a restrictive relative is semantically subordinate to the main assertion. If, in addition, the relative clause is actually embedded within the main clause, then the syntactic subordination mirrors the semantic subordination.

It is not necessary, of course, that semantic and structural subordination correspond – this is one of the differences between embedded and adjoined relatives, after all: the correspondence is more exact in the former than in the latter. In fact, many examples of semantic-structural disparity of this type can be found. Thus, while conjoined verb phrases in English normally make separate assertions about their shared subject (as in: 'John works at MIT and fishes on weekends.'), an essentially identical structure can be used to make a single assertion which, so to speak, 'climaxes' in the second conjunct (as in: 'John ran out and flagged down the mail truck.').¹⁹ And while restrictive relative clauses in English are normally subordinate semantically, in conformity with their structural subordination (as in: 'I suddenly came face to face with the bear that had attacked me viciously.'), there are essentially identical structures which are used to make an assertion rather than merely to provide background information (e.g.: 'I suddenly came face to face with a bear that attacked me viciously.'). However, despite the fact that structural subordination may be at variance with semantic subordination in many instances, I would like to suggest that a predominant trend in grammatical change is toward the reduction of precisely this sort of disparity. Moreover, I would like to suggest that the proposed evolution of relative clause structures from the adjoined type to the embedded type is an instance of this sort of grammatical change.

If this suggestion is correct, then it is appropriate to look upon the change toward the embedded relative as a special case of the very familiar phenomenon of *grammaticalization*. This term is used to refer to an assemblage of grammatical phenomena which includes, among other processes, (1) the ultimate reduction of higher predicators to the status of auxiliary or deverbal particle, or in some instances to that of morphologically bound formative, (2) a similar reduction of weakly subordinate finite clauses to tightly subordinate participial or adjectival forms, and (3) a similar process resulting in the ultimate reduction of conjoined clauses to the status of auxiliary, particle, or participial.²⁰ The principle which unifies these processes appears to be the following: each process

effects a decrease in the prominence of a clause which does not constitute the primary focus in a complex sentence (i.e., is not the location of the main assertion in a declarative, or the principal inquiry in an interrogative, or the principal request in an imperative). That is to say, each such reduction has the effect of decreasing a syntactic-semantic disparity in subordination.²¹ I propose, then, that a grammatical gap is in fact a universal construction type or a universal surface grammatical category which is either an intermediate stage or an end-point in a grammaticalization process – e.g., a nominal modifier, a verbal complement, a participial, an auxiliary, a modal particle, and so on; an impressive variety of construction types and surface categories can be shown to be the result of reductions of the sort appropriately referred to as grammaticalization. Furthermore, since the recursive apparatus of any language – i.e., the system of rules which introduce the category S(entence) into phrase structures – provides an indefinite number of complex sentences, and since, as we have seen, some of these can come to be used in such a way as to introduce a semantic-syntactic disparity in subordination, the process of grammaticalization in the evolution of a particular language is a never-ending one. Any language will inevitably exhibit instances of incipient, intermediate, and fully evolved grammaticalizations.

VI

In the foregoing discussion, I have sometimes used the term 'evolution' in referring to the conventionalized instantiation of a gap. It is natural to ask, as Berlin and Kay have done in their study of color terms, whether this sort of development can be correlated with socio-cultural or technological evolution. Using the relative structure as a point of departure, if it is true that the proposed development of the embedded relative clause is an instance of grammaticalization, i.e., that the change from an adjoined to an embedded relative is a step toward the diminution of a syntactic-semantic disparity in subordination, then clearly the instantiation of the embedded type of relative clause is to be explained in strictly linguistic terms, and there is no reason whatsoever to expect it to correlate with evolution in non-linguistic aspects of culture. This is true in general of grammaticalization, as is confirmed by the fact that any language, regardless of its cultural setting, is a virtual midden replete with the morphological vestigia of once productive rules of syntax. In the case of the Australian relative clause, the point is further streng-

thened by the observation that within a group of closely related languages, in the same culture area, it is possible to identify all stages of the proposed evolution – from adjoined to embedded, and even beyond this, to participials. Walbiri itself, besides its adjoined relative structure, possesses participial modifiers which readily appear embedded within noun phrases.

While it seems reasonable to attempt to explain the filling of a grammatical gap by appealing to a linguistic notion – i.e., the relationship between surface syntactic structure and semantics – it is clear that such an appeal is entirely inappropriate to any attempt to explain why a universally available conceptual construct, such as counting, or the basic color categories, should receive conventionalized representation in the lexicon of a particular language. Here it is quite reasonable to expect there to be a relationship between non-linguistic aspects of culture and the filling of a gap – in fact, it is commonplace to find cultural elaboration reflected in lexical structures. Among the Walbiri, for example, where the algebra of kinship plays an intellectual role similar to that which mathematics plays in other parts of the world, one finds a flourishing, even vibrant, elaboration of kinship nomenclature which succeeds in enabling knowledgeable Walbiris to articulate a truly impressive array of principles which inhere in the system as a whole – this elaboration, incidentally, goes far beyond the strictly practical needs of Walbiri society, thereby revealing its true status as an intellectual field capable of providing considerable satisfaction to those individuals who, as they go through life, become increasingly expert in it. It should be clear, however, that access to, and therefore the conventionalization of, universally available perceptual constructs (like the taxonomic and paradigmatic principles which inhere in a complex kinship system) are essentially independent of cultural or technological evolution. While it is true that need can trigger the lexical elaboration of such a construct, human beings are such that intellectual fascination constitutes a sufficient need – this is the only conceivable explanation for the enormous elaboration of kinship nomenclature in many parts of Australia, particularly in view of the fact that, as many ethnographers have pointed out, the actual functioning of societies is best understood not in terms of kinship systems but in terms of actual relationships, alliances, and totemic associations. The general point here is even more dramatically illustrated by the various auxiliary languages which have been developed in Australia for use in specified situations of avoidance and respect. These typically require the exploitation of intellectual constructs of considerable abstract-

ness, constructs not otherwise provided with conventionalized lexical representation in the standard language of the community.²³ The auxiliary languages are constructed in such a way as to ensure their rapid acquisition on the part of those who are required to use them; and the fact that they are, in fact, extremely easy to learn attests to the virtually immediate access which people have to abstract principles of classification and opposition.

I have tried in this brief and very tentative discussion to suggest that certain differences among languages and cultures are in the nature of gaps in the conventionalized instantiation of universally available categories. This began as an attempt to face the problem of explaining the existence of what might be called 'sporadic universals' – I suggest that at least some of these can be said to be sporadic only in their conventionalized expression; they are universals in the truest possible sense of the word. This will remain a mere suggestion, however, until it is possible to distinguish the basically accidental gaps of the type briefly described here from instances of nontrivial linguistic and cultural differences which are genuine – e.g., instances of structural incompatibility within a syntactic system of a particular type, or systems of kinship reckoning which are inconsistent with the principles of a particular kinship system. This is at the heart of the study of linguistic and cultural universals.

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NOTES

¹ It is a pleasure to dedicate this paper to Carl Voegelin whose work, guidance, and friendship have been of great value to me. I wish only that this paper were less tentative and therefore more worthy of him. The idea explored in this paper was generated in large part by the excellent discussion of lexically empty, but nonetheless real, taxonomic nodes in C. F. and F. M. Voegelin (1970).

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² For another account of Australian counting, see Strehlow (1944).

³ This investigation is reported in Berlin and Kay (1969). It has also been the subject of much interesting discussion in the literature on cultural and lexical universals.

⁴ Two interesting critical reviews of Berlin and Kay, one having to do with the nature of the crucial data, the other concerned partly with this and partly with the implications for evolution, are Hickerson (1971) and Newcomer and Faris (1971).

⁵ These terms have synonyms borrowed from neighboring Arandic languages:

/yurpuju/ 'black, dark' (< urpul)

/yalʃiri/ 'white, light' (< aʃir)

⁶ The Walbiri nomenclature is arguably even more highly structured than this, with

red more 'primary' than *yellow* or *green*. The predominant ritual colors are *black*, *white*, and *red*, though yellow ochre and (green) leaves are also important.

⁷ Examples of work in this area are Halle (1962) and Kiparsky (1968). And a large amount of recent work is reviewed in King (1969).

⁸ Bever and Langendoen (1971). This work also includes an excellent review of theories of linguistic change as well as recent work on the perception of sentences.

⁹ For example, in Chomsky (1964) and Ross (1967), and in the large amount of work following these.

¹⁰ In some cases, the lack of a particular grammatical device might be accounted for on the grounds that its existence would be incompatible with other aspects of the grammar. I have attempted (unsuccessfully, I now feel) to develop such an explanation for the absence of the active-passive relation in Walbiri (and other Australian ergative languages) in Hale (1970).

¹¹ Both types conform to the constraints on variables formulated by Ross (1967). It is particularly interesting that Navajo conforms to these constraints, since it is unlikely that a movement rule is involved in the derivation of relative clauses. Recent important work on Navajo by Paul Platero (1973) brings a number of surprises to the study of language universals.

¹² Word-order in Walbiri is free. By and large, the order chosen for examples in the text is arbitrary, except for that of the auxiliary (to which the subordinators attach). Surface facts relating to this are described in Hale (1972).

¹³ In infinitival embeddings, the subordinator is suffixed to the infinitive. The example given in the text employs the relative subordinator, or complementizer, /-kura/ – this is the subordinator which is appropriate in complex sentences in which the *object* of the main clause controls the deletion of the subject in the subordinate clause.

¹⁴ This is to be taken as a highly tentative formulation. In any event, it should be mentioned that the rule which introduces relative clauses must be recursive, to account for the possibility of multiple embeddings of the bi-partite structure of the type under consideration here.

¹⁵ The analysis of Thompson (1971) is also adopted by Bever and Langendoen (1971) in their study of English syntactic change.

¹⁶ This rule may be obligatory in some Pitjantjatjara dialects, though my own data are by no means clear on this. Dixon in his excellent grammar of the Dyirbal language of North Queensland (1972) and in his comparative article on relative clauses and possessives (1969), implies that Dyirbal relative clauses are of the embedded type at deep structure.

¹⁷ Also, the task of interpreting a relative clause as an NP-relative or as a T-relative would be less demanding if differences in interpretation corresponded to syntactic differences (NP-adjunction for NP-relatives and S-adjunction for T-relatives). A closely similar point is briefly developed in the text. It should be mentioned, in addition, that the explanation being sought here might have to do with other possible advantages of embedded relatives as compared to adjoined relatives. If a language has deep structure embedded relatives, then it is possible to modify more than one noun phrase in the main clause. If this capability is in fact an advantage, then that might, in part, explain the existence of deep structure embedded relatives. Such an explanation would, of course, have to take into consideration the relative advantage of achieving these effects by embedding as compared to achieving them by other means. The availability of participial modifiers, and other derived attributives in Walbiri, for example, furnishes the language with a rich variety of techniques for providing additional background material for identifying the reference of any number of noun phrases appearing in the main clause.

One might also seek to explain the existence of the embedded relative in terms of the coreference problem. If a language has the embedded relative, then the perceptual

task of associating the relative clause with the correct noun phrase in the main clause is arguably less demanding than would be the case in a language which possesses only the adjoined relative. However, there are other ways to keep track of coreference. Walbiri uses a system of referential determiners for precisely this purpose. Other languages, such as Kaititj, and Lardil of the Wellesley Islands in the Gulf of Carpentaria, use case agreement – here, an adjoined relative clause agrees in case with the main-clause noun phrase which controls the deletion of the relativized noun phrase. Recent work by Terry Klokeid on Lardil syntax (1973) shows that this is a special instance of a more general use of case agreement for coreference.

¹⁸ The backgrounding function of relative clauses is developed in an excellent paper by Schachter (1973).

¹⁹ Recent important work by Erteschik (1973) investigates the role of semantic subordination in constraining the application of movement rules. Briefly, it appears that movement across a variable may take place out of a clause which is semantically dominant – if this is correct, then certain apparent exceptions to Ross' constraints on variables (Ross 1976) can be explained in terms independent of structure; compare, for example, the impossibility of questioning a constituent in one member of a conjoined verb phrase in which neither conjunct is dominant (e.g.: *'What does John work at MIT and do on weekends?') with the relative ease of questioning a constituent in a semantically dominant conjunct (e.g.: 'What did John run out and flag down?').

²⁰ Grammaticalizations of all of these types are represented abundantly in Australian languages. A particularly interesting topic for the study of grammaticalization in Australia is the development of negation involving a particle of variable scope from an ancestral system in which the negative is a main verb. In some parts of Australia, e.g., the huge area occupied by speakers of the Western Desert Language (often referred to by the dialect designation Pitjantjatjara), it is possible to study the reduction of the ancestral negative predicator (which took an infinitive complement) to a negative particle (now a constituent of its erstwhile complement) within a single language – the earlier and the later systems exist simultaneously in different dialects of the same language.

²¹ In an extremely interesting paper, Langacker (1972) develops a closely similar idea in an attempt to explain the existence of certain synchronic rules of syntax whose formal effects are essentially the same as those of the process of grammaticalization. He speaks of a tendency for grammatical rules to "maximize the prominence of objective content". This is entirely compatible with, and perhaps equivalent to, the tendency for grammaticalization to reduce syntactic-semantic disparities in subordination.

²² Brief descriptions of two of these are to be found in Hale (1971a, b). A detailed discussion of avoidance vocabulary, which shares many properties with other types of auxiliary languages, is to be found in Dixon (1971).

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