

SEVENTH FRAMEWORK PROGRAMME
"Ideas" Specific programme
European Research Council
Grant agreement for: Starting Grant/Advanced Grant
Annex I - "Description of Work"
Project acronym: ReCoS
Project full title: Rethinking Comparative Syntax
Grant agreement no.: 269752
Duration: 60 months
Date of preparation of Annex I (latest version): 30/11/10
Principal Investigator: Ian Roberts
Host Institution: University of Cambridge

Proposal summary (half page)

This project aims to break new ground in syntactic theory by reconceptualising the principles-and-parameters approach to comparative syntax, retaining its strengths and attempting to deal with its perceived weaknesses. The central idea is to organise the parameters of Universal Grammar (UG) into hierarchies, which define the ways in which properties of individually variant categories may act in concert; this creates macroparametric effects from the combined action of many microparameters. The highest position in a hierarchy defines a macroparameter, a major typological property, lower positions define successively more local properties. Parameter-setting in language acquisition starts at the highest position as this is the simplest choice; acquirers will "move down the hierarchy" when confronted with primary linguistic data incompatible with a high setting. Hence the hierarchies simultaneously define learning paths and typological properties.

The main task of the project, taking up most of the time of the research team working on it, will be to attempt to work out on the basis of cross-linguistic data the precise form of major parts of the hierarchies, thus subjecting the theoretical predictions to rigorous empirical testing. The project aims to investigate five hierarchies: those determining word-order, null arguments, word structure, discourse-configurationality and case/agreement alignment. This will be done on the basis of secondary data from grammars, from on-line databases (*The World Atlas of Languages Structures*, *WALS*, and the *Syntactic Structures of the World's Languages*, *SSWL*), and, where feasible, from native-speaker consultants.

These five hierarchies, although not exhaustive, combine to give a typological footprint of many languages, as well as providing the basis for the study of the interaction of micro- and macroparameters. In this way, the criticism that formal comparative syntax has little to offer typological studies can potentially be answered. Also, a clear diagnostic is provided for showing that the hierarchies determine genuine syntactic variation, and not merely morphophonological variation as suggested by Berwick & Chomsky (2008). Last, a more purely theoretical component of the project aims to show that the nature of the hierarchies is determined, not directly by UG, but by UG interacting with domain-general principles of simplicity and efficiency.

ERC Advanced Grant 2010
Research proposal (Part B2)
(not evaluated in step 1)

Section 2: *The Project proposal*

a. State-of-the-art and objectives

1.0 Introduction

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1.1 Background.

The Principles-and-Parameters (P&P) approach to cross-linguistic variation was first developed by Chomsky and his associates in the early 1980s (see in particular Chomsky (1981a), and, for more general introductions, Roberts (1996), Baker (2001a)). The leading idea was that UG contains an invariant set of principles associated with parameters which define the space of possible variation among actual languages. This approach was held to be a major step in the direction of explanatory adequacy (in the sense of Chomsky 1964), since language acquisition could be seen as setting the parameters of the native language on the combined basis of the innate UG and the triggering aspects of the PLD.

The P&P approach was seen as a significant step forward for generative grammar, since earlier approaches (Chomsky 1973, 1975, 1977) had defined UG as a grammatical metatheory specifying a broad format for rules and some general principles on rule application (island constraints, etc.), a particular grammar as a system of language-specific, construction-specific rules, and language acquisition as rule induction. This theory offered little hope for insights into either language typology or language acquisition, and the P&P approach stood in stark contrast to this from its inception.

The immediate consequence of P&P theory in the 1980s was an explosion of formal syntactic work on a wide range of the world's languages. Comparative work became the

norm. The stimulus to comparative syntactic research led to the postulation of a number of parameters, without much attention being paid to the format for parameters. This initial conception gave rise to a rather arbitrary-looking collection of parameters: the Null Subject Parameter (Taraldsen 1978, Rizzi 1982), a parameter determining the Case properties of Prepositions (Kayne 1981/1984), the head-directionality parameter (Hawkins 1983; Koopman 1984; Travis 1984), V-movement parameters (Emonds 1978; Pollock 1989, den Besten 1983), the overt vs covert nature of Wh-movement (English vs Chinese: Huang 1982) and non-configurationality (Chomsky 1981b).

Partly inspired by the postulation of the minimalist programme in the early 1990s, with its emphasis on formal features as the driving force behind derivations, a shift took place in the conception of the locus for parameters: parameters were thought to be specified in the (functional) lexicon, rather than directly on UG principles (this proposal had originally been made by Borer 1984:29). More precisely, from Chomsky (1995), parameters were viewed as being specified by the formal features of functional heads. This view of parameters naturally leads to microparametric syntax (Kayne 2000), according to which there is a rather large number of parameters, each responsible for a fairly small point of difference between grammars (e.g. that past participles agree with fronted wh-words in French, but not in Spanish). The microparametric view, although not uncontroversial (see Baker 2008b) has become the dominant one in current formal comparative syntax (see Kayne 2005b).

In recent years, however, the P&P programme as a whole has been subject to criticism from a variety of sources (see Newmeyer 2004, 2005, Haspelmath 2008, Boeckx 2009). These criticisms fall into three main classes.

The first is that, given the shift to the microparametric view, the number of parameters that needs to be assumed is so large that the problem of language acquisition resurfaces. If UG allows 100 binary, unconnected parameters, then there are 2^{100} possible grammars. This leads to a proliferation of grammatical systems in a very large, unstructured parametric space, searching among which poses a significant learning problem for the acquirer (see Clark & Roberts 1993). Hence, the microparametric approach, while descriptively adequate, may fall short of explanatory adequacy. At the same time, the idea that there is a small number of “macroparameters” alongside a wide range of more “shallow” microparameters has not as yet been fully substantiated (although a good case is made in Baker 2008b).

The second line of criticism is more directly empirical: hardly any parameters have been established on which there is general agreement. In 30 years of research, few examples have been found that generalise in a straightforward way to more than a few languages. Newmeyer (2004, 2005) makes this case based on an examination of the cross-linguistic scope of the Null Subject Parameter and concludes that the P&P programme has proved a failure and should be abandoned (although the alternative Newmeyer sketches appears to be a return to the theoretical *status quo ante*, and hence brings back inductive learning of rules).

Finally, a different line of conceptual criticism has emerged from the emphasis in Chomsky’s (2005, 2007) work on reducing the content of UG to the minimum. Since the P&P model appears to presuppose a complex and richly structured UG, this is a problem (see Newmeyer 2005:83). In this connection, Berwick & Chomsky (2008) argue that much of the observable variation in grammatical systems reflects the nature of what they refer to as “the externalization process,” i.e. phonological/morphological interface (PF), rather than the narrow syntax (NS) itself. They suggest that true, NS-internal, syntactic variation may be negligible or non-existent. In a different way, then, Berwick & Chomsky also advocate abandoning the earlier notion of syntactic parameter.

1.2 *The Proposal: Outline*

The present proposal aims to break new ground for syntactic theory by reconceptualising P&P theory along novel lines, intended to meet the criticisms listed above, and thereby to provide a fully workable research programme for the formal study of cross-linguistic variation in syntax.

More precisely, the project consists of three main parts, each with a central proposal:

A) *Microparameters and macroparameters*: we reconcile Baker's (1996, 2008a,b) notion of macroparameter with the idea that parameters are specified as the formal features of functional categories by construing macroparameters as aggregates of microparameters. Apparent macroparametric variation appears when a group of functional heads are specified for the same properties: for example, if all heads implicated in determining word-order variation have the same word-order related property, the system is harmonically head-initial or head-final. This aggregate behaviour is determined, not by UG, but by a conservative learning strategy (Input Generalisation), hence the distinction between micro- and macroparameters is not part of NS/UG, but is an emergent property of the interaction between the learner, the primary linguistic data (PLD), and UG.

In these terms, we can set up hierarchies of parameters. (1) illustrates how this might work for word order, assuming for concreteness that the default linearization option is head initial, with head-final order derived by marking the relevant heads in some way (e.g. for triggering movement of their complements as in Kayne 1994):

(1) Is the head-final feature present on all heads?

r u

Y: **head-final (a)** N: present on no heads?

r u

Y: **head-initial(b)** N: present on [+V] categories?

r u

Y: **head-final in** N: **present**
the clause only(c) **on**

Languages of type (a) are Japanese, Korean, Dravidian, etc.: the harmonically, rigidly head-final systems. Type (b) includes the rigidly, harmonically head-initial Celtic and Romance languages. Type (c) features German and Dutch, to a close approximation, since they show head-final TP, vP and VP but are (almost) head-initial in all other categories. Lower in the hierarchy, we find a series of increasingly specific microparameters, relating to the order inside specific categories (rather than classes of categories), ultimately perhaps to specific lexical items (e.g. English *enough* is the only degree modifier to follow its adjective).

True macroparameters sit at the top of the network, as here all parametrised heads behave as one. As we move successively down, parameters become more “micro”, behaving in a non-uniform, differentiated fashion which is inherently more complex than the systems defined higher in the tree (we can suppose that the options move from subsets of the set of functional categories F to singleton features of heads $f \in F$, to increasingly context-sensitive environments, ultimately perhaps to single lexical items), and the options have a longer description (the conjunction of all the “dominating nodes” in the hierarchy). As such, each parameter hierarchy defines a learning path, much in the sense of Dresher (1999). The higher options are inherently preferred by the acquirer, because Input Generalisation favours the higher options in the absence of PLD regarding the full range of options (in other words, Input Generalisation leads to overgeneralisation in many cases). The hierarchies thus define markedness relations. The acquisition device searches the space by looking for the “easiest” solution at each stage, where a solution is defined as a parameter-setting compatible with available PLD. The device moves from a relatively easy to the next-hardest stage only when forced to by PLD incompatible with the current setting. A central goal of the project is to define and elaborate several parametric hierarchies of the type in (1).

B) One question that Chomsky & Berwick’s conjecture regarding externalisation gives rise to is: *how can we tell if a parameter involves an NS property or is confined to the externalisation process?* Here we will investigate a novel hypothesis: phonological and morphological parameters, by assumption, do not directly implicate the mechanisms of core syntax, since they typically involve the differing realisation of otherwise invariant features. In that case, we expect PF parameters to be **symmetrical**, in the sense that the entire logical space of variation ought to be filled, and attested in the world’s languages (it may be that phonological principles introduce various kinds of asymmetry, which then must be identifiable as such; we leave this potential complication aside for the sake of exposition, however). On the other hand, NS parameters will be sensitive to syntactic constraints, as well

as to conditions on the mapping from syntax to PF. This creates the possibility that NS constraints will be **asymmetrical**, in the sense that the logical space of possibilities will contain gaps. The gaps should be principled, in that they should be explicable in terms of syntactic as opposed to morphophonological theory. This idea can form a diagnostic for NS parameters, along the following lines:

(2) The variation space defined by a parameter P contains a gap iff P is not a pure PF parameter, but either an NS parameter or a parameter governing the NS>PF mapping.

(2) gives us a diagnostic for non-PF parameters. In these terms, Berwick & Chomsky's conjecture can be seen as stating that all parameters are symmetric. We hypothesise that this is not the case for a number of parameters/parameter hierarchies, and plan to test this hypothesis empirically.

C) The diagnostic in (2) now gives us a way of identifying NS parameters. Once this is done, a further question arises: *is the NS variation internal to UG*, as was thought in classical P&P theory, or can it be ascribed to what Chomsky refers to as "third-factor" properties of language-independent efficiency and optimality? On the basis of the parameter hierarchies we investigate, there is reason to think that there are just two axes of variation: set-theoretic relations among formal features (person, number, gender and Case features) and the distribution of the feature which triggers syntactic movement (whose formal nature we will say more about below). Of these, only the latter is UG-internal: the former follows from set theory combined with the simple and obvious idea that languages select for the set of active features (just as they select for phonological distinctive features). The major theoretical question, then, is whether this attractively simple conception can be maintained in the light of the empirical investigation of the hierarchies.

Thus, the project aims at a partial reconstruction of the original conception of syntactic parameter, in the sense that we investigate the possibility, on a more secure conceptual basis than previously, that large-scale typological variation is the reflex of a single (aggregate) property of (a set of) functional categories. Moreover, the parameter hierarchies make clear predictions about both language acquisition and change. However, the weaknesses of the original notion are dealt with on this approach. First, we will meet Newmeyer's criticisms by demonstrating the typological efficacy of parametric hierarchies. Second, the ontological status of the parameters, and of the hierarchies, is very different from either the 1980s or the 1990s conception: parametric variation is not specified in UG itself. Instead, it arises from underspecified aspects of UG, and is structured by third-factor properties arising largely from the need for efficient learning (see §3.3). Because of this, we are not led to propose an elaborate innate endowment; we may be able to maintain that the innate UG contains little more than the single combinatorial operation Merge and a schema for syntactic categories and features. Third, the parametric hierarchies reduce the number of grammars. The cardinality of G, the set of grammars, is equivalent to the cardinality of P, the set of parameters, plus 1, to the power of the number of hierarchies:

(3) $|G| = (|P| + 1)^n$, where $n = |H|$

If, for example, there are just 5 hierarchies with 20 parameters each (of course, hierarchies may contain different numbers of parameters, here we assume these numbers purely for illustration). Then |G| is 21^5 , or 4,084,101 for $5 \times 20 = 100$ possible choice points. Compared to 2^{100} , which is the number of grammars predicted by 100 *independent* binary parameters, this is a very small number. Thus the traditionally recognised explanatory value of parameters can be largely reinstated, and indeed enhanced by the postulation of the learning paths. Finally, we have an empirical way to test Berwick & Chomsky's (2008) conjecture regarding "externalisation", following the criterion in (2).

2. Objectives

2.1 Symmetric parameters

A good example of a symmetric parameter may be that which underlies the phenomenon identified by Nichols (1992:46ff.) as head vs dependent marking. Morphological features which are relevant to the syntactic relation between the head and its dependent (ϕ , i.e. person, number, gender, features, case features, etc.) may be realised either on the head or on the dependent (or both, or neither). I illustrate the various instances of head-dependent marking

that Nichols discusses using the noun-possessor relation; in this case the noun is head and the possessor is the dependent (all examples are from Nichols (1992:49ff.), markers are in italics and heads in bold):

- (4) a. *Dependent-marked possessive NP in Chechen:*
 de:- *n* **a:xča**
 father-GEN money
 “father’s money”
- b. *Head-marked possessive NP in Abkhaz:*
 à- č’k’ə n yə **-y^onə**
 ART-boy 3sg-house
 “the boy’s house”
- c. *Double-marked possessive NP from Mangarayi:*
 maral- wu **d.ab**-*ŋawu* **d.ama**-*ŋamu*
 dead person-GEN skin-his bones-his
 “a dead person’s skin and bones”
- d. *No marking in possessive NP from !Kung:*
 dz’heu **≠xanu**
 woman book
 “the woman’s book”

It is possible to capture the distinction between head-marking and dependent-marking fairly straightforwardly using the mechanism of Agree as developed in Chomsky (2000, 2001). Although, thanks to the Agree relation, the probe and goal match in features, the morphophonological realisation of those features is quite independent of the establishment of the syntactic relation. With Agree, we are able to “hold syntax constant while surveying the distribution of morphology across that constant syntax” (Nichols 1992:46). We can thus construe head- vs. dependent marking as morphophonological realisation of (possibly a subset of) the features involved in the Agree relation on the probe (head-marking) or on the goal (dependent-marking). There is no bar to realising the same features on both (double-marking) or neither (no marking). Also, split-marking, determined by the nature of the goal, is a further possibility (which I will not go into further here).

Consider for example the possessor-noun relation exemplified in (4) above. It is very plausible to see this as an Agree relation between the ϕ -features of two Ds, one the head of the possessor DP (the goal) which is contained in the DP headed by the other, possessee DP (the probe). Leaving considerations of linear order aside, and taking the possessor DP to be merged NP-internally, we have a structure like (5) for the examples in (4):

- (5) [_{DP1} D₁ [_{NP} DP₂ N]]

Here D₁ is the probe and D₂ the goal. The structural conditions on Agree are fulfilled and so this relation holds between these two elements. In a dependent-marking system like Chechen, as in (4a), DP₂ is marked for genitive case. In a head-marking language like Abkhaz as in (4b), D₁ Agrees with the possessor in ϕ -features (it may be that these features are realised on N; this is due to a further Agree relation between D₁ and N – a direct Agree relation between D₂ and N is not possible as there is no c-command relation here). (4c) combines the two patterns of morphophonological realisation seen in (4a) and (4b) and, of course, (4d) shows neither. So we see that head vs dependent marking is a symmetric parameter, and a good candidate for a PF one. Other examples might include the realisation of negation in clause-internal positions, the interaction of wh-determiners and interrogative particles in C (*pace* Cheng 1991), and the realisation of definiteness on Ds, as part of verbal agreement or by means of case alternations.

2.2 *Asymmetric parameters*

On the other hand, linearisation, the operation which imposes linear precedence on the hierarchical structure determined by Merge, is asymmetric. The observation supporting this is the Final Over Final Constraint (FOFC). If we take head-complement order to be a parametric option, and to be one which is in principle fixed independently for each head-complement pair, we observe the following situation:

- (6) a. [_{XP} [_{YP} ZP Y] X] -- consistent head-final, harmonic order

- b. $[_{XP} X [_{YP} Y ZP]]$ -- consistent head-initial, harmonic order
 c. $[_{XP} X [_{YP} ZP Y]]$ -- initial-over-final, disharmonic order
 d. $*[_{XP} [_{YP} Y ZP] X]$ -- initial-over-final, disharmonic order

See Biberauer, Holmberg & Roberts (2010), Sheehan (2009), Biberauer & Sheehan (2010) for differing accounts of this phenomenon, which share the observation that it represents a fundamental asymmetry in cross-linguistic word-order possibilities, and reflects a constraint on linearization deriving from the antisymmetric theory of Kayne (1994). If this is correct, the Berwick-Chomsky conjecture is falsified (as pointed out by Biberauer, Holmberg & Roberts). Linearisation cannot be a purely morphophonological phenomenon.

In principle, parametric hierarchies may hold either of NS or of PF parameters (I will assume that PF parameters are purely realisational and do not form hierarchies; the PF options may be richer than this, but fully investigating this possibility would take us too far afield). But NS parameters, given (2), are predicted to be asymmetric. We now have a way of identifying syntactic macroparameters: they will be asymmetric and fall into hierarchies defined by parallel behaviour of (sets of) functional heads. We have already observed that **(i) word order/linearization** is one macroparameter by these criteria. The **signature asymmetry**, showing this parameter to be non-PF, is FOFC. We will investigate this and the following possible macroparameters (these have been chosen on the basis of previous work and/or by a consideration of which aspects of the formal mechanisms are most likely to vary, in conjunction with a knowledge of the typological evidence as to what does in fact vary):

ii. Null arguments: following Holmberg (2010) and Roberts (2010a,b), we take null arguments to arise through pronoun deletion, which can take place under the generalised recoverability condition that the formal features of the goal be (properly) included in the features of the probe (we refer to such goals as “defective”). The relevant hierarchy is as follows (“fully specified” means recoverably specified, permitting recovery of deleted features):

(7) Are ϕ -features obligatory on all probes?

	r	u	
No			yes
Radical pro-drop (a) (Saito 2007)			Are ϕ -features fully specified on all probes?
	r	u	
	Yes		No
Pronominal arguments (b) (Jelinek 1984)			Are ϕ -features fully specified on some probes?
			ru
	No:	Yes	
	Non-null-subject (c)		Are the ϕ -features of {T, v, ...} fully specified Italian, etc.

This parameter falls fairly cleanly into a hierarchy: type (a) languages include Japanese, Chinese and many other East Asian languages, which lack agreement-marking altogether and yet permit any pronoun to be dropped under appropriate discourse conditions; type (b) includes a number of Amerindian languages, notably Navajo, analysed by Jelinek (1984) (these languages also allow all pronominal arguments to drop, but show fully specified subject- and object-agreement); type (c) is English or the Scandinavian languages, which do not allow null pronominals, and, as indicated, the hierarchy continues to break down into microparameters (see Holmberg & Roberts 2010 for details), starting with languages like Italian which allow null subjects only.

Do we find the **signature asymmetry** that shows this to be an NS parameter rather than just a matter of realisation of pronouns? Subjects and objects are known to differ in a number of respects: subjects agree more commonly than objects and, in languages with both subject and object agreement, show “richer” agreement and null subjects are cross-

linguistically commoner than null objects (see D'Alessandro & Roberts 2008:488, and the references given there). In fact, we find languages with (definite, referential) null subjects but not null objects (Italian, etc.), languages with both (Chinese, Navajo, etc.), languages with neither (English, etc.) but no (non-ergative) language is known which allows definite, referential null objects while not allowing comparable null subjects. We conclude that **null arguments** represent another macroparameter; the signature asymmetry is the subject-object asymmetry.

iii. Word structure: this replicates the oldest typology proposed (Schlegel 1817, Schleicher 1862, Sapir 1921). The conjecture is that 19th-century typology observed these highly salient properties of word structure and attributed them to morphology, when in fact they are determined by NS. Polysynthetic languages allow productive incorporation of lexical roots, notably N-to-V incorporation (cf. Roberts (2010c) for an account of incorporation as involving a “defective goal”, i.e. a goal whose feature content is not distinct from that of its probe). Analytic languages disallow head movement even at the lowest structural level (V-to-v and N-to-n; Huang 2007). Fusional languages relativise head-movement to categories: familiar V-movement parameters fall under this heading. Agglutination may be a case of head-final order, involving complement-to-specifier movement with the head phonologically realised (Julien 2000); as such, agglutination falls outside of this parameter (see §3.2 below). The hierarchy is as follows:

(8) Do all probes trigger head-movement?

ru

Y: **polysynthesis(a)** Do some probes trigger head-movement?

ru

N: **analytic(b)** Y: does {C, T ...}(c) ?

Type (a) is instantiated by a number of Amerindian polysynthetic languages, notably Mohawk, as analysed in detail by Baker (1996). Type (b) is Chinese, and type (c) is instantiated by the Romance and Celtic languages for V-movement to T. The **signature asymmetry** of the word-structure parameter hierarchy may be the suffixing preference observed by Gilligan & Hawkins (1988). Their observation develops Greenberg's (1963) Universal 27, which states: “[l]anguages with VO and/or Pr+NP word orders in their syntax regularly have prefixes and/or suffixes in their morphology. But in a suggestively large number of cases, languages with OV and/or NP+Po have suffixes only” (219). Again we see the crucial asymmetry. This asymmetry, and its relation to word structure and to incorporation, will be explored.

iv. Discourse configurationality: in this connection, the concept of “phase” is crucial: phases are designated pieces of the derivation, which may be linearized and interpreted independently of one another; they include the projection of and complement domain of designated functional elements, down to the next phase head. Phase heads define local domains, license movement to and/or through their left periphery, and trigger A'-movement. Suppose that C, D and v are phase heads (there may of course be others). Suppose further that there is universal functional pressure for focalisation/topicalisation to the left-periphery; at the same time, syntactic locality (subjacency/island conditions) severely restricts movement to the left periphery, forcing all long-distance movement to be successive-cyclic. Phase heads can function as escape hatches (licensing cyclic movement *through* their left periphery) or targets (licensing movement *to* their left periphery with the appropriate discourse interpretation). Let us suppose that v always allows successive-cyclic movement *through* its edge and (as a parametric option) can allow movement *to* its edge; D may show similar options; while C only allows movement *to* its edge (this latter assumption departs from the classic model of successive-cyclic movement in Chomsky 1973 – see Rackowski & Richards 2005, den Dikken 2009, for motivation). We then have the following macroparametric options:

(9) Do all phase-heads trigger A'-movement?

Y: "free word order" (a) ^r N: Does only v trigger A'-movement? ^u

Y: **wh-in-situ+scrambling** (b) ^r N: Do v and C trigger movement? ^u

Y: does v allow ^{ru} N: **does C allow**
movement to its edge? **movement? (e)**

Y: **wh-movement +** ^{ru} N: **wh-only (d)**
Scrambling (c)

Type (a) languages include Warlbiri and many other Australian languages, Latin, the Slavonic languages and others. Type (b) includes Japanese and Korean. Type (c) includes German and Dutch, while type (d) includes English, North Germanic and the Romance languages. A language of type (e) would restrict A'-movement to subjects; this is what we find in Tagalog and a number of other Polynesian languages, and was predicted by Keenan & Comrie's (1977) Noun Phrase Accessibility Hierarchy. Note that here the "only-v" option is the maximally restrictive one as I assume that movement for discourse-semantic purposes, i.e. some kind of movement to some left peripheral positions (defined by phase heads) is a substantive universal, presumably for functional reasons deriving from the need for expressivity. The **signature asymmetry** here has to do with the postulated difference among the phase heads. It is natural to think that a phase-head always allows movement *through* its edge and may bear a (discourse-related) feature allowing movement *to* its edge. Hence v's properties are unsurprising. But why does C not allow movement through its edge, if Rackowski & Richards (2005) and den Dikken (2009) are right?

Note that the hierarchy in (9) largely leaves D aside. In fact, a further aspect of this parameter concerns the general nature (and possibly existence – see Chierchia 1998, Bošković 2008) of D, since D is a locus of discourse-related properties (deixis, (in)definiteness). Overt wh-movement in the sense of Huang (1982) may be focalisation of specially-marked indefinites (von Stechow (1996)); wh-in-situ languages may simply lack this class of Ds and so do not focalise a designated class of indefinites. It is very likely, then, that D-related parameters form a further branch in (8), again breaking up into intricate microparametric variation (see Gianollo, Guardiano & Longobardi 2008).

v. Alignment: the alignment of case and agreement marking with grammatical functions such as subjects and objects is highly variable across languages, and most languages have some means of altering their unmarked alignment (arguably the commonest being the passive). The basic patterns are captured in Chomsky's (2000, 2001) probe-goal-Agree system. There Chomsky proposes that if a probe bears the movement diacritic, it causes the goal to move to its specifier. This accounts for subject-raising to SpecTP and basic cases of object shift. Collins (2005) argues convincingly that passives are derived by "smuggling" a participial phrase over the first-merged external argument in SpecvP, thereby making the object closer to T and facilitating object movement to the subject position (with the subject staying in its first-merged position and being realised as a "by-phrase"). Roberts (forthcoming) generalises Collins' account of passives and argues for the existence of a class of "indirect" derivations which are formally characterised by the simple difference that the probe triggers movement of a category distinct from the goal. In "direct" derivations, on the other hand, the probe triggers movement of its goal. This distinction between direct and indirect derivations underlies the active-passive alternation, as well as various types of causative and "dative-shift" alternations. It also underlies the ergative-accusative alternation. Where T takes the direct option, it licenses and raises the subject, as is standard. Where it takes the indirect option, VP raises over the subject in SpecvP and the object, if present, is licensed by T: ergative alignment results, with the external argument being licensed in a special way (typically by an oblique marker). If the object is not present, T licenses the subject. Hence the ergative pattern (intransitive subject patterns with transitive object) is derived. Split-ergative patterns of the kind common in Indo-Iranian languages can be derived by distinguishing perfective and

exactly how much variation there really is in Narrow Syntax, and how much may, as they suggest, lie outside.

Further, it is clear that the hierarchies interact: polysynthetic languages always allow pro-drop of all arguments (Baker 1996), agglutinating languages show a strong tendency to head-finality (although the SVO Bantu languages are an exception) and, as noted above, there are almost no SVO ergative languages. Another major typological strand of the present project is then to investigate the interactions among aspects of the hierarchies, and to see whether any of them can be collapsed.

b. Methodology

The research plan falls into three main parts, which define a logical sequence of tasks. We estimate that the first three years will be spent on the first part, described in §3.1, and of the remaining two, one each on the topics in §3.2 and §3.3.

3.1 Investigating the hierarchies

It should be clear that the details of the parameter hierarchies given in (1) and (6-9) above are largely illustrative. The main task of the project, and of most of the time of the research team working on it, will be to attempt to work out on the basis of cross-linguistic data the precise form of major parts of the hierarchies. This can be done either by starting from a given language and looking at its properties in relation to the hierarchies, or by starting from the collections of structural properties and looking for languages which instantiate them. Both methods will be followed, with data being gathered from secondary sources such as grammars and on-line databases (notably *WALS*, the *Syntactic Structures of the World's Languages* and the University of Konstanz Universals Archive), and, where feasible, primary data from native-speaker judgements of language consultants. The conclusions reached concerning the organisation of the hierarchies will make predictions concerning acquisition, markedness (which can be seen as a predictor of cross-linguistic frequency, although areal and diachronic interferences have to be controlled for) and language change. Concerning change, assuming that language change is driven by language acquisition (see Lightfoot 1979), we predict that, since acquisition “moves down” the hierarchy, changes will tend to “move up”, all other things being equal. Of course, all other things are not quite equal, for at least two reasons: first, since higher positions are more typologically distant, and lower positions closer (since they are distinguished just microparametrically), diachronic movement among higher positions is more difficult than among lower ones; second, the hierarchies interact in the diachronic domain as they do in the synchronic domain. Nonetheless, the hierarchies create certain expectations regarding pathways of change. These, and all the other predictions made by the hierarchies, are fully testable and falsifiable.

The group will investigate the following research questions related to each hierarchy:

I) **Linearization:**

- the nature of disharmonic orders, and the restrictions on these. This follows on naturally from the earlier AHRC-funded project on FOFC (AHRC Grant No. AH/E009239/1 “Structure and Linearization in Disharmonic Word Orders”), but the emphasis is different, since the question is what are the permitted disharmonic orders and how they are ordered in a hierarchy like (1);
- The question of “subharmonies”: do nominal and verbal projections typically split in disharmonic systems?
- The question of “maximal disharmony”: how disharmonic can a system be?
- The particular case of VOS languages (see below).

Since the team will include the participants in the FOFC project, these questions can be dealt with by that subgroup of the team (the PI, consultant, SRA, one Research Associate and one Research Assistant to work on VOS order).

II) **Null arguments:**

- the similarities and differences between radical pro-drop languages and pronominal arguments need to be properly established, and especially the status of the Dravidian languages in relation to the former (in this connection I applied for a British Academy grant for collaboration with linguists in India, intending to establish a regular exchange with linguists in Hyderabad with expertise in Dravidian; unfortunately the

application was unsuccessful, nonetheless the group can pursue the academic links informally over email while seeking further opportunities to fund the collaboration);

- microparametric variation concerning the various “partial” null-subject languages;
- how null subjects and null objects pattern in ergative languages (see §3.2 for more on this point).

Again, four members of the team collaborated on the AHRC-funded project “Null Subjects and the Structure of Parametric Variation” in 2002-7 (grant no. APN14458). A Research Assistant with expertise in either Dravidian or a partial null-subject language (e.g. Marathi, Brazilian Portuguese) will also be assigned this topic.

III) **Word structure:**

- the various natures of fusional systems need to be clarified;
- the relation of “templatic” morphology of the Semitic type to the overall typology;
- the exact status of the Bantu languages also requires clarification;
- Most importantly, following on from work on the AHRC FOFC project, the Hawkins-Gilligan suffixing preference requires empirical and theoretical investigation. This is a topic for one of the Research Assistants.

IV) **Discourse-configurationality:**

- can the idea, mentioned above, that D-related parameters concerning the expression of deixis and definiteness be subsumed in the same hierarchy as parameters concerning A'-movement and scrambling be maintained?
- is it correct that Huang's wh-movement parameter is in fact a matter of PF-realisation of wh-features on D?
- What is the connection between free word order as defined by this parameter, that defined by polysynthesis and that defined by pronominal agreement (note that three parameter hierarchies – word-structure, null arguments and this one -- can give highly similar surface “free-word-order” effects; see also Baker 2001b)?

This area has been less investigated than the previous three, and will require the exclusive attention of a Research Associate for a major part of the project.

V) **Alignment:**

- the detailed microparametric variation concerning types of split-ergative systems needs to be mapped out;
- this hierarchy differs from the others, in that all the properties stem from features of T; however, it is of course possible that “T” really splits into a “tense-agreement-aspect” field, along the lines envisaged by Cinque (1999);
- the possibility that “dative alternations” show parallels with ergative-accusative alignment alternations;
- if language-internal alignment alternations such as passive and causative are due to the optional availability of indirect derivations, then the question of the interaction of these with the general ergative-accusative alignment arises;
- the long-standing question of the diachronic link between ergative alignment and passives, including the idea that many Polynesian languages have undergone a passive-to-ergative change (Hohepa 1969, Hale 1970), and the possibility that split-ergativity in Indo-Iranian is derived from an earlier passive construction (Butt & Deo 2005, Garrett 1990, Harris & Campbell 1995).

As in the case of discourse-configurationality, investigating the alignment parameters will require the exclusive attention of a Research Associate.

3.2. *The cross-linguistic distribution and interaction of macroparametric properties*

As mentioned above in connection with (11), the macro-level parametric choices defined by the parametric hierarchies predict a small number of general types, which ought to be evenly distributed among the world's languages, if areal and diachronic effects can be controlled for. These types cannot, however, simply represent the “first choices” at the top of each hierarchy, since it seems clear that certain macroparametric settings in particular may render others either unobservable or impossible. For example, polysynthetic languages allow all arguments to drop pronouns and show free word order. For this reason, the prediction that languages would show a statistical preference for the least-marked value for all five hierarchies can be

immediately dismissed. Nonetheless, the hierarchies predict certain types to be commoner than others, e.g. the “initial” values for the four hierarchies other than word structure give head-final, radical prodrop, “free word order” and accusative alignment, a constellation of properties we find in many Altaic and Dravidian languages, including Japanese and Korean (although this may be partially an areal phenomenon, and the preference for agglutinating word-structure in these languages needs to be accounted for – see below). The precise nature of these predictions, and their correctness, represent non-trivial empirical questions.

Another clear case concerns the characterisation of agglutinating languages: it may be that, as suggested in Julien (2000), this arises from the movement operations characteristic of surface head-final languages according to Kayne (1994), with the simple proviso that each functional head is realised. Agglutination would then arise from a word-order parameter combined perhaps with a PF realisation parameter, but this possibility should be compared with various possibilities for including agglutination in the word-structure hierarchy. Other interactions include the relation between basic OV order and scrambling, which has frequently been observed, indicating an interaction between word order and discourse-configurationality. Alignment also appears to interact with word order: the striking (near-)absence of SVO ergative languages was commented on above. VOS order is also relevant to linearization, as the obvious Kaynian derivation involves VP-fronting under A-movement, which would lead to ergative alignment, since this is effectively an indirect derivation, but also leads to an apparent FOFC violation. It is possible that the relatively few VOS languages allow nominalised predicates (see Massam 2005), which, given the analysis of FOFC put forward in Biberauer, Holmberg & Roberts (2010), would allow it to be exempt from FOFC. Further, if ergative alignment derives from indirect derivations as described above, agreement-licensed null objects are predicted to be at least as common in ergative languages as agreement-licensed null subjects. These are among the many predictions that the parameter hierarchies make. One question might be whether the interactions are strong enough to justify collapsing some of the hierarchies; this will be investigated if the empirical facts appear to justify it. These topics will be a prime concern of the SRA and the PI, although the whole group has expertise to contribute to these complex questions. Given the general importance of VOS languages, one PhD dissertation will be on this, assuming a suitably qualified candidate is available.

3.3 *Theoretical questions*

In addition to the empirical richness of the predictions and implications of the parameter hierarchies, a number of theoretical issues arise. As mentioned under (C) in §2, the central theoretical question, given both Chomsky’s recent proposals and Newmeyer’s critique of P&P theory, concerns whether the parametric variation we describe, document and systematise through the hierarchies, is specified in UG (as thought in the 1980s and 1990s), or whether it may be derived through “third-factor” considerations as suggested by Chomsky (2005, 2007). The parameter hierarchies are defined by complexity relations: the higher settings are simpler, having a shorter description, than the lower ones. Both this notion of complexity and the acquisition strategy of Input Generalisation (introduced in §1.2(A)) are instances of a general notion of computational conservatism, which we can think of as a facet of computational efficiency. Hence, the form of the hierarchies arises from third-factor properties, while UG leaves certain grammatical properties open. The gaps left open are filled in by Input Generalisation and the mode in which the learner “moves down” the hierarchy, stopping, as stated in §1.2, at the earliest possible point compatible with experience. The form of parameters is thus not specified by UG, but is an emergent property of the interaction of UG, the acquirer and the PLD. The hypothesis to be investigated, then, is that little or nothing about the hierarchies is specified in UG. The form of parameters would thus not be specified by UG, but be an emergent property of the interaction of UG, the acquirer and the PLD. The question is to what extent the hierarchies, once properly elaborated on the basis of empirical testing, will allow these ideas to be maintained. If they do, then another major objection to P&P theory can be overcome.

This conclusion will be fully supported to the extent that this approach to parameters survives the empirical test implied by the detailed working-out of the hierarchies; if the

format for parameters turns out to be more complex, these conclusions will have to be rethought, with the overall consequences that may entail for the approach to parametric variation. Thus we have a strong and falsifiable hypothesis.

Finally, a reconsideration of the formal mechanisms implicated in the five parametric hierarchies is of theoretical interest. Linearisation, discourse configuration and alignment all depend on movement, and so on the distribution of the movement trigger. However, the movement trigger is not really a feature: it cannot be valued, checked or, arguably, counted. Instead it should be seen as a consequence of the fact that merge is not restricted to applying only once: a head may choose to "remerge" part, or all, of its complement, the second-merged occurrence of the complement will inevitably asymmetrically c-command the first-merged one and the head, and so PF will linearise it to the left of the head and delete the first-merged occurrence. A head can only do this once because the system can't count. This, effectively the general option of movement, may be the only contribution UG itself makes to cross-linguistic variation. The null-argument and word-structure hierarchies depend on purely set-theoretic relations among formal features (according to Roberts (2010a,b,c) they are special cases of Agree which can give rise to deletion or incorporation under highly restricted conditions). So variation may really be reducible to primitive properties of Merge, and the general option for choice among formal features.

Again, this is the strongest hypothesis that can be made, and will be tested by the process of working out the details of the hierarchies. These questions will be primarily dealt with by the PI and SRA, in collaboration with the whole team.

4. *Work plan*

The team will consist of four Research Assistants, all of them working on project-related PhDs, two postdoctoral Research Associates, one Senior Research Associate, a consultant (20% employed on the project) and the Principal Investigator (40% employed on the project). The tasks of the individuals in the team will be as follows:

Research Assistant 1: a dissertation on VOS languages in relation to FOFC and alignment patterns.

Research Assistant 2: a dissertation on null arguments either in Dravidian or a partial null-subject language (this student may well emerge from the contact with Indian linguists mentioned in §3.2).

Research Assistant 3: a dissertation on the suffixing preference in morphology.

Research Assistant 4: a dissertation under the joint supervision of Research Associate 1 on some aspect of parametric variation in relation to "discourse-configurationality", if a candidate with relevant language expertise emerges.

Research Assistant 5: a dissertation under the joint supervision of Research Associate 2 on some aspect of microparametric variation in split-ergativity, if a candidate with relevant language expertise emerges.

The Research Assistants will be recruited in October 2011 and October 2012, depending on the availability of suitably qualified candidates in a given year; the positions will be advertised as soon as possible after the start of the grant in June 2011. They will be selected on the basis of recommendations, a sample of written work and, where feasible, an interview with the PI and the SRA. Since it is possible that four suitably qualified candidates will not emerge in the first year, a second round of recruitment is planned for October 2012 and the budget has been organised accordingly. An American-style committee structure is envisaged for the PhD students, with the PI as Chair, and the SRA and at least one Research Associate as co-supervisors.

Research Associate 1: to concentrate primarily on the discourse-configurationality parametric hierarchy, contributing within three years a clearer picture of how the hierarchy is structured. In the last two years of the project, she will work with other members of the team on interactions among hierarchies.

Research Associate 2: to concentrate primarily on split-ergativity, contributing within three years a clearer picture of how the hierarchy is structured, particularly at the microparametric level. In the last two years of the project, s/he will work with other members of the team on interactions among hierarchies.

SRA: to function as project manager, joint supervisor for the PhD students, and mentor for the RAs. Also prime responsibility for the empirical question of the distribution of the major types defined by the hierarchies, and, jointly with the PI, the diachronic and theoretical questions they raise. To collaborate with all other members of the team and coordinate the strands of the project. In charge of day-to-day administration of the project.

It is expected that one of the Research Associate and the SRA posts will be taken by Dr M Sheehan and Dr T Biberauer respectively; these individuals have collaborated since 2002 with the consultant and PI very effectively on both of the AHRC-funded projects mentioned above.

Consultant: Professor Anders Holmberg, Newcastle University, has led two very successful AHRC-funded projects with most of the members of the present team (excluding one Research Associate and the Research Assistants; details of the projects are given above). His input for the first three hierarchies, which feature phenomena and issues partly investigated on the earlier projects, is of vital importance to the success of this project. Moreover, he has worked extensively on the split-ergative Indo-Iranian language Hawrami, and can therefore contribute to the work on the alignment hierarchy.

PI: in overall charge of the project and the contact for the ERC. The PI will also have final responsibility for the activities of the SRA and Research Associates. The PI's research will concentrate on the diachronic implications of the hierarchies and the theoretical questions.

Support: clerical and technical support from the Linguistics Department Secretaries, the Faculty Graduate Administrator, the Faculty Research Administrator, the Finance Clerk and the Linguistics Technician.

In addition to individual and group research, fortnightly group meetings will be held, and weekly meetings among different individuals on a rotating basis. Further, a weekly seminar will be held in term-time, at which invited speakers from outside will present research relevant to the project, alternating with presentations by team members. Finally, weekly Reading Groups on project-related topics involving the entire team will be held during termtime.

Outputs: in addition to 4 PhD theses, as outlined above, at least one major co-authored monograph is expected summarising the goals and central discoveries of the project (Oxford University Press has already expressed an interest in this). Each of the hierarchies will be the subject of at least one co-authored major journal article (in *Linguistic Inquiry*, *Natural Language and Linguistic Theory*, *Language*, etc). In the third year, towards the end of the phase of research on the hierarchies, the project will host an international conference in Cambridge; this will be the subject of an edited collection. A large, multi-volume work summarising the main empirical findings is also envisaged, to be published with either Cambridge or MIT Press in the later stages of the project. Finally, we will maintain a database detailing the ongoing state of knowledge regarding the empirical traits which inform the elaboration of the hierarchies and a website publicising the team's activities and making available draft papers, etc.

5. Conclusion

At its most general, this project can be seen as the first fully systematic attempt to investigate the P&P idea in depth, and to consider its implications in terms both of typology and learnability. The proposal also takes directly from current minimalist thinking the idea that linguistic knowledge derives from three factors: UG, PLD and non-language-specific principles of efficiency and optimality. If the approach described above is correct then parameter hierarchies derive from the interaction of underspecified aspects of UG (first factor), the PLD (second factor) and the manner in which the learner imposes optimisation strategies such as Input Generalisation on the PLD (third factor). In this way, it may be possible for P&P theory to genuinely fulfil its early promise. But the question remains an empirical one: only the investigation of the postulated parametric hierarchies in relation to data from a wide range of languages can provide the crucial test.

6. Funding ID

I currently hold one grant, as follows:

“Structure and Linearisation in Disharmonic Orders”, Arts and Humanities Research Council of Great Britain, Grant No. AH/E009239/1. My role is Co-Investigator (Anders Holmberg of

Newcastle University is Principal Investigator), and local Principal Investigator in Cambridge. Full Economic Cost award of £875,000, 2007-11. The grant was scheduled to end on 30/9/10, but, owing to the departure of an RA in 2008, funding was available to employ the SRA until 31/7/11. However, assuming a start-date for the current grant of 1/6/11, the project will be terminated then and the AHRC duly notified. I can therefore declare that **"There is and there will be no funding overlap with the ERC grant requested and any other source of funding for the same activities and costs that are foreseen in this project."**

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Section 3: Research Environment (max 2 pages)

(see Guide for Applicants – Instructions for completing "Part B" of the proposal)

a. PI's Host institution

The University of Cambridge is one of the leading research universities in the world. As such, it provides an excellent infrastructure for all kinds of research activity. In relation to the current project, the research facilities can be broken down into physical infrastructure, computing resources, library resources, resources for PhD students, and the intellectual background.

Physical infrastructure: since the project will employ three full-time (Senior) Research Associates, at least two offices will be required. This will be provided by the Faculty of Modern and Medieval Languages, in which the Linguistics Department is housed. The current AHRC-funded project has one large dedicated office; it is expected that this office and one other like it will be made available to the staff working on the project (including the PI and consultant).

Computing resources: the Faculty and the Linguistics Department will provide those employed on the project with relevant state-of-the-art desktop and/or laptop computers (both IBM and Macintosh are supported); all Faculty offices have high-speed internet connections. Through the University Library, nearly all current and past linguistics journals are available electronically, as are the major databases such as the *World Atlas of Language Structures* (<http://wals.info/>), *The Syntactic Structures of the World's Languages* (<http://sswl.railsplayground.net/>) and the Konstanz University database of universals (<http://typo.uni-konstanz.de/archive/intro/>).

Library resources: Cambridge University Library is one of four deposit libraries in the UK, holding all UK publications. Partly because of this and partly because of a traditionally very generous acquisitions policy, the Library has excellent holdings in all areas related to Linguistics. Most importantly for the present project, these holdings include numerous grammars of languages from all over the world. This clearly represents an invaluable resource for the present project. In addition to the University Library, there are College, Faculty and Departmental libraries, which in many cases offer access to hard-to-find grammars and other relevant linguistic resources. Finally, the University Library's online catalogue is linked to the following libraries worldwide: the Catalogue collectif de France, the Deutsche Bibliothek Database, LibDex (an index to 17,000 University, Further Education and Public libraries worldwide), the Library of Congress, the Karlsruhe Virtual Catalog, the National Library Catalogues Worldwide, WorldCat (OCLC) and The European Library.

Resources for PhD students: the PhD students will be fully integrated into the Linguistics Department and MML Faculty. As such, they will have access to the Graduate Centre (a study area reserved for graduates equipped with state-of-the-art computers and printers), Faculty, Department, College and University Libraries and the research training programmes provided by both the Linguistics Department and the MML Faculty (on the latter see http://www.mml.cam.ac.uk/gradstudies/grad_training/programme_2009-10.html).

Additionally, the project team will provide thesis committees, on the North American model, for the PhDs. Each student will have a three-member committee, consisting of the PI, the SRA and one of the Research Associates; normally one of these will be student's designated supervisor, although all three will actively participate in guiding the students' research and in general mentoring. It is also expected that PhD seminars will be offered on topics connected

to the project; these will be required for the Research Assistants funded through the project and open to other interested PhD students in the Department and Faculty.

The intellectual background: as mentioned in §1(a) above, the Research Centre for English and Applied Linguistics (RCEAL) will merge with the Linguistics Department in 2011. RCEAL's staff includes John Hawkins, one of the world's leading typologists, and James Blevins, an internationally known morphologist and typologist; these individuals will be part of the new Department of Theoretical and Applied Linguistics and thus the direct colleagues of the members of the research team. In addition, there are many linguists in Cambridge who are not affiliated to the Linguistics Department. We intend to involve these linguists as much as possible in the project's activities (Reading Group, seminars, conference, student supervision, etc.). Ted Briscoe, leader of the computational linguistics group at the Computing Laboratory, and an expert in categorial grammar, formal semantics and evolutionary linguistics; Geoffrey Horrocks, James Clackson, Thorsten Meissner and Rupert Thompson in the Classics Faculty, all experts in various aspects of Indo-European linguistics; Geoffrey Khan and Amal Marogy (Semitic linguistics), Boping Yuan (Chinese linguistics) and Vincenzo Vergiani (Sanskrit) in the Faculty of Asian and Middle Eastern Studies, and Paul Russell, a leading expert on the Celtic languages. In the Modern and Medieval Languages Faculty, each language department has a linguist expert in the structure and history of that language; these include notably Adam Ledgeway in Italian and Ioanna Sitaridou in Spanish and Portuguese. Finally, in the present Linguistics Department, David Willis is an expert on both Celtic and Slavonic languages, Bert Vaux is one of the world's leading experts on Armenian, with a good knowledge of some Caucasian languages (e.g. Abkhaz), Sarah Ogilvie, a Research Fellow at Lucy Cavendish College affiliated to Linguistics, is an expert on Australian languages, Anna Kibort, a British Academy Post-doctoral Fellow, is a native-speaker of Polish, and Luna Filipovic, another Post-Doctoral Fellow, is a native speaker of Serbian. Finally, another Post-Doctoral Fellow, Stephen Pax Leonard, is an expert on Greenlandic Eskimo and also speaks Faroese. All this expertise will contribute directly and indirectly to the project team's work, as well as to the general linguistic education of the Research Assistants. One direct way of bringing together the linguistic expertise Cambridge has to offer is through the Cambridge Institute for Language Research (CILR); in the past workshops related to ongoing research projects have been successfully held, and the same, on a larger and more regular basis, is envisaged for the current project.

Taking these factors together, it can be safely claimed that Cambridge provides an excellent environment for the pursuit of a research project of this type by this particular constellation of individuals.

Subcontracting: "The use of freelance experts either as in-house consultants or as external consultants may be considered to be subcontracts or a form of personnel costs depending on the terms and conditions of the agreement between the expert and the beneficiary. For further explanations see the Guide for ERC Grant Holders and its section dedicated to Financial Issues."

As stated above, we intend to engage the services of Professor Anders Holmberg of Newcastle University, as a freelance expert. Holmberg has led two very successful AHRC-funded projects with most of the members of the present team (excluding one Research Associate and the Research Assistants; details of the projects are given above). His input for the first three hierarchies, which feature phenomena and issues partly investigated on the earlier projects, is of vital importance to the success of this project. Moreover, he has worked extensively on the split-ergative Indo-Iranian language Hawrami, and can therefore contribute to the work on the alignment hierarchy.