International Symposium on Polysynthesis in the World's Languages
February 20-21, 2014
NINJAL, Tokyo

What are the limits of Polysynthesis?

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Of the various labels for morphological types currently in use by typologists 'polysynthesis' has proved to be the most difficult to pin down. For some it just represents an extreme on the dimension of synthesis (one of Sapir's two major typological axes) while for others it is an independent category or parameter with far-reaching morphosyntactic ramifications. A recent characterization (Evans & Sasse 2002: 3f.) is the following: 'Essentially, then, a prototypical polysynthetic language is one in which it is possible, in a single word, to use processes of morphological composition to encode information about both the predicate and all its arguments, for all major clause types [....] to a level of specificity, allowing this word to serve alone as a free-standing utterance without reliance on context.' If the nub of polysynthesis is the packing of a lot of material into single verb forms that would be expressed as independent words in less synthetic languages, what exactly is the nature of and limitations on this 'material'? The present paper investigates the limits – both upwards and downwards – of what the term is generally understood to cover.

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Polysynthesis in Ainu

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Ainu is a typical polysynthetic language in the sense that a single complex verb can express what takes a whole sentence in most other languages. A single verb form may include more than one heavy element: up to two applicative prefixes (out of three), two causative suffixes (out of five), two incorporated objects, one lexical prefix (out of two originating in nouns 'head' and 'bottom'), one verbalizing suffix (originating in the verb 'make'), as well as reciprocal, reflexive and general object (=antipassive) prefixes and agreement affixes for the first/second person subject and object. The degree of combinability of various voice markers and noun incorporation is spectacular. For instance, in (1), a transitive verb *suy-pa* 'sway sth (PL)' contains one incorporated object, one verbal modifier, two reflexive and two applicatives prefixes.

(1) *usa-oruspe* *a-e-yay-ko-tuyma-si-ram-suy-pa*
various-rumor 1PL.INC-about.APPL-REFL-to.APPL-far-REFL-heart-sway-PL
(lit.) 'We keep swaying our hearts afar and toward ourselves over various rumors.'
= 'We wonder about various rumors.' (Chiri 1974 [1936]: 169)

Nevertheless, it has been claimed that Ainu deviates from more typical polysynthetic languages such as Mohawk in that it has less freedom of word order, interrogative phrases in situ, and unrestricted morphological causatives (Baker 1996). The present paper aims to distinguish what Ainu shares with other polysynthetic languages from what is truly unique to Ainu.

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A Classification of Ainu Noun Incorporation and its Implications for Language Typology

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The Ainu noun incorporation (NI) can be classified into the four major types: object NI (*ku$_1$-**turep$_2$**-ta$_3$* 'I$_1$ dig$_3$ up$_3$ **wild$_2$ lily$_2$ roots$_2$**') (85.9%), intransitive (natural force/phenomenon) subject NI (***sir$_1$**-pirka$_2$* '(The) **weather$_1$** is$_2$ good$_2$.') (6.8%), intransitive (possessor-requiring) subject NI (***tek$_1$-e$_1$**-pase$_2$-as$_3$* lit. 'We$_3$ were$_2$ heavy$_2$-**hand$_1$**(ed)', =were old, ***-e*** is a possessive suffix) (5.6%), and transitive (natural force/phenomenon) subject NI (*ku$_1$-**koy$_2$**-yanke$_3$* 'I$_1$ am$_3$ **wave$_2$**-raised$_3$') (1.7%). This distribution can be accounted for in terms of the interaction between a number of restrictions and principles on incorporation, such as subject incorporation restriction, referentiality restriction, semantic discrepancy restriction, backgrounding principle, and reflexive interpretation rescue principle (Sato 2012). What is important is that while this distribution exhibits a hierarchy of accessibility to NI in Ainu, there is also a conspicuous gap in it: possessor-requiring noun "object" NI proper does not occur in Ainu, e.g. only *ku$_1$-**tek$_2$**-sini$_3$-re$_4$* 'I$_1$ let$_4$ **(my)** hands$_2$ rest$_3$', but not ***ku$_1$-tek$_2$-e$_2$-sini$_3$-re$_4$*** ('I$_1$ let$_4$ **(somebody's)** hands$_2$ rest$_3$' , ***e-*** (POSS)) is possible. This gap is in fact compensated by an idiomatic phrasal verb construction consisting of a fixed possessor-requiring object and transitive verb (*i$_1$-**par$_2$** a$_3$-o$_4$-yki$_5$* lit. 'People$_3$ cook$_5$ at$_4$ my$_1$ mouth$_2$',=feed me), which can be seen as a subtype of quasi-incorporation (QI) as discussed in Booji (2009).

The case of Ainu NI suggests that NI and QI are not essentially unrelated phenomena, but rather should be unified as a means for including a nominal concept into a single (either a word or not), closely-knit verbal complex; QI comes into play only after all possibilities in the NI hierarchy are exhausted.

NI hierarchy: O > S (natural force) > S (possessive) > A (natural force) > O (possessive)
Ainu: ----------
Japanese: ?---
QI as a means for filling in the lower (inaccessible) positions in the NI hierarchy

Apparently, Japanese and Ainu are completely different. In Japanese, NI is peripheral, while QI (*shigoto-suru* 'to do work') exists as a productive type. In Ainu, on the other

hand, NI is productive, while QI is rather limited. Furthermore, Japanese QI exhibits a simple 'object + vt' type, whereas Ainu QI exhibits a marked 'possessor requiring object + vt' type. However, these profound differences can be explained by the above-mentioned hierarchy: since in Japanese even an 'object + **vt**' type located in the highest position of the NI accessibility hierarchy, is highly problematic (e.g. *na-zuku* 'to give a name'), QI turns out to be the last resource to combine a nominal concept with a verb in a tighter fashion. This contrasts with Ainu, in which the NI accessibility extends further into the 'A (natural force) + **vt**' type. Thus, QI appears later at the 'possessor requiring object + **vt**' position, which is inaccessible to the NI in Ainu. I have shown that Ainu, with its rich NI as well as QI, is of great importance for constructing a more general morphosyntactic hierarchy for language typology.

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Chasing the Essence of Polysynthesis

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Polysynthesis, a tendency toward many morphemes per word, is especially interesting for its potential correlations with syntactic structure. It appears that those morpheme types with the strongest interactions with syntax contribute to *holophrasis* in the narrow sense, the combination of the essential components of the clause into a single word: the predicate, all core arguments, and perhaps markers of argument structure. But holophrasis is not an either/or matter: the crucial morphological structures vary in detail and through time, developing via various possible pathways. Some languages contain full sets of pronominal affixes for all core arguments for example (Chumashan, Eskimo-Aleut), others for first and second persons but only some third (Iroquoian, Athabaskan), and still others for just first and second (Siouan, Muskogean). Some languages have elaborate, productive inventories of valency-changing affixes such as applicatives, while others have fewer or none. These constructions, too, can develop via various routes, from various their sources, through various sequences of processes of grammaticalization. Here it is shown that attention to differences among systems in detail and to the different processes by which polysynthetic structures develop can bring us closer to defining a useful polysynthetic type and understanding the reasons behind its syntactic correlates.

The polysynthetic nature of Salish

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The Salishan languages, spoken (or formerly spoken) on the Northwest Coast of North America, are usually characterized as "polysynthetic" by different scholars studying them. The number of morphemes within a (morphological) word, however, does not get as high as, for example, the Eskimoan languages.

Salish certainly shows many of the usual characteristics that cluster together in polysynthetic languages; it is head-marking and agglutinating in word formation; predicate morphology is rich and includes transitivity and valency altering suffixes, pronominals, lexical affixes, markers of tense/aspect, plurality, diminutives, and still others. Although the average number of morphemes in a word does not appear to be high, the morphology that predicates shows certainly agrees with the label "polysynthetic". Another important aspect of polysynthesis seems to be the flexibility of word in its form, that is, a word is not fixed as regards the number of syllables contained, as in the case of (ancient) Chinese, or the number of morphemes it is composed of. A word in polysynthetic languages can be short, conveying very simple meaning, or very long with complex and elaborated meaning. For non-obligatory categories, speakers have choices as to what to include in a single word; many concepts can equally well be expressed analytically. This alternation of analytical versus synthetic structuring of phrases and clauses is well-attested in Salish.

The role of polysynthesis in Nuuchahnulth morphosyntactic structure

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This paper examines the distribution and function of polysynthesis in Nuuchahnulth (Wakashan; British Columbia, Canada). Nuuchahnulth shows a prototypical example of polysynthesis in that it involves holophrasis, i.e., the verbal predicate can stand alone as independent clause. The language does not exhibit compounding and is almost exclusively suffixing. The basic structure of a Nuuchahnulth verbal word can be schematized as follows: root–lexical suffix–aspect–derivation–inflection. Numerous (over 500) lexical suffixes provide a mechanism for bringing multiple lexically heavy morphemes into a word. However, the complexity of actual polysynthetic words in Nuuchahnulth seems rather limited: it is very rare to find words containing more than three lexical suffixes.

There are interesting cases where similar semantic content can be expressed either synthetically using a polysynthetic word or analytically as separate words, which reveals important aspects of the function of polysynthesis in Nuuchahnulth. Typical cases of this are transitive events where the semantic object can be expressed either within the polysynthetic predicate or as a separate word. In such cases, discourse-pragmatic considerations, particularly the referential properties of the object, play a major role in the choice of construction.

"Polysynthesis" in Haida

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Haida, a language isolate spoken in Haida Gwaii (or the Queen Charlotte Islands) off the northwest coast of Canada and in southeastern Alaska, has been labeled a polysynthetic language by Boas (1911), Sapir (1921), and other linguists. At the core of Haida's verbal morphology is a large inventory of verbal elements, which are divided into pre-verbal (mainly prefixes) and post-verbal elements, including derivational suffixes and (inflectional) endings. Many of the derivational suffixes have relatively concrete meanings such as "into water" or "before leaving"; the verb form with derivational suffixes can express an idea that would ordinarily necessitate more than one independent word in a less synthetic language. The endings denoting tense, aspect, and mode are categorized into nine groups (or slots) according to where they occur in a verbal structure.

However, it is doubtful whether Haida can be characterized as a polysynthetic language in a strict sense. Haida deviates from typical polysynthetic languages in that a verb form does not encode core arguments of a clause; consequently, the verb cannot function as a complete clause without lexical items. It lacks productive noun incorporation, while lexicalized noun-verb compounds are sporadically observed.

When we look at texts provided by present-day speakers, we rarely find a word that is constructed in a very complicated manner. This may be ascribed to the fact that present-day speakers tend to prefer analytic expressions with independent lexical items, which are nearly equivalent to synthetic expressions with derivational suffixes. It should also be noted that semantic factors play a significant role in constraining combinations of verbal elements: while verbal elements occupy different positions in a verbal structure, that does not mean they can appear concurrently in the same word because of the meanings they denote.

Explaining the origin and geography of polysynthesis

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Abstract: International Symposium on Polysynthesis, Feb. 20-21, 2014, NINJAL

Polysynthetic languages are much more frequent around the Pacific Rim than elsewhere. Is this a founder effect? inherited from an otherwise irretrievably ancient ancestor? A typological survey gives a very different answer. I survey 296 languages, well distributed genealogically and geographically, divided into two populations: Greater Pacific Rim (=the Americas, coastal Northern Asia, and Oceania plus northern coastal New Guinea; based on the Autotyp Geography [Nichols, Witzlack-Makarevich, Bickel 2013]) and elsewhere.

I define polysynthesis as **open head marking**: unlike ordinary (closed) head marking, the open type is not restricted to a fixed set of inflectional paradigms, or a fixed set of arguments, or to arguments in general, or to pronominal markers. In one or another language this may mean object noun incorporation, or person-marking slots for non-arguments, or adjunct incorporation, etc. This definition is broad enough to subsume all the more specific definitions of polysynthesis (e.g. holophrasis; possibility of indexing many, or all, clause members on the verb; incorporation; extreme degree of verbal synthesis; minimal or no distinction between inflection and derivation; inflectional forms of the verbs do not fall into delimited, fixed paradigms and are not, in a word and paradigm approach, selected from a lexicon but are created by the speaker; etc.) and capture the consensus of the field as to which languages are polysynthetic.

The higher frequency of polysynthesis in the Pacific Rim proves highly significant in this survey. I then survey a number of other typological variables (including most of the good Pacific Rim markers such as inclusive/exclusive pronouns, noun incorporation, head marking, numeral classifiers, etc.) to determine whether any of these variables are significantly different in frequency between polysynthetic and non-polysynthetic languages **within** the Pacific Rim population. The answer is basically no: apart from the polysynthesis itself, polysynthetic languages are very garden-variety exemplars of their larger population.

While not as clear a singularity as clicks in southern Africa, polysynthesis is a near-singularity of the Pacific Rim and bears the same kind of explanation. The languages of Africa have, collectively, very high elaboration and frequency of contrastive airstream mechanisms in consonants; clicks are an extreme airstream elaboration; and the extreme degree of elaboration could have evolved only in the context of already-great elaboration. Similarly for polysynthesis: it is an extreme degree of head marking and could only have arisen in already head-marking languages and can flourish only in a language population including many head-marking languages, such as the Pacific Rim population. But, though relatively common, since it is an extreme development it is not absolutely common even there.

Thus polysynthesis is a consequence and concomitant of head marking and can be expected to arise from time to time in a language area where head marking is favored. The Pacific Rim population is large enough that these occasional spontaneous developments add up to a fair number.

Noun Incorporation-like phenomena in Japanese: At the crossroads of polysynthesis and agglutination

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Despite Baker's (1996) polysynthesis parameter that holds that Noun Incorporation (NI) is a distinctive trait of polysynthetic languages, Japanese, an agglutinative language with no person/number agreement between verb and subject or object, exhibits a variety of NI-like phenomena (including what Shibatani and Kageyama (1988) called "post-syntactic compounding") whose behavioral properties closely resemble the "genuine" NI in polysynthetic languages. In terms of the degrees of verbal synthesis, then, Japanese is located halfway between isolating and polysynthetic languages. Focusing on NI-like operations in Japanese that productively create Noun-Verb complexes in syntactic rather than lexical structure, this paper will attempt to clarify similarities and differences between "genuine" NI in polysynthetic languages and its kin in Japanese. Specifically, it will be suggested that two kinds of elements must be sharply differentiated in elucidating the nature of the phenomena: (i) behavioral properties of incorporated nouns that are observed as a result of incorporation such as their argument-structural restrictions and referential properties in discourse, and (ii) substantial motivating factors that trigger the NI and NI-like operations. Although the behavioral properties (i) do not diverge significantly between polysynthetic NI and Japanese NI-like phenomena and therefore are likely to be attributed to certain universal principles of human language, the motivating factors (ii) crucially differ. In contrast to polysynthetic NI, which is supposed to be triggered by a rich agreement system, the productivity of Japanese NI-like processes appears to be contingent on the "non-finiteness" of head verbs, forming a gradient of "incorporability". The least productive is the type "N + Tensed Verb" (e.g. *ki-zukau* (attention-pay) 'pay attention'), and the most productive is the type "N + non-finite Verbal Noun" (so-called "post-syntactic compound" such as *tosho-koonyuu (no sai)* 'in purchasing books'). In the middle ground will be the type "N + gerundive V" (e.g. *tegusune-hii-te* (hand.ointment-apply) 'being ready') and the type "N + adnominal verb" (e.g. *michi-yuku (hito)* (street-walk (person)) 'passerby').

Was Old Japanese a Polysynthetic Language?

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Polysynthesis is sometimes regarded as a matter of degree, determined by the number of traits satisfied by a language on a typological checklist including items such as noun incorporation, verbal crossreferencing of arguments, and valency changing morphology such as applicatives and causatives, and a high index of agglutination. This paper examines the following five arguably "polysynthetic" traits of OJ, using data from the Oxford Corpus of Old Japanese (OCOJ)

1. Apophonic/non-apophonic NI) in finite verbs with rendaku (voicing assimilation) (Russell 2012)
2. Apohonic NI without rendaku
3. Pseudo noun incorporation (Yanagida 2007a, b)
4. The "prefixes" *i-* (active/ergative?) and *sa(N)-* (absolutive?) (Yanagida 2007b)
5. Preverbal reciprocal *api*

All of these traits are lost in subsequent varieties of Japanese. (1) survives in lexicalized form and (5) has been replaced by the suffixal reciprocal *–aw-*. (4) is already fossilized at the OJ stage, but the surviving evidence suggests that the "prefixes" *i-* and *sa(N)-* were pronominal clitics.

The OJ trait most distinct from modern Japanese is the existence of pseudo-NI (Yanagida 2007a, b). We compare the OJ pseudo-NI pattern to the well-studied cases of Niuean (Massam 2001) and Hindi (Dayal 2011), and address the issue of how pseudo-NI relates to a structural account of polysynthesis.

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Polysynthesis in Alutor

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Alutor is a Chukchi-Kamchatkan language, spoken in Northeastern Siberia. It is closely related to Chukchi, which is often referred to as a polysynthetic language in the literature. Alutor is a double-marking language: the agent NP of the transitive verb is marked by the ergative case and the object NP by the absolutive case; the verb includes affixes cross-referencing each argument. Thus any verbal form can stand as an independent clause. Alutor exhibits productive word formation by compounding and incorporation: NN (***aŋqa+ɣərnik*** *sea + animal=sea mammal*), VN (***java+ʕətʕ-*** *use + dog = sled dog*), VV (***oji+ʕanqav-*** *eat + stop = stop eating*), and NV (incorporation). A verbal stem may incorporate a nominal stem as the transitive object (***pulatka+vut-*** *tent + tie = build a tent*), intransitive subject (***arɣiŋ-ɣala-*** *rain + pass = the rain has passed*), location (***rattu+jp-*** *bosom + put on = put in one's bosom*), and instrument (***wannə+svi-*** *tooth + cut = cut by using with teeth*). Some adjectival stems can be attached before verbal stems as adverbial modifiers (***meŋə+oji-*** *big + eat = eat a lot*). In contrast to Chukchi and Koryak, in Alutor nouns indicating humans cannot be incorporated. Affixation is also used productively in word formation: there are aspect markers, valency changing affixes (causative and antipassive), diminutives etc. Furthermore, there is at least one 'heavy' morpheme ***k-*** bearing the noun-like meaning of 'child', which is attached before the verbal stem to indicate the direct object, and also some 'heavy' morphemes with verb-like meanings such as ***ta-N-ŋ*** 'to make **N**', ***N-u-*** 'to consume N', ***N-ŋta-*** 'to fetch N', and ***N-ɣili-*** 'to search for N', which are attached after nominal stems to derive intransitive verbs.

Nivkh polysynthetic features within and across clauses

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Nivkh (Paleosiberian) is characterised by the whole range of typical polysynthetic traits listed in (Mithun 1988, Fortescue 1994, 2007, Evans & Sasse 2002, Bickel & Nichols 2007). The language features a large inventory of bound morphemes, an abundant number of verbal morphological slots, a dependent-head noun-verb synthesis similar to noun incorporation, encoding of object and some adverbial concepts on the verb, a systematic allomorphy of bound and free morphemes (Mattissen 2003).

On the other hand, Nivkh lacks such polysynthetic properties as encoding of subject through pronominal affixation, adverbial-type affixes, as well as non-configurational syntactic structure. Furthermore, Nivkh does not avoid non-finite clauses, which is typical of polysynthetic languages, cf. (Mithun 1984, Baker 1996), but, on the contrary, displays a highly developed system of non-finite converbs that are used for clause combining in various types of paratactic constructions.

My paper focusses on the issues that have attracted less attention in the discussion of Nivkh status as a polysynthetic language. I am going, first, to examine Nivkh holophrastic verb complexes as possible indicators of core polysynthesis, cf. (Fortescue et al. 2012), and, second, to compare how polysynthetic features or their absence manifest themselves in verbal complexes that are attested in matrix and embedded clauses respectively.

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Ket Polysynthesis

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The Yeniseian family contains the severely endangered Ket, along with several vanished sister languages. Two of the family's primary branches, including modern Ket and the now extinct Kott, were documented to a degree that permits reconstruction of the Proto-Yeniseian verb template, which appears to have persisted relatively unchanged for at least 1,500 years. The complex prefixing structure of the Ket verb is typologically distinct for Northern Asia. Conjugated verb forms adhere to a rigid-position class model consisting of a root-like base, eight prefixes, and one suffix. Prefix positions 5 and 7 contain lexical morphemes that create a discontinuous stem together with the base. The other position classes contain tense-mood or subject/object markers, which are typically interdigitated among the three lexical positions. Inflectional categories are limited to past and non-past indicative vs. imperative mood, and subject/object agreement in person, number and class (3rd person masculine, feminine, or inanimate). The choice of tense-mood affixes as well as a particular stem's positional configuration of subject/object markers is lexically determined. Ket has six productive tense-mood classes, five intransitive agreement configurations, and three transitive configurations. This talk assesses Ket verb structure in light of its historical development.

Polysynthesis in Mixe-Zoquean languages

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Mixe-Zoquean languages include 14 languages belonging to two different branches, the Zoquean branch and the Mixean branch. The languages are spoken in the south of Mexico. All of them include most of the traits of OV languages, although only few of them have a rigid AOV order. All of these languages are highly polysynthetic with a very complex verbal template with include morphology conveying aspect, mood and modality, person, number, valence operators, directionals, auxiliaries, nominalizers and lexical affixes. Nominal and adverbial incorporation is highly productive, including rare types of nominal incorporation, like agent of transitive verbs. Some languages allow serial verb combinations of up to five verbal roots. All the languages are head-marking, hierarchical and ergative. Within the Zoquean branch, double marking is attested in some languages, and within Mixean branch, all the language show inverse morphology. Mixe-Zoquean languages have been in contact with Mayan, Uto-Aztecan, Huave, Otomanguean and Totonacan for more than thirty centuries and with Spanish for last five centuries. Recent work has collected pieces of evidence that several of the polysynthetic features of Mixe-Zoquean have been borrowed by neighboring languages in the same way that morphosyntactic features of neighboring languages have been borrowed by Mixe-Zoque.

Polysynthesis in Northern Australian languages

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Polysynthetic languages in Australia are all found in the 'Top End' region, distributed over three regions and/or genetic groupings, all non-Pama-Nyungan: the Daly River region (Murrinh-Patha, Ngan'gi-Tyemeri), the isolate Tiwi on Bathurst and Melville Islands to the north of Darwin, and the Gunwinyguan family of around ten languages centred on Arnhem Land and nearby Groote Eylandt. Altogether around a dozen languages of Northern Australia exhibit strong polysynthetic traits.

In this talk I will focus on these three groups of languages, with particular reference to

(a) setting them in the context of the head-marking languages which surround them, which typically have a double-indexing system of pronominal prefixes (possibly augmented by encliticised pronouns), and suffixal TAM inflections, but no noun or adverbial incorporation and a more sober inventory of applicative affixes.

(b) with regard to North Australian polysynthetic languages, looking at which typological characteristics they share and which they don't share, and examining what implications this has both for theories of which traits are linked in polysynthetic languages – I will focus in particular detail on the range of semantico-syntactic roles available for incorporated nouns, on the richness of the applicative system, and on the availability or otherwise of specific subordinating mechanisms

(c) looking at some for diachronic scenarios for the rise and fall of polysynthesis and what it implies about genetic groupings. Topics to be examined here include

(i) the very recent increase in morphological complexity in Ngan'gi-Tyemeri (likely within the last century) achieved by fusing a morphologically complex light verb and a simpler lexical verb into a single unit, trapping body part nouns between them,

(ii) the possibility that at least some non-polysynthetic languages (such as those of the Iwaidjan family) have reduced their morphological complexity through freezing an older and more productive system of noun-verb compounding so that incorporation is no longer productive

(iii) the intriguing likelihood that some of the morphological complexification within Gunwinyguan polysynthetic languages has occurred though expansions at the heart of the verbal word (e.g. by turning suffixes piggybacking incorporated nouns into applicatives) rather than at the word edge, and

(iv) bringing data from other typological features to bear on the question of whether the striking parallels between Tiwi and Gunwinyguan polysynthetic structures are independent innovations or shared retentions.